

The New Enclosures of the Mind



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You can fool some of the people all of the time; and, all of the people some of the time; but, you can't fool all of the people all of the time... However, you may be able to persuade enough of the people to monitor everyone all of the time.

Over 30 years ago, Oxford ethologist, Dr. Richard Dawkins, took sabbatical leave to write *The Selfish Gene*², one of the most disturbing books in a time of many disturbing books. Dawkins espoused the theory that human evolution is nurtured by numerous forces -- the gene, or DNA -- being only one. Human beings, Dawkins speculated, could evolve cultural memes³ capable of Darwinian replication. It was an outlandish concept without "coat tails" -- at least that chapter of his book didn't attract many followers.

ETC Group would have given the idea of cultural memetics a pass were it not for a high-level meeting of US government officials, scientists, and industry held in Washington three months after 9/11 that made research into cultural memetics a priority. Then, two years later, a book by Britain's much-respected Astronomer Royal brought us back to memetics with his concern that it may be possible to medicate social attitudes and manipulate human nature.

But, the most compelling reason to track this potentiality is because it makes sense. If, as the UN University's 2005 State of the Future Report⁴ suggest, we are entering the era of the Massively Destructive Individual - where anyone, anywhere could be devastatingly violent, using anything - then massive surveillance is, at best, a partial response. Aggressive surveillance will elicit a massive social reaction. Better than surveillance is surrender. If society can be cajoled into surrendering its information than the likelihood of a successful defense increases. Better still, if society can be convinced to surrender control over its own actions, then the world's dominating corporate/government partnership can sleep at night. Civil society needs to dissect the logic and the feasibility of all this...

Massively-destructive individuals:

In 2003 Dr. Martin Rees, then Britain's Astronomer Royal and now the President of the Royal Society, made a bet that, by 2020, bioterrorism or Bio error will kill one million people. Rees stresses the importance of the individual as the new threat to our security. "We are entering an era," the astronomer says, "when a single person can, by one clandestine act, cause millions of

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² DAWKINS, Richard: *The Selfish Gene*. Oxford University Press, 1976. (second edition, 1989). See, especially, Chapter 11 and the endnotes to Chapter 11 written in 1989.

³ memetics: is a neodarwinian approach to evolutionary models of cultural information transfer based on the concept of meme (Dawkins used the term "meme" to describe a unit of human cultural transmission analogous to the gene, arguing that replication also happens in culture.) Memetics has turned into an approach in the study of self-replicating units for culture. It has been proposed that just as memes are analogous to genes, memetics is analogous to genetics.

⁴ GLENN, Jerome C. y GORDON, Theodore J.: *State of the Future*, United Nations University. 2005. <http://www.millennium-project.org/millennium/sof2005.html#Table>

deaths or render a city uninhabitable for years”⁵ Suicide bombers, for example,- the "conventional" individual instrument of mass destruction -- were almost unheard of in 1975 but there were 43 in 2000, almost one a day in 2005 and considerably more than that today. ⁶

Martin Rees and the United Nations University warn us to fear our neighbors... “... the nuclear threat will be overshadowed by others that could be as destructive, and far less controllable,” the President of the Royal Society advises, "These may come not primarily from national governments, not even from "rogue states," but from individuals or small groups with access to ever more advanced technology. There are alarmingly many ways in which individuals will be able to trigger catastrophe.”⁷

Of course, Rees is right. But, the political policy effect of the Massively-Destructive Individual is for society to surrender its rights to government and accept universal surveillance. If anyone can do anything then government will demand the authority to do anything to anyone.

Anything anywhere: The capacity to turn almost anything into a weapon has expanded enormously with the recent development of nano-scale technologies. Nanotechnology builds up from the level of atoms and molecules to create new materials with new properties - giving more credibility to the threat of MDIs. At a nanotech trade show in St. Galan, Switzerland in 2005, a company selling bulk nanocarbon tubes -- the poster child of the new technology -- told Hope Shand of ETC Group that his company only shipped the nanotubes a couple of kgs at a time since, in larger quantities, they tended to explode.⁸ So what? According to one of the most watched videos on the Internet, if you drop Mentos Mints into a 2 L bottle of Diet Coke, it too will explode.⁹ Yet, nanoparticles are something more than a school canteen joke. Aluminum oxide (an old-fashioned chemical compound long used by dentists to repair cavities is totally benign at the macro-scale but, at the nano-scale, it explodes and is being used by the U.S. Air Force to ignite bombs.¹⁰ (The difference between macro particles of aluminum oxide and nanoparticles is the difference between nice teeth and no teeth!) Another presumably benign material, gold - used in rings and earrings not only for its beauty but because it is so innocuous - is used as a catalyst when the gold molecule is between eight and 24 atoms in size, because it then becomes reactive. Above or below this number, gold is its usual passive self. If you have to choose between gold, aluminum oxide, Mentos Mints and Coke, only Coke can't be carried onboard an aircraft, due to new security regulations.) The point is that with nanotechnology it is not possible to rule out any conventional chemical compound as a potential weapon. This fact alone changes almost everything in defense strategic planning.

The corollary to ubiquitous explosives is that new communications technologies make it increasingly likely that almost anyone might be an individual of mass destruction. “Although modern technology allows instant worldwide communication,” Martin Rees warns, “it actually makes it easier to survive within an intellectual cocoon.” “...beliefs [are] reinforced by selective

⁵ REES, Martin: Our Final Hour -- A Scientist's Warning: How Terror, Error, and Environmental Disaster Threaten Humankind's Future in This Century On Earth and Beyond. Basic Books. 2003.

⁶ Scientific American: "Fast Facts, Suicide Bombers", January, 2006. citing : Scott Atran, the Jean Nicod Institute, CNRS; Bruce Hoffman, RAND Corporation.

⁷ REES, Martin: *ibid.* page 4.

⁸ Personal communication with Hope Shand, ETC Group Research Director following her presentation at the Nano-Fair in St. Galan, Austria in 2005.

⁹ The Economist, "The newspaper industry More media, less news" Aug 24th 2006.

¹⁰ PowerPoint presentation made by Tracy Hester, lawyer, at "Nano Days" at CBEN, Rice University, Houston, Texas, October 2004.

electronic contact with other adherents...”¹¹ As unhealthy as this might be for the individual - and dangerous to society -- it provides governments with an excuse for intrusive surveillance.

Massively-monitored societies (MMS):

Civil society’s concern about surveillance is deep, historic, and fetishist. Although some of us - mostly in social movements in the Global South -- have legitimate reason to be wary (farm and indigenous leaders, trade unionists, and investigative journalists do get killed, after all) -- many of us in the North would be more dismayed if we were not monitored -- not sufficiently important -- not so strategically engaged -- as to warrant surveillance. The point here is not that surveillance is unimportant or that it is not threatening and debilitating to social justice -- but, that in the future, surveillance will be largely replaced by surrender.

The same year Richard Dawkins completed *The Selfish Gene* - the United States joined with Britain, Canada, and Australia to establish *Echelon*, a global telephone surveillance system.¹² Even at the time, most of us in civil society realized that there is a great difference between tape recording everything and being able to listen to - and make sense out of - anything. That time has passed. *Echelon* can now do both. And that's just the beginning...

In almost perpetual motion overhead, satellites and, even, lowly airplanes, equipped with remote-sensing devices, monitor national sovereignty, high-flying toxins, errant fishing trawlers, drug traffickers, and economic refugees. Today's infrared cameras register the signature of someone who has been in a coat or a bed several hours previous. Parabolic microphones eavesdrop on conversations a football field distant. A three-dimensional paraboloid can track sound waves back to a single focus. New technology can suck up speech from longitudinal vibrations transmitted through two window panes.¹³ If you say it, someone can hear it.¹⁴

And, you can be followed. Across the Pacific from Japan, DARPA (the US Defence Advanced Research Project Agency) is researching a “digital insect” – a mobile, autonomous snoop that combines photo-rechargeable batteries with nanosensors for sound, and infrared and visible light, plus molecular detectors. The tiny platform would “narrowcast” its findings in digital microbursts to an off-site receiver. The military purposes are obvious but such technologies also offer huge profits on high Street. Imaging and recording technology has been nano-sized, cost-reduced, and mass-produced so that high-quality surveillance is commercially accessible.¹⁵

Spin-offs and spy-effects: One of the big changes since the end of the Cold War lies in the changed-relationship between the military and industry. It is now as likely that the consumer electronics industry will catalyze a military/surveillance technology shift as it is that military exigencies will eventually trickle down into consumer products. For example, the sensors first used to detect faint emissions from distant stars also allow the US military to detect guerrilla fighters and are now found in consumer digital cameras. Today, according to Martin Rees, the

¹¹ REES, Martin: *ibid.* page 6.

¹² ATKINSON, William Illsey: “They’re watching you.” *Globe & Mail*, Toronto September 13, 2005.

¹³ All ideas in this paragraph can be found in: ATKINSON, William Illsey: *ibid.*

¹⁴ The uses of nanotechnology for military and civilian surveillance are discussed extensively in ALTMANN, Jiirgen, *MILITARY NANOTECHNOLOGY - Potential applications and preventive arms control*. Routledge Taylor & Francis Group, 2006.

¹⁵ ATKINSON, William Illsey: *ibid.*

demand for technological innovation is coming more from consumers than from Generals.¹⁶ This multi-purpose approach is called COTS -commercial off the shelf technology. Spy satellites use COTS technology to resolve images down to 10 centimetres – powerful enough to read a license plate or see the smirk on an admiral’s face.¹⁷

Nano soldiers: Over a third of the budget of the US National Nanotechnology Initiative has been spent on defence and military uses since it was initiated in 2001¹⁸. The military also funds nanotech research in Western Europe (e.g. Britain, Sweden), Israel, China, Malaysia, and India. Key military objectives for nanotech include fast biowarfare detection, stronger and lighter armour, more powerful explosives including triggers for mini-nukes, nanotechnologically improved soldiers and full ‘information dominance’ through nanotechnology.

Nanotechnology, in the words of India’s President Kalam (himself a missile scientist), is expected to “revolutionize total concepts of warfare.” It comes at a time when low intensity warfare and the ‘war on terror’ are a high political priority.

Tagged – You’re It: The 9/11 factor has broken down any vestigial barriers between military and commercial surveillance. RFID (Radio Frequency ID) tags are tiny silicon chips that broadcast simple bits of digital data when a radio frequency is fired at a tag from up to 10 metres away. The smallest current RFID tags are the size of a grain of sand¹⁹ and supermarkets such as Wal-Mart and Tesco now require that cases and pallets containing products bear RFID tags, to track inventory and prevent theft. In a few years, it is expected that individual products will also be tagged. RFID chips are already implanted in some cars, tires, credit cards, medicines, pets, prisoners and even passports (US passports incorporated RFID tags in 2006). Meanwhile, a US based company, Verichip, has produced an FDA²⁰-approved tag that is implanted under the skin to provide access to medical records, VIP access to special locations or to track wandering seniors, kids or workers. Even smaller than RFID tags is a set of readable tags being developed by Nanoplex. Its nanobarcodes (striped nanoparticles) tags can be mixed into a material or sprayed onto it giving it a uniquely invisible code readable several meters distant.

While RFID tags are passive beacons of information, the big money is betting on tiny wireless sensors that actively gather information about their environment and transmit onward to a third party – “smart dust.” Berkeley Robotics Lab has pioneered Smart Dust with US Defense Department funding. The lab’s tiny autonomous wireless sensors (known as ‘motes’) can be dropped onto a battlefield to monitor troop movement, chemical toxins and temperature – relaying data to a command centre. While the original motes were penny-size, they have nano parts inside, and prices are dropping quickly as Intel, Motorola, Honeywell and others ratchet up production. The goal is to shrink the sensing components to the almost-invisible scale of a dust particle – allowing the military, the justice minister, or your mom – access to all the dirt.

¹⁶ REES, Martin: *ibid.* page 79 at the footnote 79.

¹⁷ ATKINSON, William Ilsey: *ibid.*

¹⁸ National Nanotechnology Initiative: “Funding.”

<<http://www.nano.gov/html/about/funding.html>> - the actual figures are that DOD has received 1.219 billion dollars between 2001 and 2005 which is 30% of the 4.1 billion spent so far, however Aspects of Dept of Energy funding, NASA funding and Dept of Justice and Homeland Security are also defense related

¹⁹ Smartcode RFID Integrated Circuit was announced in Jan. 2004 – its is 0.25mm square – a barely visible speck of silicon – see <<http://www.smartcodecorp.com/newsroom/13-01-04.asp>>

²⁰ FDA: The US Food and Drug Administration.

But, smart dust is also too passive since it doesn't get about much – without the aid of a high wind – which is why the University of Berkeley Robotics Institute is also working on insect sized flying robots that can carry wireless sensors. 'Robofly' will ultimately be a centimeter sized robot that flies and lands with the precision of a housefly.²¹ While robofly doesn't actually fly yet, slightly larger autonomous spyplanes are already airborne. At the annual Micro Aerial Vehicle (MAV) competition, sponsored by defence aerospace companies, teams of engineers compete to create the smallest unmanned flying vehicle capable of transmitting video. So far the smallest MAV is 4.3 inches.²²

A better approach to tiny mobile surveillance might be to do away with robots altogether and mount surveillance sensors directly on insects. Back in September 1997, the bio-robot department at Tokyo University constructed 'Roboroach' an ordinary cockroach with sensors implanted on its shell that allowed researchers to remotely control the direction in which it moved. Within a few years, but Japanese researchers say, electronically controlled insects carrying mini-cameras or other sensory devices could be used for a variety of sensitive missions – for rescue work crawling through earthquake rubble, or for slipping under doors for plain old industrial espionage."²³ Since the military in many countries, including the United States, have the legal ability to suppress patent applications and information, it is not surprising that research into biological -- including nano biological -- monitoring systems has dropped out of sight with the growth in public interest.

Surrender trumps surveillance:

But it is not what the government will do to us so much as it is what we are doing to ourselves. In a world where the massively-destructive individual is plausible, not even intense surveillance is a guarantee of security. Our help is necessary. The people are already surrendering vital information about themselves faster than governments can request it. In Britain and elsewhere cell phone/cameras with GPS systems are providing annotated photographs of neighbors and neighborhoods with incredible detail. This is not the future -- this is now. We are telling on ourselves.

CSO's have focused on surveillance and ignored social surrender. Using inexpensive, readily-available COTS technology, a US journalist recently drove his van around an upscale suburb picking up "nanny-cam" (home video monitor) signals that volunteered audio and visual information about the houses he passed.²⁴ Row upon row, suburbs and condos are providing real-time home movies of their owners' daily idiosyncrasies. Link these videos to the millions of others volunteered on youtube; the daily confessions poured out on Facebook and myspace; and the 100 million explicitly networked social patterns surrendered through Internet telephony like Skype and there isn't much you or your friends haven't told. Add this to the ubiquitous security cameras on subways, buses, street corners, and at checkout counters around the rich

²¹ SQUATRIGLIA, Chuck: "Spy Fly: Tiny, winged robot to mimic nature's fighter jets." San Francisco Chronicle. November 2, 1999, p A17.

²² STILES, Ed: "UA Flying High after MAV Competition." April 15, 2004
<<http://uanews.org/cgi-bin/WebObjects/UANews.woa/2/wa/EngrStoryDetails?ArticleID=9047>>

²³ TALMADOE, Eric: "Japan's Latest Innovation: A Remote-Control Roach." Associated Press.
<<http://www.intecorr.com/roach.htm>>

²⁴ ATKINSON, William Illsey: "They're watching you." Globe & Mail. Toronto September 13, 2005.

world and most urbanites are just a step away from starring in someone else's reality TV entertainment.

Not only are we spying on ourselves for others, we're footing the bill! In 2005, 150,000 people -- mostly in the United States -- ponied up \$100 each to buy a test kit that would let them send a sample of their DNA to IBM. Together with The National Geographic Society, IBM has launched the Genographic Project to map human genetic diversity around the world. People paying the hundred dollars wanted to know if they were distantly related to Bill Gates or Attila the Hun. Industry wants to know as much about human genetic characteristics as possible. This absurd social inversion is taking place throughout health care. Dr. J. Craig Venter, (a controversial and famous geneticist since he led the private initiative to map the human genome) is offering a Grand Challenge prize to the first scientist who can map one person's genome for less than \$1000. Soon, individuals will be able to go about with implanted microchips containing their own genome map. Once you have a microchip on your shoulder, who will be looking over it?

People will surrender their genomes because it will allow doctors to prescribe a wider range of medicines with the assurance that there is no genetic reason why these medicines could be dangerous. Over the past few decades, virtually thousands of drugs have been dismissed in the research process -- or withdrawn from market -- because a small percentage of the population experiences dangerous adverse reactions when they are taken. Individual genome maps will allow pharmaceutical companies to bring these shelved drugs back onto the market. The downside, of course, is that people will have to surrender their privacy to the pharmaceutical industry. We can describe this as either disease avoidance for the patient or risk avoidance for the insurance industry and employers. Even now, you can theoretically get your own map for a measly \$20 million.²⁵

The strongest privacy laws in the world can't prevent people from surrendering information about themselves -- whether it be through "nanny-cams," cell phone cameras, or a DNA DVD in your forearm. Nor will laws do much good preventing neighbors from intentionally (or otherwise) tattle-tailing on neighbors.

If we're creating a "see-through society" what's the problem? Most of us have nothing to hide -- and, those that do -- most of the rest of us would want them discovered. This is only an argument if we ignore history. Abuse of power was not a feature unique to 20th century Fascists and dictators. There is a reason why an earlier generation fought so hard for the secret ballot and why the rich and powerful of their time fought so hard against it. But, there's not even a need to monitor anything if it is possible to manipulate the minds of theoretical terrorists or social dissidents -- or trade competitors.

Digital Democracies?

Is it not equally true that the new communications technologies can be used to advance democracy? In the early 1980s, while many environmentalists abhorred the rise of desktop computers, some issue activists embraced the technology and used the computational tool to analyze and out-organize both governments and industry. When ETC, former the Rural Advancement Foundation International, RAFI, got its first computers in 1982, it was roundly

²⁵ CHURCH, George M.: "Genomes for ALL". Scientific American. January 2006.

criticized by environmentalists in Germany. However, RAFI's ability to undertake an analysis of the collection and movement of crop germplasm and of gene bank storage standards was central to its success in forcing the UN Food and Agriculture Organization to establish a Commission on Genetic Resources in 1983. Similar stories are told by the Pesticides Action Network in their work monitoring crop chemicals. More dramatically, it was the use of radio cassette tapes in Iran in 1979 that made the Ayatollah Khomeini's revolt against the Shah possible. Ham radio operators working from their cars brought down Ferdinand Marcos in the Philippines in 1986. The fax machine organized global support for the protests in Tiananmen Square in China in 1989.²⁶ And the popular ousting of Philippine President Joseph Estrada in 2001 is credited to cell phone text-messaging. Cell phone monitoring at polling stations during the 2001 Senegal election is credited with keeping the vote honest and toppling the government there. Cell phones were also used to protect ballot boxes in the Ghanaian elections of 2000 and 2004.²⁷ In 2004, cell phone photographs sent by US military prison guards to friends back home found their way to the *Washington Post* and dealt a harsh public blow to the US government's credibility in Iraq.

These political events took place in the South – in countries with oppressive governments, managed media, and poor conventional communications. In each case, civil society's skillful use of new communications technologies leap-frogged over state controls. During the toppling of Estrada, for example, Filipinos were sending an estimated 45 million text messages a day, more than double the entire combined volume of the rest of the world at that time. The Philippines had barely 3 million fixed telephone lines but its 76 million citizens – even then – commanded over 4 million mobile phones.²⁸ Does Phone Power to the People mark a breakthrough point for democracy in the South?

About 80% of the world's people are now within reach of a mobile phone signal and 15% of the world is connected to the Internet. The ratio of Internet users in industrial and developing countries is narrowing and penetration rates have improved from 41 to 1 in 1992 to 10 to 1 in 2004²⁹ and, perhaps, 5 to 1 today. Shouldn't the revolution be at hand?

We've thought so before. The arrival of the telegraph – and, especially, the undersea cable – was at one time heralded as a profound democratic breakthrough – as is the Internet today. The truth would be found out, romantics proclaimed. Political and economic power would become transparent. In the end, of course, the telegraph wire served best to reinforce the political power of the countries that controlled the technology and the economic power of the corporations who came to dominate it. Within a few decades, Britain's Eastern Telegraph and

²⁶ FERGUSON, R. James: "Lecture 10: Scripts for Cooperation and Protest: People Power, Low-Violence Strategies and Cosmopolitan Governance" 2005.
<<http://72.14.207.104/search?q=cache:viD5evHfn14J:www.international-relations.com/wbadvir/ADVIR-Lec10-2005.doc+manila+citizen+protests+in+2000+fax+technology&hl=en&gl=ca&ct=clnk&cd=50&client=firefox-a>>

²⁷ CASTELLS, Manuel; FERNANDEZ-ARDEVOL, Mireia; LINCHUAN QIU, Jack and SEY, Araba: *Mobile Communication and Society- A Global Perspective*, MIT Press. 2007.

²⁸ CHANDRASEKARAN, Rajiv.: "Philippine Activism, At Push of a Button: Technology Used to Spur Political Change," *Washington Post Foreign Service*. December 10, 2000. Page A44.

²⁹ GLENN, Jerome C. & GORDON, Theodore J.: *2005 State of the Future*. Washington D.C.: American Council for the United Nation's University, 2005. p 22.

the US's Western Union ruled the wires.³⁰

Likewise, the radio: when the airwaves first became available to virtually everyone with any technical competence, some thought the revolution was at hand. After all, how could governments exercise control over the air? Many predicted an era of unrestricted free speech and free information that would finally make it possible for the people to exercise true democracy. But, from the beginning in Europe, governments took control of the technology and prohibited access to the airwaves to all but approved parties. By the mid 1920s in the United States, the crowded airwaves forced the US government to step in and organize band width.³¹ But by the beginning of the Great Depression – when social unrest was soaring to new heights – the freedom of the airwaves had ended.³²

There were similar hopes for cable television as, in the late '60s and early '70s, community organizations in North America and elsewhere organized to establish local channels designed to strengthen communities and democracy. Those cable channels still continue today – but nobody is watching. The cable networks have been merged into the original television systems and then hyper-merged into cinemas, radio, newspapers, magazines, and the Internet.

What can citizens honestly expect from the Internet and other communication technologies when their basic structure is controlled by the US military? At any given moment there are 7 million people chatting on Skype. But Skype is controlled by the Internet which is controlled by the US military. And, in 2005, Skype was bought by eBay and Rupert Murdoch, bought myspace. A year later, Google took over youtube. Today, the latest Internet rage -- Facebook -- may soon become someone's subsidiary.

Atoms for Piece -- Social engineering for pacification?

Prof. Jacob Hamblin of Clemson University makes it clear that social engineering is not a post 9/11 invention. As far back as 1930 social scientists -- concerned that the aftermath of the Industrial Revolution and the predicted revolution in automation would destabilize industrial societies -- argued for the need to manipulate the social conscience in order to maintain progress as well as law and order. Among the major proponents of social engineering was the International Committee on Mental Hygiene. Prominent social scientists posited the theory that social problems were a matter of "psychological maladjustment". The International Committee morphed into the World Federation on Mental Health under the leadership of Canadian psychiatrist, G. Brock Chisholm, who was also the first Director-General of the World Health Organization. When the newly-elected US president Dwight Eisenhower addressed the UN General Assembly in 1953, the President launched his "Atoms for Piece" initiative and, probably unintentionally, catalyze a feeding frenzy within the UN "family" of agencies for leadership in the initiative. Ultimately, UNESCO lost out to the US-inspired International

³⁰ SPAR, Debora L.: Ruling the Waves: Cycles of Discovery, Chaos, and Wealth from the Compass to the Internet, Chapter 2 – The Codemakers., Harcourt Inc: New York. 2001.

³¹ STARR, Paul: The Creation of the Media: Political Origins of Modern Communications. New York: Basic Books 2004. As reviewed by Wade Roush in Technology and Culture. April 2005. 46(2): 417-418.

³² SPAR, Deborah L.: *ibid.*

Atomic Energy Agency. Nevertheless, UNESCO joined forces with Chisholm's organization, the World Federation for Mental Health, to examine ways to guide and control scientific debate over the risks of nuclear energy and to allay widespread public concerns. According to UNESCO and the WFMH, setting aside public alarm was all a matter of reorganizing education and media management. The social scientists talked in terms of "behavioral modification" for whole societies and "psychiatric therapy" for the world in order to help humanity adjust to new technologies. The idea that scientists could work with the education system and the mass media to reshape society and social attitudes was pervasive well into the 60s when the social movement against racism, disaffection with the Vietnam war, and distrust over environmental deterioration swept it aside.³³

Memes and democratic dissent:

Is it really possible to externally direct the evolution of a human culture? Hopefully not. Is it possible that governments will attempt this kind of manipulation? Yes, it is. And, like it or not, successful or not, the very attempt would prove hugely disruptive. If the initiative itself is incredible, the attempt is credible and civil society should be vigilant.

Remember cultural memetics. If there is any truth to the notion of a massively-destructive individual -- or, if ruling elites believe it to be possible -- or, if it is in their interest to convince society that MDI's are a threat -- then the logical "first response" is to establish a ubiquitous surveillance system monitoring everyone everywhere. Since aggressive surveillance inevitably stirs opposition, the best strategy is to create a see-through society that happily surrenders information.

Even back in the mid-70s, Dr. Richard Dawkins would have argued that government manipulation leading to such a societal surrender is already a "meme". Cultural memes are already developed and directed through the mass media and public education. Sit-coms and curricula have been enormously successful in creating new social norms. Some of these - such as an aversion to smoking, acceptance of sexual orientation, or antipathy to drunk driving -- have been obviously beneficial. Others -- such as the demeaning of indigenous knowledge, the denial of global warming, or the dismissal of sustainable livelihood strategies in favor of consumerism -- have been obviously destructive. All of these represent "soft" memes.

Medicating memes: There are, in theory, other possible manufactured memes that could prove much harder. Arguably the most respected scientist in the United Kingdom, Martin Rees warns, "...human character may be changed by new techniques far more targeted and effective than the nostrums and drugs familiar today..." "By mid-century...[people may] have different attitudes from those of the present (maybe modified by medication, chip implants, and so forth)" "Nongenetic changes could be even more sudden, transforming humanity's mental character in less than a generation, as quickly as new drugs can be developed and marketed. The fundamentals of humanity, essentially unaltered throughout recorded history, could start to be transformed within this century."³⁴

That the world's corporate/government partnership might contemplate the use of drugs or

³³ HAMBLIN, Jacob Darwin: Exorcising Ghosts in the Age of Automation United Nations Experts and Atoms for Peace. In: Technology and Culture. vol.47 No.4, 2006.

³⁴ REES, Martin: *ibid.* pages 2-13.

cogular implants to advance their social control should not be surprising. Already,, all forms of unhappiness or discontent are interpreted as a personal medical problem. It is not that citizens are unemployed or underemployed that is wrong, it is that they are depressed about it. There is a pill for that. It is not that there is too much stress, too much social upheaval, too much pollution that is the problem, it is that these things bother us. There is a pill for that. It is not that our bosses demand too much of us, it is that we need too much sleep or can't quite meet the rising bar of employer expectations. There are pills that can reduce our sleep requirement or enhance our memory or help us think faster. It is not that industry and government need to adjust, the people need to be adjusted.

If a baby gets a cogular implant for memory enhancement or an implant to end deafness, will the send/receive icon sport a transmittable "security" override?

e-Brains? Closely related to the concept of cultural memes is the potential for neuroscientists to understand -- and adjust -- memory. Dr. Eric Kandel received the Nobel Prize in medicine in 2000 for just such work. Kandel traced memory in the simple *Aplysia marine* snail -- following the neurological pathway from the initial sensation to the storage of the sensation's memory in a pattern of electrical and chemical connections that could be pinpointed and, theoretically, manipulated. Scientists now believe they may be able to do the same for humans - helping patients overcome psychic trauma by dulling or eliminating the memory of terrible events. There are, of course, other potential uses less benign.³⁵ Two researchers at the Neurosciences Institute in San Diego, USA engineered a 30-fold increase in the aggressivity of the famous fruit fly by boosting the presence of an enzyme -- CYP6a20 -- coded by a single gene. It's unusual for a characteristic like aggressiveness to be traced to one gene but it is probably more interesting that fruit flies share a quarter of their DNA with human beings.³⁶

Epic inheritances? It is, of course, much more interesting if the brain can be re-wired so that cultural memes are passed on from one generation to the next. If it is possible to manipulate how -- or what -- we think, could these altered neural patterns be inherited? Researchers at Umeå University in Sweden think maybe so. Together with colleagues in the UK, they have discovered that epigenetic changes -- chemical changes to DNA such as additional methyl groups - brought about among pre-pubescent youngsters through nicotine or alcohol can be passed onto their children and grandchildren. A long-term survey of British men revealed that early smokers passed on epigenetic changes to their sons and grandsons that led to obesity and other health problems. Another survey in northern Sweden showed that grandparents who were frequently hungry between ages.

Parasitic memes: 30 years ago, Richard Dawkins wasn't just talking about these soft or mechanical memes. Dawkins speculated on -- but neither promised nor prophesied -- the development of viral or parasitic memes that could literally control some facets of human cultural evolution. In early December, 2001 -- coincidentally less than three months after 9/11 -- the US Department of Commerce (DOC) and the National Science Foundation convened a meeting of scientific experts, industry, and senior US government officials under the auspices of the White House, on the theme, "Converging Technologies for the Enhancement of Human Performance." The NSF's Dr. William Baimbridge talked about "cultural memetics" (Richard Dawkins old theory) that it may be possible to map-- and predict -- the neurological behavior of a culture or community (or individual) and then either adapt or, at least, anticipate responses to

³⁵ The economist: "Science of the mind: protein memories", March 2, 2006.

³⁶ New Scientist: "Single gene turns fruit flies into fighters", 19 August, 2006.

stimuli. Possibly the greatest area of scientific progress in the last decade has not been in nanoparticles or genome mapping but in neurosciences. Researchers are learning to follow the neurological pathways from senses to one (or several) responding parts of the brain. They are also learning how to grow neurological connections and redirect impulses. Publicly, the purpose of this research is to help those in chronic pain, to suppress anxiety, or to vanquish addictions. But, the same research could wipe away fear in soldiers or induce apathy among anti-globalization protesters.

The papers and conversation in that December Washington meeting pretty much say it all... “...the classic problem of social science has been to understand how and why some people and groups deviate from the standards of society, sometimes even resorting to crime and terrorism,” William Bainbridge and Gary Strong of the National Science Foundation told their audience, “...deep scientific understanding of the memetic processes that generate radical opposition movements may help government policymakers combat them effectively.”³⁷

Not all the discussion focused on suppressing violence. In the aftermath of the Seattle WTO debacle, the NSF and Department of Commerce were also concerned about economics... “A science of memetics, created through the convergence of many existing disciplines, would likely give a basis for understanding the relationship between social groups and globalization — a topic of enormous recent interest. Fundamentalist groups are no longer ‘fringe,’” the NSF’s two researchers asserted, “as they practice tactics to deal with variety and change, and they have become a topic not only for cultural anthropologists but also for law enforcement and governments in general. Certain “ideas” may have the force of a social virus...” they went onto warn that some “ideas” can spread “...as quickly and can have as deleterious effects on a population as do biological viruses.”³⁸

What to do? According to the assembled scientists and bureaucrats in the Washington meeting, “If we had a better map of culture, analogous to the Linnean system that classifies biological organisms into species and genera, we could help people find the culture they want and we could locate “uninhabited” cultural territories that could profitably be colonized by growing industries.” “Memetic science,” the policy advisers opined, “could help us deal with challenges to American cultural supremacy...”³⁹

Although Bainbridge and Strong were not claiming to express the views of the US government, the executive summary of the NSF/DOC report stresses that “highest priority” was given by the attending government and industry officials to their proposal for a Human Cognome Project -- a plan to map the neurons and memes of the human brain just as the Human Genome Project mapped our DNA.⁴⁰

Gondii no Gandhi: Is it really possible for neuroscientists to change the way people think or behave? Can a culture be changed? It was the idea of creating parasites or neural viruses --

³⁷ STRONG, Gary W. & BAINBRIDGE, William S., National Science Foundation: “Memetics: A Potential New Science”, in *Converging Technologies for Improving Human Performance -- Nanotechnology, Biotechnology, Information Technology, Cognitive-sciences*. pages 179 – 186. National Science Foundation/Department of Commerce-sponsored report (June 2002) ROCO, Mikhail & BAINBRIDGE William S., editors.

³⁸ STRONG, Gary W. & BAINBRIDGE, William S.: *ibid.*

³⁹ STRONG, Gary W. & BAINBRIDGE, William S.: *ibid.*

⁴⁰ ROCO, Mikhail & BAINBRIDGE, William S., editors: *Converging Technologies for Improving Human Performance -- Nanotechnology, Biotechnology, Information Technology, Cognitive-sciences*. P. 318-325, National Science Foundation/Department of Commerce-sponsored report (June 2002).

today's counterparts to computer viruses -- that originally attracted Richard Dawkins to the plausibility of cultural memetics. There is considerable evidence in the natural world that the brains of everything from insects to mammals are routinely "turn around" so that creatures are manipulated to do the bidding of another species - even if it means committing suicide. Oxford researchers (not Richard Dawkins) have discovered a tiny parasite, *Toxoplasma Gondii*, that makes mice fatally-attracted to cats. The parasite manipulates rats to carry it to its preferred host, cats. It is dormant in rodents but reactivated when gobbled up by the cat.⁴¹ Researchers in Montpellier report that hairworms that grow inside grasshoppers take over their brains secreting proteins that drive the grasshoppers to drown themselves in water when the hairworms need to mate.⁴² New Zealand researchers have found that cockles infected by *Curtuteria Australias* are used to return the parasite to birds. The parasite stops the cockles from burrowing in mudflats, forcing them to remain on the surface as prey for the birds.⁴³ Then consider the remarkable case of the lancet liver fluke (*dicrocoelium dendriticum*) that lays its eggs in the liver of cows and sheep. The eggs are excreted and consumed by snails where they reproduce in the snail's digestive gland and are excreted again. Ants eat the excreted snail slime and become controlled by the parasite. When the sun sets and temperatures drop, the ants are compelled to leave the colony and climb blades of grass to wait to be eaten. This process is repeated nightly until the ants are consumed. Safely inside the cow or sheep, the parasite returns to the liver to lay its eggs once more.⁴⁴

The ability of parasites to manipulate the minds of grasshoppers and mice may not seem like a "proof of principle" that the cultural or political attitudes of humans could as easily be "re-educated". Yet, *Toxiplasma Gondii* has already infected human beings and some researchers controversially claim that it is the cause of some abnormal behavior patterns such as promiscuity in women and violence in men.⁴⁵

We are not suggesting that governments are about to nano-engineer new bacteria or viruses that will be slipped into our water pipes or grain silos to make sure we all vote "right" in the next election. We only suggest that the age-old exigency of ruling elites to modulate the will of the People to their own ends has not only not gone away but may have powerful -- and unanticipated -- tools to achieve this goal. As worrisome as surveillance may be, societal surrender and the various forms of cultural memetics demand civil society attention. Unless the People seek a social policy solution to social justice issues, the threat of massively-destructive individuals may coerce "all of the people" into placing themselves under the control of others

⁴¹ BERDOY, M.; WEBSTER, J.P. and MacDONALD, D.W.: "Fatal Attraction in Rats Infected with *Toxoplasma Gondii*." Proceedings. Biological Sciences/The Royal Society. United Kingdom: Oxford University Veterinary Services. 267(1452). Aug 7, 2000. pp 1591-1594.

⁴² OWEN, James: "Suicide Grasshoppers Brainwashed by Parasite Worms" National Geographic News - September 1, 2005.

<http://news.nationalgeographic.com/news/2005/09/0901_050901_wormparasite.html>

⁴³ McFARLAND, L.H.; MOURITSEN, K.N. and POULIN, R.: "From first to second and back to first intermediate host: the unusual transmission route of *Curtuteria australis* (Digenea: Echinostomatidae)." Journal for Parasitology. 89(3). June 2003. pp 625-628.

⁴⁴ PEACOCK, Andrew: "Animal Diseases Factsheet –Publication AP059 – *Dicrocoelium dendriticum* - The Lancet Fluke of Sheep." Government of Newfoundland and Labrador.

<http://www.nr.gov.nl.ca/agric/animal_diseases/domestic/pdf/dicro.pdf>

⁴⁵ LAFFERTY, Kevin, "Can the common brain parasite, *Toxoplasma gondii*, influence human culture?", *Proceedings of the Royal Society*, UK, Proc Biol Sci. 2006 noviembre 7; 273(1602): 2749–2755.

"all of the time".⁴⁶

⁴⁶ For an updated discussion on the use of new technologies including the Internet to disrupt elections and distort public opinion, see: ANDREJEVIC, Mark: *iSpy - SURVEILLANCE AND POWER IN THE INTERACTIVE ERA*. University Press of Kansas. 2007.