'The Intelligent Machine as Anti-Christ'

ABSTRACT: As a sculptor and electronic media artist, I have realized that at a basic level, traditional sculpture and Artificial Intelligence have similar goals: the simulation of the human. This paper gathers ideas which to connect the two, in a loosely historical, interdisciplinary way. It traces a line forward from the Venus of Willendorf through Greek sculpture to Artificial Intelligence and robotics. It identifies a general drive in our species to anthropomorphism, and makes particular reference to the anthropomorphic machine. The idea of the robot as personification of fear/fascination with the technological complex is considered in this context. The paper identifies anthropmorphism and its relation to technological development as rich territory for the exercise of art.

> "...And what rough beast
> its' hour come round at last
> slouches toward Bethlehem to be born?"
>
> (W.B.Yeats. : The Second Coming.)

Two cultural tendencies seem to converge on the millenium. (1) One is ancient, the other is relatively young. The first is mans' desire to simulate himself, the urge to anthropomorphism. It seems that human intelligence has always interpreted the world outside in terms of itself: "Man is the measure of all things". We are bound to anthropomorphize.

One of the propositions underpinning this paper is that no particular medium of creative pursuit has a monopoly over any particular subject matter or concern. We could not suggest that the concern "love" is only available to the medium of poetry, nor that poetry can only be about 'love'; traditional cliche notwithstanding. Likewise I propose that anthropomorphism inhabits various aspects of cultural practice at various times, it is not confined to any one discipline, period or cult.

The second tendency converging on the millenium is the gradual erosion of the established qualities by which the race defines itself to be unique. In earlier times, man defined himself with respect to animals and the distinctions were clear and stable. Now it is with respect to the machine that man defines himself. This is paradoxical because the machine is itself a product of man.

As the machine encroaches ever further on these sacrosanct human qualities, it induces fear. There is a psychological fear that we will be made irrelevant by our own creation, as the aging parent is by the adult child. The second fear is a pragmatic one: a fear of retrenchment as workplaces become automated. These fears have become 'personified' in the Robot, the anthropomorphized machine.

In using the term 'Robot' here I must clarify that the term has two concurrent and only vaguely related forms. The first, historically, is the robot in literature, amongst which we must count Frankensteins' monster as a precursor. (Life, once again, mimics art.) The term 'Robot' is itself a product of literature, it was coined by Czech playwright Karel Capek in his play 'Rossums' universal robots" of 1921.(2) The second is robot of science and industry. These correspond roughly to the two types of fear outlined above.

A robotics professional might object that current and future generations of industrial robots become less and less anthropomorphic. Indeed, all new technologies are modelled on previous technologies and 'become' themselves through development. In the case of the motor car the model was the horse-drawn carriage, in the case of the robot it is the human body. There remain many decidedly anthropomorphic projects.

The point at which an device ceases being a robot and becomes and automated machine or system is to my knowledge, not clearly defined. A toaster can be regarded as a primitive robot. In the same sense the point at which a form ceases to be anthropomorphic is ill defined. This question was a major issue in modernist sculpture. As the focus of this discussion is anthropomorphism I will concern myself with robots which possess anthropmorphic features. For the purpose of this argument I claim a wider than usual definition of the term to include not only objects whose static form resembles the human, but devices whose functioning is modelled on human processes. In these terms, although externally less anthropmorphic than its fictional cousin, the modern industrial robot is still predicated on anthropmorphic premises.

Robotics and Gender Politics

It is sobering to reflect on the gender of the creators of robots both in fiction and fact. They tend

overwhelmingly to be men. One wonders if there is not some kind of a sexist agenda built right into the entire study. On a psychological level one might hypothesize an overcompensation for 'womb envy'. On a social/political level it is conceivable (no pun intended) that they may well express a desire to make women redundant and powerless. In this regard, it may be construed as a covert expression of patriarchal values.

This desire to replicate human life by other than the usual means is not restricted to robotics. Biological engineering and particularly in-vitro fertilisation are major enterprises of that variety. In her eclectic essay of 1984, Donna Haraway notes: "Pre cybernetic machines... were not self moving, self designing, automouous. They could not achieve mans' dream, only mock it. They were not man, an author to himself, but only a caricature of that masculinist reproductive dream. To think otherwise was paranoid. Now we are not so sure. Late twentieth century machines have made thoroughly ambiguous the difference between natural and artificial, mind and body, self developing and externally designed and many other distinctions that used to apply to organisms and machines." (3)

In-vitro fertilisation can also be seen as a scientific realization of the ancient alchemical enterprise to create the homunculus, which, one might hypothesize, was prompted by a similar male drive. I am not aware of any alchemical exercise to create 'the little woman', nor of female alchemists. These qustions are however, a diversion from the subject of this paper: the enterprise of artificially procreating real people is a study in itself. In this paper I concern myself specifically with the creation of simulated people.

Gods in the Image of Man

Anthropomorphic sculpture is the earliest of the forms of simulated people. We must assume that before sculpture was regarded as a *cultural form* , a conventionalized practice, it was considered simply as a *representation* . Whether the Venus of Willendorf was a representation (in the sense of a portrait) of a specific woman or represented womanhood in general, or represented a fertility deity; we might confidently assert that she was not made to be put in a museum. The Greeks, the Egyptians, the Chinese and the Indians we must recall, stuccoed and polychromed their sculpture to achieve the closest possible verisimilitude.

Greek myth is replete with stories of the non genetic creation of people. The stories of Talos and of Galatea are two examples. They are both statues breathed with life by the Gods. Deities in general tend to be anthropmorphic: from the various Greek, Egyptian and Hindu deities with their human bodies and animal heads, to the God of the Hebrews. (Who was created in whose image is a moot point.) I suggest that the 'Robot' of literature and cinema should be considered in this way, an anthropmorphic 'deification' or objectification of a perceived 'power' in contemporary culture.

Kinesthesia and Clockwork

We are dynamic beings whose nature is located in movement as much as it is in form. As Buckminster Fuller said: 'I seem to be a verb'. We move through space and a significant part of our perceptual machinery is devoted to recognising time based pattern. We recognise things by the way they move, as much as by their static appearance. Cassius, in Shakespeares' Julius Caesar says: "'Tis Cinna; I do know him by his gait; He is a friend."(4) It was not long before the static likeness was made redundant by the development of practical mechanics which could *articulate* form. By 100AD, Hero of Alexandria had constructed many mechanized sculptures and tableaux powered by water.

It could be argued that 'sculpture' became a form of conventionalized cultural practice, became 'fossilized', at the point when technological development produced a technique more appropriate for creating likeness: a technology which could describe change through time; movement. This drive to anthropomorphism demonstrably occupies whatever technological and cultural niche provides the most sophisticated representation at any one time.

Medieval alchemy and Kabbalistically inspired necromancy are replete with attempts to create homunculi, as related in Goethe's Faust. We should recall that Dr Frankenstein served his esoteric

apprenticeship studying the works of Cornelius Agrippa, Albertus Magnus and Paracelsus. His monster was not wholly new, a product of the new scientific attitude, but was also the realization of the alchemists quest for the homunculus. Nor is the idea of an alchemically produced homunculus specifically western, ancient Chinese alchemy texts relate similar enterprises. Yiddish literature hosts a similar product of mystical science, the Golem.

Between Hero of Alexandria and Baroque Europe, the development of mechanical automata continued in Islamic culture. It is said that the Caliph of Baghdad had a golden tree upon which perched many silver mechanical birds which sang and flapped their wings. (This story is also related of the Byzantine Emperor Porphrygenitus.) They may have had anthropmorphic machines as well.

The invention of clockwork in the C17th enabled devices to become autonomous of external power sources. This brought about a plethora of new automata, the most spectacular being 'the clerk' by Jaquet-Drosz (1774), which dipped its quill into an inkwell and wrote a page of perfect copperplate text. Vaucansons' mechanical duck (1738) is extraordinary in the extent to which it simulated organic processes such as digestion. The device would 'eat', and shortly afterwards, shake its tail in a characteristically duck-like way and eject some foul smelling waste matter. Although these works achieved world renown, they were regarded as curiosities and spectacles and were not allowed into the hallowed halls of fine art.

Clockwork was the paradigmatic technology of the day. It was more than just a tool. It helped shape the world view of the culture. With the proliferation of clockwork and the new reality of machine divided time, people (among them Descartes) discussed the motion of the planets and the functions of the body in terms of this technology. Many of the clocks contained within them clockwork models of the movement of the planets and mechanized human and animal figures, the great astronomical clock of the Cathedral of Strasbourg being an extant example.

The proliferation of reliable and precise mechanical techniques during the industrial revolution allowed for more complex automata. Among these were the Theatra Mundi, mechanized theatrical dioramas popular in Europe and the USA in the C18&19th, which persist only in Department store Christmas window displays. (5)

Mechanical Reproduction and Modernism

Industrialization also introduced the spectre of industrial degradation of society which seeded an enduring cultural schizophrenia towards the machine, our slave and our master. Movements such as the Craft Movement of William Morris promoted and anti-industrial, anti-technological attitude among the makers of culture. These occured for the best possible reasons at the time. There was great cause for concern during the industrial expansion: for life and limb, liberty and the preservation of culture and tradition. (6)

From this point on the machine personified became the focus for this schizophrenia. Frankenstein is an early expedition into the area. By the time of Fritz Langs Metropolis, the familiar formula is complete: Rotwang says: "At last my work is ready. I have created a machine in the image of man, that never tires or makes a mistake. Now we have no further use for living workers...Give me another 24 hours and I'll give you a machine which no one will be able to tell from a human being." (7).

Charlie Chaplin in Modern Times depicts a naive and romantic symbolic defeat of the machine exactly by those qualities which make people unmachinelike. It is this act of definition *with respect to* or *in opposition to* the machine which indicates that it was no longer "nature", but the machine, against which man measured himself. Furthermore, there would be no need to make such protestations if it was not feared that the machine had the upper hand. As Albert Einstein responded to the publication of a book entitled '100 authors against Einstein': "If I were wrong, one would have been enough".

As late as the mid sixties, sculpture theorist Jack Burnham still employs this romantic dualism: "Without the advantages of cybernetics Tinguely has come closest to "humanizing" the machine. A precise definition of "human" is elusive. It is not an extension of the anthropomorphic precision which

characterizes the automata collection at Neuchatel. Rather, to be "human" is to expose oneself through animal vulnerability and fallibility. Standing alone in a room, one of Tinguely's metamechanical works appears nakedly subject to the whims of the gods -like the standing male nudes of archaic greece, the kouroi."[8]

Why have the anti-technological values of the Craft Movement remained stained onto the art community until the present day, while the immediate industrial conrterxt changed radicallly? My suspicion is that as the machine became more sophisticated, it began to encroach further into territory which was regarded as definingly human. For a machine to spin yarn or pump water is one thing. It is another thing entirely for it to create images (ie photography) and thereby threaten painting, one of those activites regarded as a crowning glory of the species. The suggestion that technological innovations made traditional art practices redundant, and thus prompted the explorations that resulted in modernism is one that is rarely entertained among art historians, but I believe that it is difficult to refute.

Giant Brains

During World War II electronic computing machines in Britain and the USA were developed by the likes of Alan Turing and John von Neumann. In attempting to endow these machines with powers of logic and reasoning, these researchers were modelling the mind outside the body. The model for this reasoning could not be other than human, and hence we enter the period of 'abstract' or 'disembodied' anthropomorphism. Alan Turing declared that artificial intelligence would be a reality by the year 2000 and devised a test (now known as the Turing test) by which one could assess computer intelligence. The test was sucessful if a human questioner could not distinguish between the responses of a human and a machine. It was baldly anthopocentric as it presupposed that the only and ultimate form of intelligence was that possessed by people.

In the following two decades, computer research split into two parallel streams, each with its boom periods. One of these streams was based in analog computing and emulated the sensorimotor behavior of its biological models. This was cybernetics.

Cybernetics is predicated on the notion that machines and living beings are essentially similar in the way they relate to the world. (This is the same as saying that machine behavior is modelled on animal behavior.) Norbert Weiners sucessfully applied this theory in his correct diagnosis of ataxia, a human neurological disorder, as a feedback loop problem. (The door swings both ways, we anthropomorphize machines and we interpret human behavior in mechanistic terms.)

J D Bolter notes: "Weiner compared the new electron tubes to neurons and wanted to subsume the study of both under one discipline. Wiener's outlook was clearly as much influenced by pre-electronic control devices (feedback loops in various machines) as by the digital computers just being built ....Those following Wiener's approach spoke of creating artificial brain cells and neural networks and allowing the machine to learn as a baby was presumed to do, ...But the theory of neural networks, which was developed mathematically, met with little or no practical success ...Specialists more or less gave up the idea of building a machine which would mirror the elements of the human brain, they no longer demanded a literal correspondence between man and machine. [9]

The other path of development was that of simulating mathematical logical processes in automated binary digital processes. The difference here is between the modelling of biological processes in *analogous* electronic processes and the devising of an automated logic which arrives at the same logically correct results as the human mind, but via radically different procedures.

This automation of reasoning is called 'Artificial Intelligence'. In his recent book, Hans Moravec outlines this separation: "The cybernetics researchers, whose self-contained experiments were often animal like and mobile, began their investigation of the nervous system by attempting to duplicate the sensorimotor capabilities of animals. The artificial intelligence community ignored this approach in their early work and instead set their sights directly on the intellectual acme of human thought... mechanizing human reasoning. This 'top-down' approach made impressive strides at first but has produced few fundamental gains in

over a decade."(10) By 1956, an early artificial intelligence program called Logic Theorist had already found a more elegant proof of theorum 2.85 of the Principia Mathematica than any produced by human mathematicians, including Russell and Whitehead.(11) It becomes more and more evident that abstract reasoning is only the most easily automated corner of what we loosely refer to as 'intelligence'. Hans Moravec emphasizes this point: "Organisms that lack the ability to perceive and explore their environment do not seem to acquire anything that we would call intelligence."(12)

In any case, abstract logic is a human invention and the production of machines that simulate such processes must properly be regarded as anthropomorphic. J.D. Bolter remarks: 'the artificial intelligence specialist is not interested in imitating the whole man. The very reason that he regards intelligence as fundamental is that such intelligence corresponds to the new and compelling qualities of electronic technology. Today, as before, technology determines what part of the man will be imitated.'(13) In these terms, the development of Artificial Intelligence can be seen as the sucessor in this history of anthropomorphism, in the transition from mechanical to electronic technology. In popular literature, Hal, the computer in Kubrick's 2001, is an expression of this new generation of 'disembodied' anthropomorphism.

In the sixties, Jack Burnham embraced Cybernetic theory and built around it a new model of art practice. He argued that inasmuch as mimesis has always been the concern of sculpture, from the caveman to early modernism, anthropormorphic robotry is the logical sucessor to that tradition in sculpture and argues that the 18th century clockwork automata of Vaucanson and Jaquet Drosz are significant predecessors of this trend. "It is doubtful if non- anthropomorphic sculpture can exist. Since the creation of the first non- objective and Constructivist sculptures in the early part of the twentieth century, artists have consistently denied the anthropomorphic and mimetic content of their works. Each sucessive generation of nonobjective...sculptors has accused the previous generation of anthropomorphism....What we will examine as Cyborg or post kinetic art is really the first attempt to simulate the structure of life literally. *Thus, sculpture seeks its own obliteration by moving toward integration with the intelligent life forms it has always imitated.*" (14)

'Personal' Computers

The computer has become the defining technology of our culture. Whether or not it is in fact the case, the computer is linked in the public mind with the spectre of machine borne intelligence. As this new tool is a tool for reasoning, rather than a tool for concrete manufacturing, the debate for human identity in the face of technology has become focused on the mind. In what way is the machine mind different from the human mind? What can we think that a computer can't? And the flag that the mind waved was *creativity*.

There is a peculiar parallel of reductionist arguments here between: the sucessive redefinition of the essentially human in the face of developing technology; and the history of modernism in the visual arts, in which sucessive avantgardes voluntarily jettisoned defining aspects of the artwork in the quest for its essential nature. Curiously too, both arguments arrived at the same endpoint: the creative idea. In the visual arts this point was called 'conceptual art' at which point the artwork became entirely disembodied. (15)

Globally, the 1980s saw a conservative swing on all fronts. In art this was a recoiling from the "free form '70s". Modernist reductivism had taken art to the edge of the cliff and in fear of total annihalation, those with vested interests began furiously back-pedalling and attempted to reinvest the 'object' with some sort of value. The expressionistic gesture as psychoanalytic sacrament was resurected on the Ouija board of contemporary culture as if it never died, and the simulation was taken as the thing itself. The doubts of Thomas were whitewashed.

If the rough beast is the 'non- aunthentic', simulation in general, then all our simulating technology, (more or less intelligent) is the anti-christ, then postmodern theory and Baudrillard in particular have led us all to embrace it, like lambs to the slaughter.

One hopes that the debate over the defining characteristics of the human organism will not follow this kind of retrogressive behavior.

Conclusion

From the Venus of Willendorf to Artificial Intelligence, there would seem to be an intense desire to emulate the Gods in their power of creativity, to create life.(14) This attraction remains permanently 'sexy', it carries the power of a taboo. In traditional Islamic culture it is forbidden even to pictorially represent people.

Contemporary researchers allow their domains to be called 'knowledge engineering', 'expert systems' and 'neural nets' to capitalise on the attraction of these taboo activities; the names are marketing strategies. Artificial Intelligence might more properly be called 'automated logic'. Claude Shannon never called his pioneering study "information theory", but the much less sexy name 'coding theory'. This is not to damn the entire study of AI, just the clothes in which it has been dressed.

On a deeper level, the assumptions about the nature of intelligence or sentience that lie at the core of Artificial Intelligence theory are brought into question. Pivotal issues are the relationship between 'the body' and intelligence, and the question of 'understanding'. As Hubert Dreyfus stated in 1979: "...intelligence requires understanding, and understanding requires giving the computer the background of common sense that adult human beings have by virtue of having bodies..." (15) In the same essay Dreyfus quotes Marvin Minsky's deliberations on the subject :

" "... We still know far too little about the contents and structure of common-sense knowledge. A 'minimal' common sense system must 'know' something about cause-effect, time, purpose, locality, process, and types of knowledge...We need serious epistemological research in this area"

Dreyfus responds: "Minskys' naivete and faith are astonishing. Philosophers from Plato to Husserl, who uncovered all these problems and more, have carried on serious epistemological research in this area for two thousand years without notable sucess." He continues: " But Minsky seems oblivious to the hand waving optimism of his proposal that programmers rush in where philosophers such as Heidegger fear to tread, and simply make explicit the totality of human practices which pervade our lives as water encompasses the life of a fish." (16)

With historical distance, contemporary Artificial Intelligence will be regarded as a latter day version of Vaucanson's Duck. An interesting machine in itself, it can however lay little claim to being 'alive'. It can neither 'desire' its food, nor catch the scent of its own excrement.

In the Next Exciting Episode...

Meantime the anthropomorphized (and intelligent) machine remains a cultural obsession. One needs look no further than the plethora of Robot movies produced in the USA, but globally consumed. Bladerunner, Robocop, Starwars, Tron, War Games, Westworld, 2001, Short Circuit: the list goes on and on. These movies tend to gravitate to two main theses: either man is creating his non- organic successor, or man and machine will amalgamate and supersede genétic evolution. Are we reaching the point at which our drive to anthropomorphism will complete its gestation period and burst forth fully developed from the shells of our bodies, in some ghastly 'Alien' style cinematic version of the Book of Revelations? Or will the millenium usher in an epoch of peace, light and universal harmony? Stay tuned.

Footnotes

1.   The millenium, we should recall, is an arbritrary date, predicated on two notions specific to our culture: the Christian religion and the base 10 counting system.

2.   'Rossums' universal robots'. Karel Capek 1921

3.   Donna Haraway " A manifesto for cyborgs" Socialist Review 1984.

4.   William Shakespeare. 'Julius Caesar' Act1 scene 3

5.   These 'theatra mundi' are themselves reminiscent of the 'memory theatre' projects of the Elizabethan magus Robert Flood, and his predecessors Giordano Bruno and Guillo Camillo. These are themselves the sucessors of a long line of mnemonic systems which seem to date back to preliterate Greece. cf. Frances Yates 'The art of memory" 1966

6.   Precisely why this fear has endured among the makers of culture is not so clear. Socially the repercussions have been profound, as C P Snow noted in the 'fifties. C P Snow 'the two cultures" in The New Statesman, 6 Oct 1956.

7.   Fritz Lang "Metropolis" 1926

8.   Beyond modern sculpture p245

9.   Turings man p213

10. Hans Moravec "Mind Children" Harvard University Press, 1988 p16.

11. Logic Theorist was written by Allen Newell, Herbert Simon and Cliff Shaw. For this piece of AI history I am indebted to Fred Truck and the manual to his interactive artwork ArtEngine.

12. Moravec ibid p16

13.   J D Bolter "Turings' Man." Pelican 1986 p213

14. BMSp332

15. Another curious parallelism is that at the point when the idea of downloadable software was on the verge of becoming a commercial reality, artists were creating, without computers, in conceptual art, works of pure information which could reasonalby be termed 'cultural software'.

1. see "Artificial Life" Ed: Christopher Langton. "The proceedings of an interdisciplinary workshop on the synthesis and simulation of living systems." Addison Wesley 1989

1. 'What computers can't do. revised edition.' Hubert Dreyfus. Harper colophon 1979. p3

1. ibid p36

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