

“Robot-Soldiers”: Science, Surveillance, and the Culture of Control

By [Derrick Jensen](#) and [George Draffan](#)

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Science and technology constitute two major oppressions of our time. Yet, if one goes by the literature, not only are science and technology seen as liberators (either from superstition, fear or material deprivation and want), those who control and direct them (technocrats, industrialists, statisticians) are seen as liberators too. – Claude Alvares

Of course our culture today is not secular, but just as religious (in the pejorative sense of superstitious, unconscious, assumed) as ever. Only today, science is the religion, experts are the priests, bureaucrats are the gatekeepers, and research and development institutions are the cathedrals.

Right now, military researchers at MIT and elsewhere are working hard to fabricate technologies that will—and we have to stress that we’re not making this up—allow soldiers to leap buildings, deflect bullets, and even become invisible. Shoes containing power packs will store energy when soldiers—or state police, or corporate security guards, insofar as there’s a difference—walk, then release this energy in bursts to allow them to jump over walls. Soldiers—cops, corporate goons—will be given exoskeletons, like insects, to deflect bullets. These exoskeletons will have the capacity to turn into offensive weapons as well. These exoskeletons will also deflect light so that those wearing them will be as invisible as the man at the center of the Panopticon, as invisible as God. Ned Thomas, director of the Institute for Soldier Nanotechnologies at MIT, explains why he wants to try to create these übersoldiers—and I picture him laughing like all the mad scientists in all the bad science fiction movies as he speaks—“Imagine the psychological impact upon a foe when encountering squads of seemingly invincible warriors, protected by armour and endowed with superhuman capabilities, such as the ability to leap over 20-foot walls.”

Military scientists long ago figured out how to put electronics into the brains of rats, and to cause them to move forward, backward, left, right by pushing buttons on computer keyboards. Imagine the fun these scientists will have if they figure out how to do this to women’s hips.

Recent research has been aimed at co-opting the rats’ will. Scientists put an electrode near a pleasure center in the rat’s brain, and others to stimulate whiskers on each side of the rat’s nose. The scientists then trigger, for example, implants near the left whiskers, and follow that by triggering the pleasure center. This convinces the rat to move left. After only ten days of this, rats can be trained to climb trees, walk, and stand in the open, or do many other things rats don’t normally like to do, controlled by technicians issuing commands from laptop computers up to 550 yards away. As a reporter for the *Washington Post* put it, not

disapprovingly, “The rat thus becomes a living robot, controlled remotely by a human handler but able to go anywhere a rat can go.”

“I like the results,” said a scientist at Northwestern University, who gave his reason: “This is the first time where you have control of a whole complex animal.”

A scientist at New York’s Downstate Medical Center put the final word on this, “The rat looks normal and isn’t feeling any pain because he’s getting rewards for doing the right thing.”

The rat is no longer a rat. It is a puppetrat, controlled by “providence,” by God, by a man with a laptop.

Imagine putting electrodes near pleasure centers in human brains. Imagine getting humans to feel pleasure for doing things that are against their nature. Imagine getting them to feel pleasure for “doing the right thing,” for doing that which is favored by providence, defined, of course, by those at the center. Imagine getting humans—or what used to be humans—to feel pleasure working for Wal-Mart (attaching RFID chips). Imagine getting them to feel pleasure purchasing items (containing RFID chips) from Wal-Mart. Imagine getting them to feel pleasure watching propaganda for the corporate state. Imagine getting them to feel pleasure voting in meaningless elections to put in power people who do not represent them. Imagine getting them to feel pleasure in following laws laid down seemingly not by those in power but by providence. Imagine getting them to feel pleasure as they narc out those who do not have implants or who otherwise do not choose to do “the right thing.” Imagine getting them to feel pleasure in hunting down and killing those miscreants.

Imagine the fun these scientists will have when they put electrodes into the pleasure centers of women, to get them to feel pleasure—whether they feel pleasure or not—for “doing the right thing.” They already do this: Scientists have long since discovered that if they implant electrodes in women’s brains—they use their patients in mental hospitals—they can bring the women, even women in what they describe as “a low mood,” to have “repetitive orgasms.”

They may want to order a set of electrodes for use around the house.

Remote-controlled rats may be the least of our worries.

Tomorrow’s warfare, according to experts at a conference on the future of weaponry, will be “revolutionised by computing, robotics and biotechnology to create ‘killer insects’ that can hunt down their prey in bunkers and caves and eat humans alive.” Paul Hirst, professor of social theory at Birkbeck College, London University, gives some details: “micro aircraft that fly by their own sensors and carry many deadly sub-munitions; intelligent jumping mines that shower selected targets with small guided bomblets. . . . The result would be really effective substitutes for chemical and biological weapons: deadly bio-machines of finite life that could be released by sub-munitions, showering opponents in millions of nanobots . . . that could literally eat humans alive.”

And how will those in power find those they wish to have eaten? First, in addition to the RFID chips that can identify the location of someone who has bought any tagged consumer items, those in power will, according to Charles Heyman, editor of *Jane’s World Armies*, be able to drop thousands of minimicrophones, cameras, and vibration sensors at crucial sites to relay information back to the center of the Panopticon.

In case all of that doesn't suffice, military researchers are currently working hard to fabricate radar devices that will identify people by how they walk. It seems that our gait is as distinctive as our fingerprints, and scientists at Georgia Tech have been able to gain identification success rates of 80 to 95 percent.

A reporter asked Gene Greneker, head of gait research at Georgia Tech, whether he was concerned about the ends to which his work would be put. His response could have been spoken by the creators of mobile killing vans used by Nazis, creators of nuclear bombs, creators of electrodes to be put into the brains of rats (or women), creators of suits to turn the servants of those in power into *übersoldiers*. He said, "We are research and development people. We think about what's possible, not what the government will do with it. That's somebody else's job."

The article did not report whether Greneker felt pleasure—electronically-induced or otherwise—as he said this.

A couple of years ago, the United States government began bringing together information-gathering programs under a vast surveillance network called Total Information Awareness (TIA). TIA was a program of the Information Awareness Office, which in turn is part of the Defense Advanced Research Projects Agency (DARPA), run by the Pentagon.

Those in charge would like to be able to provide their agents with instantaneous access to records from around the world. A lot of records. In its advice to corporations that may contract to provide some of this information, DARPA states, "The amount of data that will need to be stored and accessed will be unprecedented, measured in petabytes." One byte is the amount of memory it takes to store one letter. One petabyte is one quadrillion bytes. That's one with fifteen zeros after it. This means that those in power want to maintain a database that would be more than fifty times larger than all of the books in the Library of Congress, or somewhere on the order of a billion books.

This information could include financial, health, shopping, telephone, employment, and library records, fingerprints, DNA samples, gait analyses, brain scans, surveillance photographs, information on whom and how you love (including audio and video recordings of your most intimate moments), recordings of phone conversations, copies of emails, maps of internet activities, information on addictions or other exploitable weaknesses, and all sorts of other information no sane person could even dream of collecting. Even if the project were to use only one petabyte of storage, that would still be enough to amass forty pages of text for each person on the planet.

In response to criticism, the United States government changed the name of Total Information Awareness—though not, of course, its function—to the less accurate Terrorism Information Awareness. Presumably it also began dossiers on everybody who complained about the program.

The Information Awareness Office logo consists of the name of the organization surrounding a blue background against which we have the truncated pyramid and the by-now-familiar all-seeing eye. This eye, of providence, of God, of the police, of the military, of representatives of major corporations, emits a ray of golden light to illuminate and overlook the globe. In the upper right are the initials DARPA, and in the lower left is *Scientia est Potentia*, a Latin phrase they translate as *Knowledge is Power*.

Knowledge is not always power. There are other ways to be and perceive in the world. Knowledge can be love. It can be relationship. It can be connection. It can be neighborliness or familiarity. Knowledge can simply be knowledge.

Last week I had one of the most exciting and wonderful mornings of my life. I live near a pond. I often sit at its edge. I love to watch tadpoles swim, watch them over time grow legs, slowly lose tails, take their first hops onto land, make their first awkward flips of the tongue (sometimes before they learn how to use their tongues, they wildly miss their targets and their whole bodies tumble till they land on their noses!). I also love to watch whirligig beetles who skate in incomprehensibly complex patterns—or maybe in no patterns at all—over the surface of the water, and backswimmers who hang motionless then glide quickly toward potential prey. Newts who swim to the top for great gulps of air, then back down again too deep for me to see. I watch mating dragonflies, the male joining his genitals to the female's near the base of the female's head, leaving her back end free to dip into the water and drop eggs even as they mate.

That morning a large brown insect crawled from the pond, covered with mud. I'd seen insects like this, and I'd also seen their skins hanging empty from blades of grass. I didn't know who they became. So I watched.

I watched as the creature made its way slowly across spaces of bare ground and through patches of grass until it found the blade it wanted to climb. It made its way to near the top, then grabbed on tight.

I waited. I looked away to water skippers and willows and rushes. When I looked back a furry hump had formed on the creature's back, between where the shoulder blades would be on you or me. The hump got larger.

Again I waited. The wind played with the tips of redwood branches. Wrentits sang, as did sparrows and thrushes, and some other bird I could not name but whose trilling song made me smile. A jay cocked its head and looked at me.

The hump became a head, and over time first one, another, then a third pair of legs became visible. They were all the palest yellow, nearly white. They unfolded slowly. I had no idea who this creature was. The sun rode the sky. It grew warm on my back. More of the creature emerged, and more. It began to hang from the shell that used to be its skin. Sometimes it would move vigorously, sometimes it would slowly expand, and sometimes it would rest. I wondered if it would keep pushing itself from its former skin until it fell to the ground. Then suddenly it thrust itself upward to grasp the grass with its legs. It pulled hard, and pulled again. Finally it was free.

I still had no idea who it was. It was pale and stubby, with ruffles on its back.

I wanted to take a picture to show my friends, to post on my website. But I knew, because the creature told me, that this would be wrong.

The ruffles on its back began to expand. Slowly. Everything was slow. I'd been sitting by then for probably two hours, but it seemed much less because each moment I wanted to know what would happen the next.

The ruffles unfolded, the abdomen expanded. Longer, longer. The ruffles became wings, four

of them. The eyes clarified. Colors came alive.

It was a dragonfly. No longer pale pink but very bright blue. "Now," it said. "Now get the camera." I did. It spread its wings. I took pictures. It waited.

I was hungry. I walked the path—three-eighths of a mile through dense forest—to my mom's. As I walked I pondered how many times I've walked this path these past three years. Easily three to four thousand. For the first year or so I used to carry a lantern at night, but then I quit because I got to know the path well enough to walk it at a normal pace even on the darkest nights (hint: look up to see the slight break in the forest canopy that signals the path). This time, of course, it was early afternoon. I got to my mom's. I ate there. I often do. I made my own meal, but she often cooks for me. She likes to cook and knows how to do it well. She also knows what foods I like, or don't. Afterward I helped her in her garden. She tells me what chores she would like me to do, and I (eventually) get them done. It works. We each know what helps the other, and want to help the other how we can.

I walked back home, expecting the dragonfly to be gone. But it remained through the afternoon, and into the night.

I awoke around 9:30 the next morning. The first thing I did was go outside, expecting, again, to see only the husk of the dragonfly, clinging to the grass. But the dragonfly remained. I stopped a few feet away. It did not move. I looked down to my feet for just a moment—to make sure I wouldn't step on any baby frogs if I shifted my weight—and when I looked back up it was gone.

There was only one large dragonfly on the pond. It was bright blue. It circled, then rose up to fly around the meadow, then back down to the pond. Then back up, in wider and higher spirals till it felt it knew the landscape. Higher and higher it spiraled, until it flew over the top of the redwoods and into the world.

Knowledge, whether it is of a dragonfly, a path, my mother, me, a landscape, is not always power. There are other ways to be and perceive in the world. Knowledge can be love. It can be relationship. It can be connection. It can be neighborliness or familiarity. Knowledge can simply be knowledge.

Or knowledge can be power over others.

Do you know as much about yourself as they do?

If you're a consumer, there are records about your credit cards, layaway plans, leases and rentals, purchases, purchase inquiries, subscriber lists, clothing sizes, internet web browsing preferences.

If you've been to school, there are records about your school applications, academic records, academic references, extracurricular activities, awards, and sanctions.

If you have a job, there may well be records about your job applications or employment agency applications, medical examinations, drug tests, personal and professional references, performance assessments, employment history, employment licenses and certifications.

If you indulge in any entertainment or leisure activities that involve spending money, there

are records relating to your travel itineraries, recreational profiles compiled by travel agents, auto and other rentals and leases, lodging reservations, airplane, ship, and train reservations, concert or other entertainment tickets, newspaper and magazine subscriptions, and telephone/cable records.

Do you participate in financial transactions? Have you ever borrowed money or had a bank account? There are data on your bank records, ATM cards, credit card transactions, online banking files, credit reports, tax returns, stock brokerage accounts, and traveller's check transactions.

If you ever had an insurance policy, then you are assessed for the risk you pose to the company. If you have health, auto, home, business, or any other kind of insurance (and in this paranoid culture, you can buy insurance for just about any conceivable risk), then there's lots of information about you in those files.

If you've ever been an initiator or target of legal action, you might be mentioned in court records, lawyers' records, in arbitration or other out-of-court settlement records, or in newspaper reports about legal actions.

If you've ever bought or rented property, then you're a tenant or a mortgage holder and there's information related to your real estate purchase, sale, rental, or lease. (One of the first things the Zapatista rebels in Chiapas did when they took over towns was to pull the mortgage records from the courthouse and burn them, to much public applause.)

Are you now, have you ever been, or will you ever be the recipient of public assistance or private benefits? Chances are good you've got one or more of these: private pension records, social security records, health care records, records associated with employment benefits, unemployment benefits, workers' compensation claims, disability records, food stamps, veterans' benefits, or senior citizen benefits.

Do you use any public or private utilities? How about telephone, electricity, heating fuel, cable or satellite television, internet service, garbage collection, sewer, security services, or delivery services?

Are you a driver, a voter, a traveller? Have you ever been married or divorced? Were you born? There's a record on you.

Who collects all that information? Who stores it? Who's got access to it? Is it shared among agencies, among corporations?

Do the people who have this information have your best interests at heart? Do they really know who you are? What do they want from you?

When the people at the Information Awareness Office translate *Scientia est Potentia* as *Knowledge is Power*, they're not only defining knowledge very narrowly (and in a way my therapist friends would say "is highly diagnostic of their own personal issues and difficulties"), but they're also perpetuating another scam, one that most of us participate in more or less willingly, to our own detriment and to the detriment of the planet. This is that they have translated *scientia*—the root of the word *science*—as *knowledge*.

The spooks at the Information Awareness Office aren't the only ones who conflate science and knowledge. It's pretty common in our culture. I asked philosopher Stanley Aronowitz,

author of *Science as Power*, among many other books, about this conflation. He said, "Science is founded on the idea that the results of its methods—which are very specific mathematical and experimental methods—are equivalent to what we mean by truth. The mythology holds that science describes physical reality, that science is truth. And if science is truth, instead of merely one form of truth, then all other forms of truth—all philosophical truth, all ethical truth, all emotional, spiritual, relational, experiential truths—are devalued. They're regarded as something else besides truth. Scientists may agree, for example, that there is something called artistic truth, but they—and I'm talking not so much about specific scientists (although this is often true) as I am about what the scientific worldview does to all of us—don't think artistic truth has anything to do with the material reality that the scientist investigates."

He continued, "Science is based on exclusion. And not just the exclusion of all these other forms of knowledge. It's full of exclusions. Logic, for example. In order to establish its authority it excludes what might be described as a critical logical analysis that derives not strictly from experiment, but from the less formal observation of any, say, philosopher or political or social theorist."

"Or human being," I added.

He said, "Scientists will say, 'That's all very interesting, but it's really got nothing to do with truth. It's just your opinion.'"

"Why do we care?"

"At the very least because if you can convince people that science has a monopoly on truth, you may be able to get them to believe also that the knowledge generated through science is independent of politics, history, social influences, cultural bias, and so on." And in the bargain, you can get them to doubt their own experience.

This might be a good time to examine the etymology of the word *science*. It comes from the Latin *scientia*, from *sciens*, which means *having knowledge*, from the present participle of *scire*, meaning *to know*, probably—and here's where it gets exciting—akin to the Sanskrit *Chyati*, meaning *he cuts off*, and Latin *scindere*, *to split, cleave*. The dictionary tells me there's more at *shed* (presumably the verb, as in dog hair, not the noun, as in a shack).

So I look up *shed*, which derives from the Middle English for *divide, separate*, from Old English *scaeden*, akin to High German *skeiden, to separate*, which brings us back to our Latin friend *scindere*, and from there to the Greek *schizein, to split*.

We are all familiar of course with the root *schizein* because of its famous grandchild *schizophrenia* (literally *split mind*), which is a psychotic disorder characterized by a loss of contact with the environment, illogical patterns of thinking and acting, by delusions and hallucinations, and by a noticeable deterioration in the level of functioning in everyday life.

Science, scire, scindere, schizein, schizophrenia. A mind split into pieces.

It should come as no surprise, at least to etymologists as well as regular people with too much time on their hands, that the words *scientia*, translated to mean knowledge, and *science*, the main means by which people in this culture are presumed to gain this knowledge, have at their core the notion of splitting off, separating from. After all, the word "separate" comes from the Latin for "self," *se*, meaning "on one's own" (which springs from

the belief and promotes the fiction that a self is independent of family, community, landbase), and *parare*, “to prepare.” In this culture it is separation that prepares a person for selfhood. It is separation that defines us. Separation has become *who we are*. It is the illusion of separation, as we shall see, that keeps us enslaved.

Surveillance, and this is true for science as well—indeed, this is true for the entire culture, of which surveillance and science are just two holographic parts—is based on unequal relationships. Surveillance—and science—requires a watcher and a watched, a controller and a controlled, one who has the right to surveil or observe—with knowledge, truth, providence, and most of all might on his side—and one who is there for the other to gain knowledge—as power—about.

These unequal relationships require a split, a separation. There can be no real mixing of categories, of participants. The lines between watcher and watched, controller and controlled, must be sharp and inviolable. Humans on one side, nonhumans on the other. Men on one side, women on the other. Those in power on one side, the rest of us on the other. Guards on one side, prisoners on the other. At Pelican Bay State Prison, where I taught creative writing for several years, I once received a chiding letter from my supervisor after I innocently answered an inmate’s friendly question as to what I was doing for Thanksgiving: To even let him know I was spending it with my mom was to make myself too known—too visible—to this other who must always be kept at a distance.

If this sounds a lot like the pornographic relationship, that’s because it is. Pornography—cousin to surveillance, and bastard child of science—requires the same dynamic of watcher and watched, the same dyad of unchanged subject gazing at an object to be explored at an emotional distance, the same relationship of powerful viewer looking at powerless object. (This may explain at least some of the popularity of pornography: people who are powerless in every other aspect of their lives get to feel some power as they look at these pictures and read the attached text.) When I read that we must not “make scruple of entering and penetrating into these holes and corners,” I wonder whether I am reading a letter by the father of science Sir Francis Bacon to King James I (describing how the methods of interrogating witches—that is, restraint and torture—must be applied to the natural world), or whether I’m reading a description at www.perfectlypussey.com. When I read about using the “mechanical arts” (that is, once again, restraint and torture) so that she “betrays her secrets more fully . . . than when in enjoyment of her natural liberty,” am I still reading Bacon’s words on science, or have I landed at www.fetishhotel.com?

These unequal relationships—insofar as we can even call them relationships—must be oppositional. Predator and prey must not be working together for the benefit of both of their communities, and for the benefit of the land. Instead, from this perspective—this perspective based on selves being separate, and knowledge being gained through splitting off—predator and prey (and this applies to humans as well) must be locked in an eternal battle, good against evil, a battle that ends in Armageddon.

As civilization plays out its grim endgame, and as those in power move ever closer to their ultimately unattainable goal of absolute control (through absolute surveillance), converting in their efforts the wild both inside and out to devastated psyches and landscapes, it might be well past time to reconsider the premises that underlie much of this destructive way of being (or not being) and perceiving (or not perceiving). For in many ways, perception shores up the whole bloody farce.

So often we see the world—or do not see the world, but see what we project into the world—in terms of opposites. Given that our culture is based on opposition, this is precisely what we should expect. Any discussion of surveillance highlights many pairs of seemingly opposing—warring—impulses.

There is the need to control versus the need for freedom. The need for bureaucracies to run large institutions versus the need for democracy. The need for administration and regulation of markets versus the need for markets that are free and self-balancing. The needs of industrial production versus the needs of our landbases. The requirements of scientific analysis versus love and relationship. The needs of technology—with each new technology separating us further from the natural world—versus our need to be intimate with nature. The needs of efficiency versus the requirements (and joys) of craft. The needs of police forces versus the needs of people acting in self-defense. Paternalistic governance versus autonomous humans in communities.

In the wars between these perspectives, right now the winners in each case are those who are served by corporate and governmental bureaucracies.

Some of these opposites really are opposites. Industrial production really does destroy landbases. The *need* for control really does run counter to freedom. Scientific analysis cannot coexist with love and relationship (vivisection, anyone?). Industrial technologies inescapably separate us from nature (that's the point!). And so on.

In these truly oppositional cases, we are not facing the actual conflict. We could not, and continue to live as we do. No reasonable people would destroy their landbase, even to manufacture groovy products like GI Joes and Hummers (there are now more automobiles than people in the United States, by the way). Similarly, no one not gripped by fear would require—or allow—security to throttle freedom. (Are industrialized people free? As we'll see in a moment, we are “given” the freedom to make false choices, the freedom to choose anything we want so long as it does not go against the structures of power).

Instead these wars are fought on the landscapes of our minds. Certainty versus mystery. Logic versus emotion. Security versus freedom. Personal consumption versus service to community.

In these wars, fear and habit have been defeating courage and freedom.

A classic device of power—and this is true whether we're talking about emperors or perpetrators of domestic violence—is to present their victims with a series of false choices whereby no matter which the victims choose, the perpetrators win and the victims are further victimized. Nazis, for example, sometimes gave Jews the choice of different colored identity papers. Many Jews then focused, reasonably enough, on trying to figure out which of these colors would more likely save their lives. Of course the color of the identity papers made no material difference: the primary purpose of the choice was to divert victims' attention from the task of unmaking the whole system that was killing them. In addition, this false choice co-opted victims into believing they were making meaningful choices. In other words, it got them on some level to take responsibility for what was being done with them: *If I am killed it is my own fault because I chose the wrong color.*

Now, would you rather vote Republican or Democrat? For which major corporation would you like to work? Which shopping mall has the best deals this weekend? Do you want

privacy or security?

Both the spies at the Pentagon—or maybe at some corporate headquarters, we always get confused as to which is which—and public interest advocates at, for example, the American Civil Liberties Union (ACLU), state that we should and must have security *and* privacy. But it's another false choice, both sides of which, framed as they currently are, serve to divert our attention while those in power continue to extend their control. The military industrial complex continues to operate as if spying on “our enemies” will make each of us individually—separately—and the world in general more secure. And lawyers continue to operate as if more regulations will stem the tidal wave of invasive technology and commercialization of culture. Neither of these positions has a shred of evidence to support it. In fact both are demonstrably untrue. Nonetheless they are clung to, articles of faith in some religion to which we do not—cannot—admit we adhere.

Not only the spies and übersoldiers are invisible. So are our beliefs.

Aronowitz told me that a “fundamental precept of science is that at some point we're finally going to get to the bottom of things, that we are getting closer and closer to ‘the truth.’ That someday we'll understand the fundamental building blocks of matter, we'll unify electromagnetism with gravity, and, like Einstein believed, we'll have a general theory. This conceit may be scientists' version of utopian hope. Now, some scientists don't believe this, instead believing there will always be uncertainty and upheaval, but the majority believe we're moving toward some ultimate theory. And you really have to say that this latter group subscribes to science as a religion.”

“What's wrong with that?” I asked.

“First, their religion masquerades as something it's not; in fact they consider themselves skeptics, and are often highly scornful of people who rely on ‘mere faith.’ More broadly, science is coercive in the same way that dogmatic belief in a deity can be coercive. Just as God is then taken as an axiom by true believers, so the four elements of scientific discourse cannot be questioned.”

“Four elements?”

“The first is the exclusion of the qualitative in favor of the quantitative. If you cannot assign a number to something, it doesn't exist. The second is that except at the outset, speculation is excluded in favor of observation and experimentation. The third is that knowledge is claimed to be free of value. There's nothing inherently wrong in knowing how to make a neutron bomb, for example.”

“Those who make them can say, ‘We are research and development people. We think about what's possible, not what the government will do with it. That's somebody else's job.’”

“It's simply information, so the mythology goes. And the fourth is that method is given primacy in the confirmation of knowledge.”

“Meaning. . . .”

“Meaning that since science has defined its methods as the only way to discover truth, the only acceptable criticisms of science are those conducted within the methodological framework that science has set up for itself. Further, science insists that only those who

have been inducted into its community, through means of training and credentials, are qualified to make these criticisms.

"Many scientists consider it absurd that Christian fundamentalists use biblical references to bolster their claim that the Bible is literally true, yet we all let science use the tools of science to settle disputations concerning its own viability. That makes no sense to me.

"But there is something else at stake here. Theirs is a belief in the end of history. It's a version of a belief, at the level of science, of what Francis Fukuyama says at the level of human affairs, that we've finally ended history. Fukuyama thinks we've ended history because the world has been unified under the common denominator of capitalism, so-called liberal democracy, the market."

"Obviously there are a lot of problems with Fukuyama's boosterism of capitalism, not the least of which is that it doesn't match reality. . . ."

"Oh, absolutely. He makes no sense at all. And the same is true scientifically. The scientific hope is for an end of natural history. We will someday understand everything."

"And essentially be as God. . . ."

"But let me ask you this: Does the world change? Is the material world itself moving constantly?"

"Absolutely."

"Well, if that is true, then we can't ever know the ultimate anything. If there exists anything even remotely resembling freewill actors anywhere in the universe, then there can be no ultimate knowledge of the sort science purports."

This essay is excerpted from the book [Welcome to the Machine: Science, Surveillance, and the Culture of Control](#) , by Derrick Jensen and George Draffan, (Chelsea Green Publishing, 2004).

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