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Tech Noir

James Cameron's Terminator (1984)

formerly YLEM newsletter

SCIENCE FICTION—THE LAST 10 YEARS
By Loren Means

Ten years ago, it appeared that a new film genre was emerging. It was called Tech Noir, after the name of a nightclub in one of the flagship films of the genre, The Terminator. Tech Noir was something of a hybrid of science fiction and film noir, and its principle examples were Blade Runner, Total Recall, and three films which were manifested in series—Terminator, Alien, and RoboCop. Blade Runner and Total Recall were based on works of fiction by Philip K.Dick, who had died ten years before. As with film noir in its heyday in the Forties, there was a tenuous relationship between these films and the corresponding movement in literature, in this case a manifestation of the Eighties called Cyberpunk.The most influential Cyberpunk novel was Neuromancer by William Gibson, which popularized the concept of cyberspace, and Gibson was hired to write a script for the third iteration of the Alien series, although it was never filmed.

Tech Noir and Cyberpunk had in common a vision of a "bad future", a grungy, hopeless future that promised only greater threats to human life and prosperity than were currently the case. This attitude was a concrete manifestation of a concept which had a long history in science fiction, although it never seemed to catch on in other genres—"dystopia". Which, of course, is the opposite of utopia. I recall a discussion with Jim Kitses, author of a study of the film noir classic Gun Crazy, in which he asked me if I thought it would be appropriate to apply the term "dystopia" to the world view of film noir, and his gratification when I agreed.

The Tech Noir sensibility was in direct opposition to the prevailing ethos of the most popular science fiction film franchises, Star Wars and Star Trek, in which technologies, robots and aliens tended to be benign, at least when brought under the influence of reason or heroism.

I wrote a very long article ten years ago prompted by Tech Noir and particularly its depiction of artificial humans, and submitted the piece to Film Quarterly. It was rejected, but with the kind of encouraging rejection letter ("it really deserves to be published, but we aren't the right publication for it") that I have sometimes written myself. But then I found the political aspects of Tech Noir to be too depressing to pursue, and I plunged into film noir and hard-boiled fiction instead, finding them less politically acute.

Recently I came across a debate between Ray Kurzweil, one of our most provocative thinker/inventors, and the science fiction writer Vernor Vinge, regarding Vinge's postulation of a Singularity when machine intelligence would overtake human intelligence. A bit of research revealed that Vinge had first written of this Singularity ten years ago, and had been pursuing it since. When Vinge came to San Francisco a few months ago, I contacted him for an interview, and he told me he was featured at the World Science Fiction Convention being held at San Jose, and invited me to meet him there.

I had never attended one of these big "Cons" before, and was amazed at the literary giants who were mingling with their fans and exchanging ideas on panels. In addition to the YLEM Journal's previous contributor, Rudy Rucker, I heard such luminaries as David Brin, Gregory Benford, Greg Bear (all on one panel), Connie Willis, Kim Stanley Robinson, Joe Haldeman, and Pat Murphy, as well as such new stars as Ken Wharton, Charlie Stross, and China Mieville.

In looking at the differences between science fiction now and then, I found that Tech Noir and Cyberpunk were barely mentioned, although people keep making movies from the works of Philip K.Dick. What was in the air was the domination by the Star Wars and Star Trek franchises, not only in film but now in literature, a fierce rivalry between hard science fiction and fantasy, which fantasy appeared to be winning, and in place of dystopia, I found a strong, almost messianic belief in the value and efficacy of technology, and most surprising of all, a belief in progress. In other disciplines, the end of the Twentieth Century had entailed the end of Modernism, with its commitment to the perfectibility of humankind and human society, and its replacement with Postmodernism, which strongly suggested that all belief was suspect. The only area in which I continued to see belief in progress was in the area of computer hardware and software. I had almost convinced my wife that I had to buy my son a new computer every two years even though her old DOS machine had produced her Doctoral dissertation without a hitch. And now here was David Brin saying: "I'm known as an optimist because I think people are getting better, smarter, wiser..."

I also observed in contemporary science fiction a phenomenon I was also finding in the visual arts—extremely bright and accomplished scientists somehow finding the time to create electrifying art.

This issue of the YLEM Journal is something of a preface to several upcoming issues which will explore current trends and controversies in contemporary science fiction, which now more than ever I believe to be the contemporary literature of ideas.Since the ConJose was a literary convention, I expected to hear the kinds of cultural theory that is bounced around at art and film seminars. Instead I was struck by the influence of two thinkers whose concepts were in the air everywhere—Isaac Asimov and Hans Moravec.Asimov's Three Laws of Robotics are still extremely controversial, as are Moravec's theories of the implantation of human consciousness into machines. So we are reprinting, with their kind permission, pieces from Moravec and Vinge from the last decade, as well as a pared-down version of my Androids article which talks about Asimov's three laws. I'm also including what may have been the last interview with Philip K.Dick, which was included in the Blade Runner Souvenir Magazine of 1982. I was convinced that this interview had been lost when the publisher went out of business, but the magazine has just turned up on the web at www.brmovie.com/Magazine

In the near future, look for interviews with Vinge, Wharton, William Gibson, Bruce Balfour, and Bruce Sterling, as well as an article by Clifford Pickover, among many others. I'm seeing a convergence of science fiction and artificial intelligence,

in that we may soon see that the alien life forms come not from outer space, but from our interactions with our machines. Perhaps Rudy Rucker is right in his imagining that at some point robots may create artificial humans.

[Erratum: the caption for the cover of the last issue of the YLEM Journal should have said: Tree Pond.Digital frame captured in real-time through HMD (Head-mounted display) during live performance of immersive virtual environment Osmose (1995).Char Davies, www.immersence.com]

Call for entries

The International Symposium on Digital Art, IV03 - DART is calling for papers and participation. Details at http://www.graphicslink.demon.co.uk/IV03/DART.htm

Forum

"Mathematics and the Arts"
Wednesday, March 12, 7:30 PM
McBean Theater, The Exploratorium 3601 Lyon St., San Francisco, CA 94123
FREE, open to the public, wheelchair accessible

Mathematicians with a vocation of sculpture, and a writer with a yen for Chaos will show us the zingy possibilities they have discovered for using abstract mathematical concepts in a concrete way. Hear about the 12-foot math sculpture that won the silver at the 13th International Snow Sculpting Championship in Breckenridge, CO this year!

"Art, Math, and Sculpture" by Carlo H. Séquin
Carlo Sequin will explore the roles of computers, multi-media, virtual environments, and rapid prototyping in the design of abstract geometrical sculptures. Sequin teaches computer science in the U.C. Berkeley Electrical Engineering & Computer Science Department. In his talk, "Art, Math, and Sculpture" he describes techniques that grew out of a six-year collaboration between Brent Collins, a wood sculptor, and himself. These are particularly applicable to abstract geometrical sculptures, where precisely defined and highly optimized shapes follow a clear underlying logic. The use of these techniques has resulted in several sculpture families, represented by virtual displays, many small physical maquettes, a few larger wood and bronze sculptures, and recently, a 12-foot snow sculpture. At the 13th International Snow-Sculpting championships, held in Breckenridge, Colorado, Sequin's design, called"Whirled White Web", realized by team USA-Minnesota (5 people, 5days), garnered the silver medal. Sequin will also show pictures of this "wild and wonderful" event and bring models for close examination.

"Visual Enjoyment of Mathematics" by Franklin Sheehan
Franklin Sheehan, who is Emeritus Professor of Mathematics with his major concentration in mathematical statistics has a good eye for mathematical structures that have aesthetic interest. He will talk about his sculptural works and bring one to see at close range. Sheehan began teaching at San Francisco State in 1954, almost 50 years ago, with few interludes. One of these was three years of teaching at U.S. Navy Postgraduate School.

"Chaos", the 1990 video by mathematician and author Rudy Rucker explains the various forms of the mathematical concept by animation.

"Math in Literature and Film" by Adam Phipps
Phipps writes: "Mathematics has been confined to the linear world for centuries. So has literature, and in the past century, film. The subject of math in art has a long history with such notables as Bach with his musical offering and Escher and his drawings. As the presentation of mathematics has become more complex, with better understanding of concepts such as chaos, indeterminacy and chance -- so has literature and film, which has incorporating these concepts in storylines and basic structure. Film has proven a difficult medium to convey these concepts, forcing the conclusion: Is it possible to make a coherent film that possesses aspects of, and demonstrates these concepts as has been done in literature?

Plus displays of geometric art by Mary Teetor, Bill Blackwell, Trudy Myrrh Reagan and Eleanor Kent.

Contact: Trudy Reagan, 650-856-9593,
trudy.myrrh@stanfordalumni.org
Complete information listed at http://www.ylem.org

PHILIP K. DICK ON BLADE RUNNER
By Vic Bulluck

All I can say is that the world in BLADE RUNNER is where I really live. That is where I think I am anyway. This world will now be a world that every member of the audience will inhabit. It will not be my private world. It is now a world where anyone who will go into the theatre and sit down and watch that film will be caught up and the world is so overpowering, it is so profoundly overpowering that it is going to be very hard for people to come out of it and adjust back to what we normally encounter.

Cover to British Edition of Do Androids Dream of Electric Sheep - art by Chris Moore

Once the film begins, you are taken from this world into that world and you really are in that world. And I think the most exciting thing is that it is a lived-in world. A world where people actually live. It is not a hygienically pristine space colony which looks like a model seen at the Smithsonian Institute. No, this is a world where people live. And the cars use gas and are dirty and there is kind of a gritty rain falling and it's smoggy. It's just terribly convincing when you see it.

Everybody seems to have some kind of business that he is engaged in. Everybody is involved in some kind of thing. Which is what you really do see in a big metropolis. You always wonder, who are these people? Where are they going? What are they doing? What kind of lives are they leading? You become endlessly curious about this amazingly complex life of the metropolis. What exists behind those closed doors? What is going on behind those lighted windows? You get a glimpse but you never get the full story.

One day I woke up and realized that there are 47,000 barrels of nuclear waste that have been dumped in the Atlantic and about half that in the Pacific. In 45 years these thousands and thousands of barrels of nuclear waste, radioactive waste will begin to leak into the ocean and begin to destroy the life chain at its source. And I suddenly realized that, although I won't be alive when it happens, my children and other people will be alive. I realized that this is the most urgent problem that faces us. Destruction of the ocean is destruction of the whales, the porpoises and the life chain itself. We are poisoning our entire life and we really must be the guardians and the caretakers of the whole biosphere. I always thought of it as a hypothetical situation and all of a sudden it became extremely real.

The Voight-Kampff empathy test is probably as valid a test as there is ever going to be–because it is testing for something beyond intelligence, but which is still a form of intelligence. It is sort of a higher form of intelligence, that is, a concern for other living beings. What the test really asks the replicant to demonstrate is a reciprocal concern for other life. One is concerned for the replicants and one asks in return from the replicants a concern for the lives of other creatures. The replicants are entitled to this concern but only if they themselves exhibit it.

The purpose of the story as I saw it was that in his job of hunting and killing these replicants, Deckard becomes progressively dehumanized. At the same time, the replicants are perceived as becoming more human. Finally Deckard must question what he is doing, and really what is the essential difference between him and them? And, to take it one step further, who is he if there is no real difference?

Seeing Rutger Hauer as Batty just scared me to death, because it was exactly as I had pictured Batty, but more so. I could have picked Sean Young out of a hundred different women as Rachael. She has that look.

Of course Harrison Ford is more like Rick Deckard than I could have even imagined. I mean it is just incredible. It was simply eerie when I first saw the stills of Harrison Ford. I was looking at some stills from the movie and I thought, this character, Deckard, really exists. There was a time that he did not exist, now he actually exists. But he is not the result of any one individual's conception or effort. He is the result of my effort, Hampton Fancher's efforts, David Peoples' efforts, Ridley Scott's efforts, and to a very large extent, Harrison Ford's efforts. And there is actually, in some eerie way, a genuine, real, authentic Deckard now.

Friends of mine who looked at the photographs, who read the novel, said, "Do you realize that if you had not written that book, Harrison Ford would not be wearing that tie, he would not be wearing those shoes?" And I said, "That is true. But what is more exciting is that if Harrison Ford had not played that role, Deckard would never have become an actual person." Ford radiates this tremendous reality when you see him. And seeing him as a character I created is a stunning and almost supernatural experience to me.

PIGS IN CYBERSPACE
By Hans Moravec (1992)

Exploration and colonization of the universe awaits, but earth-adapted biological humans are ill-equipped to respond to the challenge. Machines have gone farther and seen more, limited though they presently are by insect-like behavioral inflexibility. As they become smarter over the coming decades, space

will be theirs. Organizations of robots of ever increasing intelligence and sensory and motor ability will expand and transform what they occupy, working with matter, space and time. As they grow, a smaller and smaller fraction of their territory will be undeveloped frontier. Competitive success will depend more and more on using already available matter and space in ever more refined and useful forms. The process, analogous to the miniaturization that makes today's computers a trillion times more powerful than the mechanical calculators of the past, will gradually transform all activity from grossly physical homesteading of raw nature, to minimum-energy quantum transactions of computation. The final frontier will be urbanized, ultimately into an arena where every bit of activity is a meaningful computation: the inhabited portion of the universe will be transformed into a cyberspace.

Hans Moravec in 1992

Because it will use resources more efficiently, a mature cyberspace of the distant future will be effectively much bigger than the present physical universe. While only an infinitesimal fraction of existing matter and space is doing interesting work, in a well developed cyberspace every bit will be part of a relevant computation or storing a useful datum. Over time, more compact and faster ways of using space and matter will be invented, and used to restructure the cyberspace, effectively increasing the amount of computational spacetime per unit of physical spacetime.

Computational speedups will affect the subjective experience of entities in the cyberspace in a paradoxical way. At first glimpse, there is no subjective effect, because everything, inside and outside the individual, speeds up equally. But, more subtly, speedup produces an expansion of the cyber universe, because, as thought accelerates, more subjective time passes during the fixed (probably lightspeed) physical transit time of a message between a given pair of locations--so those fixed locations seem to grow farther apart. Also, as information storage is made continually more efficient through both denser utilization of matter and more efficient encodings, there will be increasingly more cyber-stuff between any two points. The effect may somewhat resemble the continuous-creation process in the old steady-state theory of the physical universe of Hoyle, Bondi and Gold, where hydrogen atoms appear just fast enough throughout the expanding cosmos to maintain a constant density.

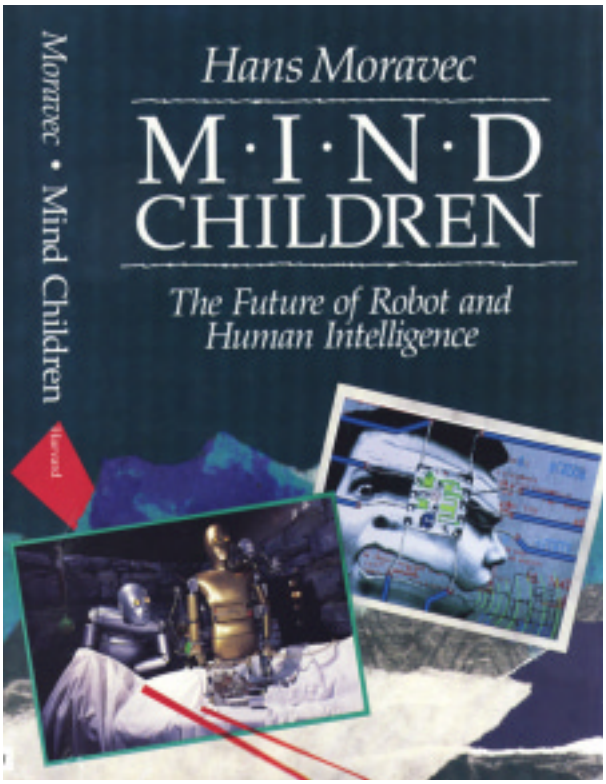
A quantum-mechanical entropy calculation by Bekenstein suggests that the ultimate amount of information that can be stored given the mass and volume of a hydrogen atom is about a megabyte. But let's be conservative, and imagine that at some point in the future only "conventional" physics is in play, but every few atoms stores a useful bit. There are about 1056 atoms in the solar system. I estimate that a human brain-equivalent can be encoded in less than 1015 bits. If a body and surrounding environment takes a thousand times more storage in addition, a human, with immediate environment, might consume 1018 bits. An AI with equivalent intelligence could probably get by with less, since it does without the body-simulation "life support" needed to keep a body-oriented human mind sane. So a city of a million human-scale inhabitants might be efficiently stored in 1024 bits. If the atoms of the solar system were cleverly rearranged so every 100 could represent a bit, then a single solar system could hold 1030 cities--far more than the number (1022) of stars in the visible universe ! Multiply that by 1011 stars in a galaxy, and one gets 1041 cities per galaxy. The visible universe, with 1011 galaxies, would then have room for 1051 cities--except that by the time intelligence has expanded that far, more efficient ways of using spacetime and encoding data would surely have been discovered, increasing the number much further.

Start with the concepts of telepresence and virtual reality. You wear a harness that, with optical, acoustical, mechanical and chemical devices controls all that you sense, and measures all of your actions. Its machinery presents pictures to your eyes, sounds to your ears, pressures and temperatures to your skin, forces to your muscles and even smells and tastes for the remaining senses. Telepresence results when the inputs and outputs of this harness connect to a distant machine that looks like a humanoid robot. The images from the robot's two camera eyes appear on your "eyeglass" viewscreens, and you hear through its ears, feel through its skin and smell through its chemical sensors. When you move your head or body, the robot moves in exact synchrony. When you reach for an object seen in the viewscreens, the robot reaches for the object, and when it makes contact, your muscles and skin feel the resulting weight, shape, texture and temperature. For most practical purposes you inhabit the robot's body--your sense of consciousness has migrated to the robot's location, in a true "out of body" experience.

Virtual reality retains the harness, but replaces the remote robot with a computer simulation of a body and its surroundings. When connected to a virtual reality, the location you seem to inhabit does not exist in the usual physical sense, rather you are in a kind of computer-generated dream. If the computer has access to data from the outside world, the simulation may contain some "real" items, for instance representations of other people connected via their own harnesses, or even views of the outside world, perhaps through simulated windows.

One might imagine a hybrid system where a virtual "central station" is surrounded by portals that open on to views of multiple real locations. While in the station one inhabits a simulated body, but when one steps through a portal, the harness link is seamlessly switched from the simulation to a telepresence robot waiting at that location.

The technical challenges limit the availability, "fidelity" and affordability of telepresence and virtual reality systems today--in fact, they exist only in a few highly experimental demonstrations. But progress is being made, and its possible to anticipate a time, a few decades hence, when people spend more time in remote and virtual realities than in their immediate surroundings, just as today most of us spend more time in artificial indoor surroundings than in the great outdoors. The remote bodies we will inhabit can be stronger, faster and have better senses than our "home" body. In fact, as our home body ages and weakens, we might compensate by turning up some kind of "volume control." Eventually, we might wish to bypass our atrophied muscles and dimmed senses altogether, if neurobiology learns enough to connect our sensory and motor nerves directly to electronic interfaces. Then all the harness hardware could be discarded as obsolete, along with our sense organs and muscles, and indeed most of our body. There would be no "home" experiences to return to, but our remote and virtual existences would be better than ever.



Mind Children by Hans Moravec (1988)

The picture that we have now is a "brain in a vat," sustained by life-support machinery, and connected by wonderful electronic links, at will, to a series of "rented" artificial bodies at remote locations, or to simulated bodies in artificial realities. But the brain is a biological machine not designed to function forever, even in an optimal physical environment. As it begins to malfunction, might we not choose to use the same advanced neurological electronics that make possible our links to the external world, to replace the gray matter as it begins to fail? Bit by bit our brain is replaced by electronic equivalents, which work at least as well, leaving our personality and thoughts clearer than ever. Eventually everything has been replaced by manufactured parts. No vestige of our original body remains, but our thoughts and awareness continue. We will call this process, and other approaches with the same end result, the downloading of a human mind into a machine. After downloading, our personality is a pattern impressed on electronic hardware, and we may then find ways to move our minds to other similar hardware, just as a computer program and its data can be copied from processor to processor. So not only can our sense of awareness shift from place to place at the speed of communication, but the very components of our minds may ride on the same data channels. We might find ourselves distributed over many locations, one piece of our mind here, another piece there, and our sense of awareness at yet another place. Time becomes more flexible--when our mind resides in very fast hardware, one second of real time may provide a subjective year of thinking time, while a thousand years of real time spent on a passive storage medium may seem like no time at all. Can we then consider ourselves to be a mind without a body? Not quite.

A human totally deprived of bodily senses does not do well. After twelve hours in a sensory deprivation tank (where one floats in a body-temperature saline solution that produces almost no skin sensation, in total darkness and silence, with taste and smell and the sensations of breathing minimized) a subject will begin to hallucinate, as the mind, somewhat like a television tuned to a nonexistent channel, turns up the amplification, desperately looking for a signal, becoming ever less discriminating in the theories it offers to make sense of the random sensory hiss it receives. Even the most extreme telepresence and virtual reality scenarios we have presented avoid complete bodylessness by always providing the mind with a consistent sensory (and motor) image, obtained from an actual remote robot body, or from a computer simulation. In those scenarios, a person may sometimes exist without a physical body, but never without the illusion of having one.

But in our computers there are already many entities that resemble truly bodiless minds. A typical computer chess program knows nothing about physical chess pieces or chessboards, or about the staring eyes of its opponent or the bright lights of a tournament. Nor does it work with an internal simulation of those physical attributes. It reasons instead with a very efficient and compact mathematical representation of chess positions and moves. For the benefit of human players this internal representation is sometimes translated to a recognizable graphic on a computer screen, but such images mean nothing to the program that actually chooses the chess moves. For all practical purposes, the chess program's thoughts and sensations--its consciousness--is pure chess, with no taint of the physical, or any other, world. Much more than a human mind with a simulated body stored in a computer, a chess program is a mind without a body.

So now, imagine a future world where programs that do chess, mathematics, physics, engineering, art, business or whatever, have grown up to become at least as clever as the human mind. Imagine also that most of the inhabited universe has been converted to a computer network--a cyberspace--where such programs live, side by side with downloaded human minds and accompanying simulated human bodies. Suppose that all these entities make their living in something of a free market way,

trading the products of their labor for the essentials of life--in this world memory space and computing cycles. Some entities do the equivalent of manual work, converting undeveloped parts of the universe into cyberspace, or improving the performance of existing patches, thus creating new wealth. Others work on physics or engineering problems whose solutions give the developers new and better ways to construct computing capacity. Some create programs that can become part of one's mental capacity. They trade their discoveries and inventions for more working space and time. There are entities that specialize as agents, collecting commissions in return for locating opportunities and negotiating deals for their clients. Others act as banks, storing and redistributing resources, buying and selling computing space, time and information. Some we might class as artists, creating structures that don't obviously result in physical resources, but which, for idiosyncratic reasons, are deemed valuable by some customers, and are traded at prices that fluctuate for subjective reasons. Some entities in the cyberworld will fail to produce enough value to support their requirements for existence--these eventually shrink and disappear, or merge with other ventures. Others will succeed and grow. The closest present day parallel is the growth, evolution, fragmentation and consolidation of corporations, whose options are shaped primarily by their economic performance.

A human would likely fare poorly in such a cyberspace. Unlike the streamlined artificial intelligences that zip about, making discoveries and deals, reconfiguring themselves to efficiently handle the data that constitutes their interactions, a human mind would lumber about in a massively inappropriate body simulation, analogous to someone in a deep diving suit plodding along among a troupe of acrobatic dolphins. Every interaction with the data world would first have to be analogized as some recognizable quasi-physical entity: other programs might be presented as animals, plants or demons, data items as books or treasure chests, accounting entries as coins or gold. Maintaining such fictions increases the cost of doing business, as does operating the mind machinery that reduces the physical simulations into mental abstractions in the downloaded human mind. Though a few humans may find a niche exploiting their baroque construction to produce human-flavored art, more may feel a great economic incentive to streamline their interface to the cyberspace.

The streamlining could begin with the elimination of the body-simulation along with the portions of the downloaded mind dedicated to interpreting sense-data. These would be replaced with simpler integrated programs that produced approximately the same net effect in one's consciousness. One would still view the cyber world in terms of location, color, smell, faces, and so on, but only those details we actually notice would be represented. We would still be at a disadvantage compared with the true artificial intelligences, who interact with the cyberspace in ways optimized for their tasks. We might then be tempted to replace some of our innermost mental processes with more cyberspace-appropriate programs purchased from the AIs, and so, bit by bit, transform ourselves into something much like them. Ultimately our thinking procedures could be totally liberated from any traces of our original body, indeed of any body. But the bodiless mind that results, wonderful though it may be in its clarity of thought and breadth of understanding, could in no sense be considered any longer human.

Robot by Hans Moravec (1998)

So, one way or another, the immensities of cyberspace will be teeming with very unhuman disembodied superminds, engaged in affairs of the future that are to human concerns as ours are to those of bacteria. But, once in a long while, humans do think of bacteria, even particular individual bacteria seen in particular microscopes. Similarly, a cyber being may occasionally bring to mind a human event of the distant past. If a sufficiently powerful mind makes a sufficiently large effort, such recall could occur with great detail--call it high fidelity. With enough fidelity, the situation of a remembered person, along with all the minutiae of body, thoughts, and feelings would be perfectly recreated in a kind of mental simulation: a cyberspace within a cyberspace where the person would be as alive there as anywhere. Sometimes the recall might be historically accurate, in other circumstances it could be artistically enhanced: it depends on the purposes of the cybermind. An evolving cyberspace becomes effectively ever more capacious and long lasting, and so can support ever more minds of ever greater power. If these minds spend only an infinitesimal fraction of their energy contemplating the human past, their sheer power should ensure that eventually our entire history is replayed many times in many places, and in many variations. The very moment we are now experiencing may actually be (almost certainly is) such a distributed mental event, and most likely is a complete fabrication that never happened physically. Alas, there is no way to sort it out from our perspective: we can only wallow in the scenery.

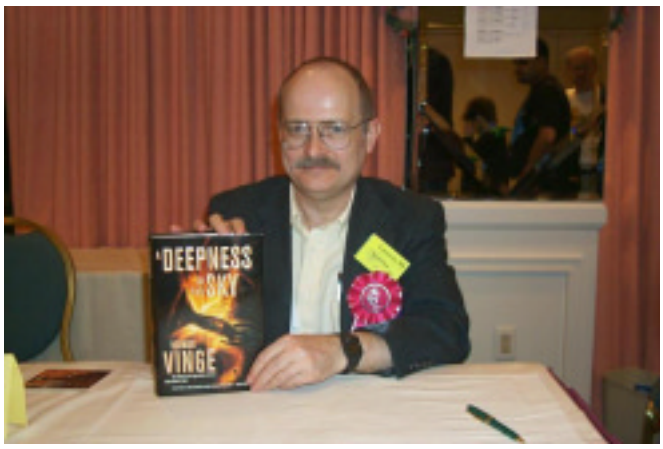
[Hans Moravec, of the Robotics Institute of Carnegie-Mellon University, is the author of Mind Children and Robot. www.ri.cmu.edu/~hpm]

Nature, Bloody in Tooth and Claw?
Vernor Vinge

www-rohan.sdsu.edu/faculty/vinge/
www.frc.ri.cmu.edu/~hpm/

The original version of this article was prepared for the 1996 British National Science Fiction Convention (Evolution).

The notion of evolution has frightening undertones. The benevolent view of Mother Nature in many children's nature films often seems a thin facade over an unending story of pain and death and betrayal. For many, the basic idea behind evolution is that one creature succeeds at the expense of another, and that death without offspring is the price of failure. In the human realm, this is often the explanation for the most egregious personal and national behavior. This view percolates even into our humor. When someone commits an extreme folly and is



Vernor Vinge with his novel A Deepness in the Sky

fatally thumped for it, we sometimes say, "Hey, just think of it as evolution in action."

In fact, these views of evolution are very limited ones. At best they capture one small aspect of the enormous field of emergent phenomena. They miss a paradigm for evolution that predates Lord Tennyson's "bloody in tooth and claw" by thousands of million years. And they miss a paradigm that has appeared in just the last three centuries, one that may become spectacularly central to our world.

Long before humankind, before the higher animals and even the lower ones, there were humbler creatures ... the bacteria. These are far too small to see, smaller than even the single-celled eukaryotes like amoebas and paramecia. When most people think of bacteria at all, they think of rot and disease. More dispassionately, people think of bacteria as utterly primitive: "they don't have sex", "they don't have external organization", "they don't have cellular nuclei".

Certainly, I am happy to be a human and not a bacterium! And yet, in the bacteria we have a novelty and a power that are awesome. At the same time most folk proclaim the bacteria's primitive nature, they also complain of the bacteria's ability to evolve around our antibiotics. (And alas, this ability is so effective that what was in the 1950s and 1960s a medical inconvenience is becoming an intense struggle to sustain our antibiotic advantage, to avoid what Science magazine has called the "post anti-microbial era".) The bacteria have a different paradigm for evolution than the one we naively see in the murderous behavior of metazoans.

The bacteria do not have sex as we know it, but they do have something much more efficient: the ability to exchange genetic material among themselves -- across an immensely broad range of bacterial types. Bacteria compete and consume one another, but just as often both losers and winners contribute genetic information to later solutions. Though bacteria are correctly called a Kingdom of Life, the boundary between their "species" is nearly invisible. One might better regard their Kingdom as a library, containing some 4000 million years of solutions. Some of the solutions have not been dominant for a very long time. The strictly anaerobic bacteria were driven from the open surface almost 2000 million years ago, when free oxygen poisoned their atmosphere. The thermophilic bacteria survive in near-boiling water. Millions of less successful (or currently unsuccessful) solutions hide in niches around the planet. The Kingdom's Library has some very musty, unlit corners, but the lore is not forgotten: the Kingdom is a vast search and retrieval engine, creating new solutions from the bacteria's ability for direct transfer of genetic information. This is the engine which we with our tiny computers and laboratories are up against when we talk airily of "acquired antibiotic resistance". For the bacteria, evolution is a competition in which little is ever lost, and yet solutions are found. (I recommend the books of Lynn Margulis for a knowledgeable discussion of this point of view. Margulis is a world-class microbiologist whose writing is both clear and eloquent.)

For the most part, we metazoans have a strong sense of self. More, we have a very strong sense of boundary -- where our Self ends and the Otherness begins. It is this sense of self and of boundary that makes the process of evolution so unpleasant to many.

The bacterial Kingdom continues today. It has been stable for a very long time, and will probably be so for a long time to come. It has its limits, ones it seems unlikely ever to transcend. Nevertheless, I find some comfort in it as an alternative to the conflict and pain and death we see in evolution among the metazoans. And many of the bacteria's good features I see reflected in a second paradigm, one that has risen only in the last few centuries: the paradigm of the human business corporation.

Corporations do compete. Some win and some lose (not always for reasons that any sensible person would relate to quality!), and eventually things change, often in a very big way. Unlike bacteria, corporations exist across an immense range of sizes and can be hierarchical. As such, they have a capacity for complexity that does not exist in the bacterial model. And yet, like bacteria, their competition is mainly a matter of knowledge, and knowledge need never be lost. Very few participants actually die in their competition: the knowledge and in-

sight of the losers can often continue. As with the bacterial paradigm, the corporate model maintains only low thresholds between Selves. Very much unlike the bacterial paradigm, the corporate one admits of constant change (up and down) in the size of the Self.

At present, the notion of corporations as living creatures is whimsy or a legal contrivance (or a grim, Hobbesian excuse for tyranny), but we are entering an era where the model may be one to look at in a very practical sense. Our computers are becoming more and more powerful. I have argued elsewhere that computers will probably attain superhuman power within the next thirty years. At the same time, we are networking computers into a worldwide system. We humans are part of that system, the dominant and most important feature in its success. But what will the world be like when the machines move beyond our grasp and we enter the Post-Human era? In a sense that is beyond human knowing, since the major players will be as gods compared to us. Yet we see hints of what might come by considering our past, and that is why many people are frightened of the Post-Human era: they reason by analogy with our human treatment of the dumb animals -- and from that they have much to fear.

Instead, I think the other paradigms for competition and evolution will be much more appropriate in the Post-Human era. Imagine a worldwide, distributed reasoning system in which there are thousands of millions of nodes, many of superhuman power. Some will have knowable identity -- say the ones that are currently separated by low bandwidth links from the rest -- but these separations are constantly changing, as are the identities themselves. With lower thresholds between Self and Others, the bacterial paradigm returns. Competition is not for life and death, but is more a sharing in which the losers continue to participate. And as with the corporate paradigm, this new situation is one in which very large organisms can come into existence, can work for a time at some extremely complex problem -- and then may find it more efficient to break down into smaller souls (perhaps of merely human size) to work on tasks involving greater mobility or more restricted communication resources. This is a world that is frightening still, since its nature undermines what is for most of us the bedrock of our existence, the notion of persistent self. But it need not be a cruel world, and it need not be one of cold extinction. It may in fact be the transcendent nature dreamed of by many brands of philosopher throughout history.

DO ANDROIDS CATHECT?
by Loren Means

The first time the word "robot" was used was in a Czechoslovakian play produced in 1921 called R. U. R., written by Karel CapekThe fear of robot revolt is a central theme of R. U. R., and its political roots in the class struggles of the early part of the twentieth century is strikingly evident in a story written by Karel Capek and his brother Josef in 1908 entitled "System." In the story an industrialist describes his program for turning his workers into automatons:

> I have sterilized the workman and purified him: first I have destroyed in him all germs of altruism and friendship, family feeling, the sense for poetry and the transcendental; I have regulated his alimentary and sexual activities, I have made a desert of his environment."[1]

The tenor of regard for the workers is identical to that expressed by the manager of the robot factory toward the robots in R. U. R.: "Robots do not hold on to life. They can't. They have nothing to hold on with--no soul, no instinct. Grass has more will to live than they do." [2]

In both Capek works, the workers revolt and kill their masters. In "System," the workers achieve the consciousness that leads to revolt through sexuality, and at the end of R. U. R. it is suggested that the sexually-based feelings a male and female robot share will lead to their being able to procreate. The robots achieve revolutionary consciousness because they are modified to become more like humans than their original conception. This comes about through two factors; first, the robots must be sensitized to feel pain. As a human scientist puts it:

> We must introduce suffering...for industrial reasons. Robots sometimes damage themselves because nothing hurts them. They put their hands into machines, break their fingers, smash their heads--it's all the same to them. We must give them pain--it's a built-in safeguard against damage. [3]

The other factor leading to the humanization and consequent revolt of the robots is the introduction into them of a "soul" by the same scientist, who is persuaded to do so by a female representative of the Humanity League, an organization formed by humans to improve the lot of the robots. The end result of both Capek works is the same: in "System," disaster results from the company owner's attempt to reduce his workers to automatons; in R. U. R. the debacle is the result of attempting to elevate the automatons to the capacities of humans.

This dominant strain of androids depicted as dangerous to humans is opposed by another tradition of science fiction which posits the robots as rendered harmless and helpful. Isaac Asimov, one of the most prolific and influential creators of fictional robots, was displeased with the dystopian nature of R. U. R.:

> It is perhaps not surprising that a technological advance, imagined in 1921, was seen as resulting in universal disaster. Remember that World War I, with its tanks, airplanes, and poison gas, had just ended and had showed people "the dark side of the force," to use Star Wars terminology...I could not bring myself to believe that if knowledge presented danger, the solution was ignorance...The solution had to be wisdom. You did not refuse to look at danger, rather you learned how to handle it safely. [4]

Asimov began writing stories about benevolent robots, and in 1942 formulated the Three Laws of Robotics:

1--A robot may not injure a human being, or, through inaction, allow a human being to come to harm.
2--A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
3--A robot must protect its own existence as long as such protection does not conflict with the First or Second Law. [5]

These immutable laws were encoded into the robots when they were manufactured, effectively neutralizing any incipient threat that the robots might pose.

The androids named in the Terminator and RoboCop films are in fact cyborgs, postulating human flesh integrated with metal. Being entirely synthetic, the Terminator cyborgs have artificial brains which are closer to computers than human brains. Note the use of the term "memory" to describe cyborg learning in the novelization of the script of Terminator:

> He walked to the edge of the parking lot and looked out on the city below. A map from his memory overlaid itself on the scene...He...studied the relief map of Los Angeles, planning a hundred strategies, charting a thousand pathways, and accumulating valuable environmental data before setting off on his mission... After he'd first stolen the station wagon, it had taken him about sixteen minutes to adjust to the random pattern of city traffic...But then he learned to calculate the ebb and flow of the vehicles and through memory and analysis of contextual activity piece together the rules of the road. [6]

Arnold Schwarzennegger as the Terminator

The Terminators have no emotions, and their principle reason for existence, in addition to their indestructability, is their inexorable tenacity. Since they are incapable of empathy or indecision, they do not swerve from their task until annihilated, like any machine.

This lack of emotion is rendered slightly problematical and somewhat humorous in the second film, in which the murderous cyborg of the first film is recast in the role of protector. He has been captured by the humans and reprogrammed to kill other Terminators and all humans who threaten the life of the leader of the humans in the future, John Connor. (It is announced in one of the novelizations that the war between the humans and the cyborgs had already been won by the humans when the first Terminator was sent into the past to reverse the victory retroactively.) The Terminator of the first film is pitted against his replacement, the next model, who is physically superior to him. Consequently, as in the Alien films, the aggressor robot of the first film is reversed into an underdog in the sequel.

The cyborg in the RoboCop films, on the other hand, is an almost total augmentation of a previously constituted human. All that remains of him is the bottom half of his face and his brain. It is not explained why either of these items is retained. The fact that his brain is human rather than a computer not only does not add anything to his performance, it is positively detrimental. The designers stated that they have erased his "memories," (they do not say how), but the memories recur nonetheless, causing hesitation and untoward behavior. The fact that the cyborg would also be susceptible to emotions (since no mention is made of "erasing" them) is ignored, with the implied supposition that erasing the memories would stifle the emotions as well. This implied identity of emotion and memories is maintained throughout the films, for the situations in which emotions arise are those connected with the return of supposedly lost memories.

It is interesting to conjecture which cyborg would win a battle between Robocop and even the first Terminator. Strength factors being equal, Robocop would constantly be the potential victim of his schizophysiology, which could hamper and undermine his performance at any time. Terminator would also be able, with his computer brain, to calculate possibilities faster than RoboCop and so come up with more strategies, as in a chess game. On the other hand, RoboCop would have the advantage of the creativity of the human mind, which could be the spark that would cause him ultimately to triumph. This would depend on the extent to which creativity had been suppresed in RoboCop by his creators, along with memories and concomitant emotion.

RoboCop might also have an advantage over Terminator in that the human brain is capable of simultaneous processing of divergent data, whereas the computer (at least at this point) is locked into linear processing, one step at a time. (Computers can "multitask" more than one job at a time, but they do this by "swapping out" an activity in one program and substituting an activity in another program, still in linear progression. More powerful computers can now handle "parallel processing," which is two streams of linear processing. No computer can duplicate the human brain's capacity for simultaneous processing of widely divergent tasks.)

Although this hypothetical encounter of the cyborgs does not exist on film, it has been imagined in the comic book series RoboCop Versus Terminator, written by Frank Miller in 1992. In that series, RoboCop emerges victorious, although his method

of winning is not revealed. Rather Miller makes some provocative allusions to the nature of RoboCop's human brain and its relation to the cybernetic nature of his being. Miller postulates that the Terminators are created by harnessing RoboCop's brain:

> Part machine, part man–the only mind to join with software–and to command it–to manipulate it–it is so stupid, after all, this software. So limited. It can only gather and sort–while he can posit and conjecture and guess...Free associate. Is it possible? Can his mind make the computers think and desire? Yes! Can he give them life? Yes! Guess. Imagine. Is it possible? Yes!

Ridley Scott's film Blade Runner, shot in 1982, was based loosely on a novel by Philip K. Dick entitled Do Androids Dream of Electric Sheep? which was published in 1968. Patricia Warrick has identified the androids in this novel as representing the left hemisphere of the brain, the intellectual, unfeeling side, while the human protagonists represent the right hemisphere, the intuitive, empathetic side. [8]

A 1984 interview with Ridley Scott demonstrates that he held his assumptions about android consciousness to be self-evident: "If you create a machine through genetic engineering, biochemistry, or whatever, the very fact that it has been created by a human being indicates to me that when it becomes truly sophisticated it will ultimately be free-thinking. I'm sure that in the near future, computers will start to think for themselves and develop at least a limited set of emotions, and make their own decisions." [9]

Peter Weller as Robocop

Scott is "sure" of all this, but there is no evidence or logical basis to assume that machines could every become "truly sophisticated" enough to accomplish what Scott takes for granted. Scott's statement is reminisent of a pronouncement by Professor Marvin Minsky of M.I.T., who functioned as a technical consultant on Stanley Kubrick's film 2001, which featured a sentient killer computer:

> Today, machines solve problems mainly according to the principles we build into them. Before long, we may learn how to set them to work upon the very special problem of improving their own capacity to solve problems. Once a certain threshold is passed, this could lead to a spiral of acceleration and it may be hard to perfect a reliable `governor' to restrain it. [10]

Fred Glass is willing to accept the significance of android memories, although with a different emphasis:

> As in Robocop, [Quaid], the hero [of Total Recall] is an amnesiac, and the plot evolves from Quaid's attempt to recover his identity...This aspect of Total Recall recalls Blade Runner. The replicants' "memories," implanted at "birth," establish lives they've never lived, right down to photo albums of family and friends who have never existed. For Quaid the identity loss has occurred more recently. But for replicants, Robocop, and Quaid alike, their missing identity is a symbolic castration, a loss of power over their lives that must be regained...As individuals we are always attempting to recall things we have repressed...We are all amnesiacs, both in this individual-psychological sense and in a broader representation: as victims of social amnesia, the peculiar anti-historical mechanism of our culture that works to keep rulers and ruled in their places. [11]

Glass equates replicants (androids), Robocop (a cyborg with human memories), and Quaid (a human with implanted memories). But androids don't go through the human developmental stages, and consequently don't have any memories to repress (since these would be of no commercial use to their manufacturers.) It could be postulated that one of the ways that androids are superior to humans is the fact that they do not inherit the neurotic baggage of human childhood. Androids also differ from humans in that they not only do not have childhood memories, they also don't have amnesia regarding these childhood memories, which is also an essential aspect of the psychological makeup of psychically healthy humans. As psychologist W. R. D. Fairbairn put it:

> It is impossible for anyone to pass through childhood without having bad objects which are internalized and repressed...This would appear to be the real explanation of the classic massive amnesia for events of early childhood, which is only found to be absent in individuals whose ego is disintegrating (e.g. in incipient schizophrenics, who so often display a most remarkable capacity for reviving traumatic incidents of early childhood. [12]

Giuliana Bruno equates the fundamental condition of the android as akin to schizophrenia:

> The schizophrenic condition is characterized by the inability to experience the persistence of the "I" over time. There is neither past nor future at the two poles of that which thus becomes a perpetual present. Jameson writes, "The schizophrenic does not have our experience of temporal continuity but is condemned to live a perpetual present with which the various moments of his or her past have little connection and for which there is no conceivable future on the horizon." [13] Replicants are condemned to a life composed only of a present tense; they have neither past nor memory. There is for them no conceivable future. They are denied a personal identity, since they cannot name their "I" as an existence over time. [14]

Bruno could have done well to quote Jameson's closing statement: "The informational function of the media would thus be to help us forget, to serve as the very agents and mechanisms for our historical amnesia." [15]

The relationship of the lack of affect manifested by the schizophrenic and the characteristic reaction patterns of androids is developed much more extensively in Dick's novel than in Scott's film, and the danger of killing a schizoid human who is mistaken for an android is a running theme throughout the book. Dick himself suffered from mental disturbances throughout his life, and it is speculated that the stroke which killed him was stress-related. Dick made this statement regarding the role of schizophrenia in his work:

Rutger Hauer as the android Roy Batty in Blade Runner

> I draw a sharp line between the schizoid personality and actual schizophrenia, which I have the utmost respect for, and for the people who do it--or have it, whatever. I see it this way: the schizoid personality overuses his thinking function at the expense of his feeling function (in Jungian terms) and so has inappropriate or flattened affect; he is android-like. But in schizophrenia, the denied feeling function breaks through from the unconscious in an effort to establish balance and parity between the functions. Therefore it can be said that in essence I regard what is called "schizophrenia" as an attempt by a one-sided mind to compensate and achieve wholeness: schizophrenia is a brave journey into the realm of the archetypes, and those who take it--who will no longer settle for the cold schizoid personality--are to be honored. Many never survive this journey, and so trade imbalance for total chaos, which is tragic. Others, however, return from the journey in a state of wholeness; they are the fortunate ones, the truly sane. Thus I see schizophrenia as closer to sanity (whatever that may mean) than the schizoid is. The terrible danger about the schizoid is that he can function; he can even got hold of a position of power over others, whereas the lurid schizophrenic wears a palpable tag saying, "I am nuts, pay no attention to me." [16]

Dick's formulation of the schizoid/schizophrenic dichotomy is surprisingly accurate for a layman. Dr. Thomas Ogden, a prominent psychiatrist and educator, states the difference:

> Schizophrenia stands in marked contrast to the schizoid personality organization in that the former represents a fragmentation (disorganization) of the personality, whereas the latter represents a form of psychological cohesiveness based on stable (though often rigid) internal object relationships. [17]

Dick tended to equate the schizoid state with the left side of the brain, and schizophrenia with the right side of the brain. Joseph Bogen sees the different hemispheres of the brain as processing information in different ways based on temporal considerations. As he puts it, "The most important distinction between the left and right hemisphere modes...is the extent to which a linear concept of time participates in the ordering of thought." [18] In this formulation, the functions of the left hemisphere are in time but not in space, whereas the functions of the right hemisphere are in space but not in time.

It is conceivable that the freedom from the sense of the temporal would render androids innately superior to humans, and any acquisition of human traits by the androids would actually be an impoverishment. In Blade Runner, Tyrell tries to suggest this to Roy Batty, the android whom Scott tries to elevate to heroic status, by suggesting to him that the intensity of Batty's experience should outweigh considerations of longevity. Batty insists on longevity instead, and when Tyrell cannot provide it, Batty twists the Oedipal situation in that he blinds his father in the process of killing him. Batty recapitulates the history of humanity by renouncing the perpetual present of infancy for the historicity of the Oedipal conflict.

The limbic system of the brain is the seat of emotion, but it is also the locus of attention and the learning and memory of motor functions. Idea formation and speculation take place in the neocortex. The emphasis Dick placed on the right brain/left brain dichotomy begs the question of the ultimate lack of need of neocortical functions on the part of computers/robots. Robots need principally limbic functions of learning and memory. They do not speculate in the way that humans do, in that they do not use

intuition or emotion or faith in making decisions. Computers can test conditions and draw conclusions, and they can run through possible scenarios rapidly (as in chess), but the genius of the human mind lies in its ability to combine limbic and neocortical functions in uniting knowlege and awareness of possibility with the emotional resonance of the hunch.

The main difference between robots and people is that robots have an incomplete limbic system--they have learning and memory without emotion. Ridley Scott's speculation that androids would develop emotions is spurious. It is doubtful if emotion could be replicated in an artificial construct. Models for learning and memory exist in the world of math and machinery, but no models of emotion have been created. There is no machine that gets angry, at this point. Putting a computer brain into a robot body and having it emulate a human is already to a limited extent a reality. Putting emotion into an android is an order of magnitude away from that. What kind of machine would it be? How would it work? And why would it be necessary?

Science fiction that simply posits that androids have emotions because they were engineered to have them begs these questions, and is irresponsible. Scott's concept of adding "memories" to "cushion" android-developed emotions is absurd, and backwards. Scientists can make a robot that perceives, learns, and remembers. It cannot "feel pain" in the sense that Capek raised, but it can measure levels of temperature and pressure and take appropriate action to avoid damage to itself. Likewise it could evaluate aspects of its experiences and accumulate comparative data in such a way as to take action as though motivated by emotion.

A prominent British science fiction author, Brian Aldiss, discusses the difference between humans and robots:

> Order is not possible in human affairs, or not at our present youthful evolutionary stage; nor will it be until we are reduced to a robotlike state of obedience. Robots, being amenable to laws and orders, are amenable to order. They make ideal citizens--but only of a dead culture.
>
> The ideas robots conform to are, of course, humanity's ideas. But man comprises emotion as well as intellect. Man, being whole, is always in conflict with his own ideas. Robots are only half human. In consequence, they are able to conform to man's intellectual ideas against which his spirit constantly rebels.
>
> If... we are to become beings without emotional tone, with merely automatic responses to given situations - then robots represent in symbolic form the next stage of human evolution. In which case, we should take heed of the warning and accept a measure of chaos in preference to a rule of logic. Such is the message we receive from the novels of Philip K. Dick, one of the best robotic-writers, because he generally uses his robots as buffers between the living and nonliving. Dick's...robots are paradigms of people isolated through illness, with low-voltage ontological currents. [19]

Harrison Ford as Rick Deckard in Blade Runner

The inversion of Dick's value system into the conception that the android state is inherently superior to that of the human is suggested by Ridley Scott's avowed desire to end Blade Runner with a strong suggestion that Deckard might be an android. As Mark Salisbury points out:

> "Blade Runner was not one of my favorite films," [Harrison Ford, who played Deckard] recalls. "I tangled with Ridley. He wanted the audience to find out that Deckard was a replicant, I fought that because I felt the audience needed somebody to cheer for."..."The original focus of the film ought to have been the fact, or at least the innuendo, that Harrison Ford is a replicant and that they were being turned loose deliberately," explains Scott now. "In other words, the whole thing was under control because that's the way the world was. I think that would have been the most satisfying ending In a way it's a bleak ending, but it's also a bleak film..." [20]

Even though Scott was overruled, some viewers, Thomas Byers among them, still entertained the possibility that Deckard might be a replicant:

"And even if he is taken to be a replicant, the film's cautionary point is simply reinforced, for the society portrayed is one that has become so cold that the robots are more human than the human beings." [21] Indeed, the overall effect of the tale is to indicate that in such a society the identifying characteristics of humanity (at least in the sense of humaneness) would be so drained away as to deconstruct more or less thoroughly the traditional human/robot (humane/inhumane, feeling/unfeeling) opposition. What SF has traditionally taken to be a difference between the human and the robotic would then emerge more clearly as a difference within the human. That this is in fact already the true locus of the opposition was the explicitly stated

position of the late Philip K. Dick:

> There is amongst us something that is a bi-pedal humanoid, morphologically identical to the human being but which is not human...Within our species is a bifurcation, a dichotomy between the truly human and that which mimics the truly human. [22]

Scott's film reflects a fundamental turn in the focus of dystopia which contemporary filmmakers are expressing, and in so doing embodying an essential difference between modernism and postmodernism. The science fiction writers created androids to illustrate the dangers of people being turned into machines by social oppression. As Yevgeny Zamyatin, author of the 1920 Russian dystopian novel We put it, "Life in big cities is like that in factories: it de-individualizes, makes people somehow all the same, machine-like." [23] In Philip K. Dick's worldview, the android represents the affectless, intellectualizing schizoid, while humanity is represented by the intuitive schizophrenic who is grounded, however painfully, in the reality of the present. The android exists in science fiction literature as an example of what humanity must strive to avoid becoming. Dick's greatest fear is expressed in his novel Vulcan's Hammer (1960): "The things became alive and the living organisms were reduced to things. Everything was turned inside out, like some terrible morbid view of reality." [24]

In Ridley Scott's filmic inversion of Dick's novel, the human remains schizoid, while at least one android reaches the heights of schizophrenia. While science fiction writers postulated androids that were deranged enough to think themselves superior to humans, contemporary sci-fi/horror filmmakers assert that it is humans who are deranged, and that the androids really are superior to them. Perhaps the definitive statement of this viewpoint is enunciated by Sarah Connor, single mother of the potential savior of humanity, in Terminator 2, as she realizes that the most frightening aspect of the cyborg, its unwavering singleness of purpose, is now the only remaining virtue:

> Watching John with the machine, it was suddenly so clear. The terminator would never stop, it would never leave him, it would never hurt him...it would always be there, and it would die to protect him. Of all the would-be fathers who came and went over the years, this thing, this machine, was the only one who measured up. In an insane world, it was the sanest choice.

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n. pronounced eylum, 1. a Greek word for the exploding mass from which the universe emerged.

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