

## Artistic life forms that would never survive Darwinian Evolution: Growing Semi-Living Entities

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### Manipulations of Life:

The use of animals or parts of animals for human centric purposes has been practiced since the dawn of humanity. The ability to manipulate the living world was originally developed through principles of selective breeding. Living organisms were appropriated by humans and reshaped for functional and aesthetical purposes alongside agriculture practices (such as ornamental plants and fish, husbandry animals and pets). For even longer the use of freshly and preserved organisms (wood, leather, ivory etc.) have been part of the human constructed world.

Are the kinds of manipulations offered by modern biology so different from the past ones?

With the aid of our newly acquired knowledge of life processes – from ecologies to molecular biology – we can exercise an ever growing degree of control over the manipulation of living biological systems to the extent that the techno-sphere ('human made') and the biosphere ('nature') are increasingly indistinguishable. The ability to cut and paste genes from different organisms, the prospect of designing artificial genes, and the possibility of coercing living functional tissue (outside of an organism) to grow and behave according to human determined plans, are just some examples of this merger.

A few artists are now exploring the new knowledge and new tools offered by modern biology to manipulate and create living and semi-living works of art.

The manipulation of living tissues (from a complex organism) outside and independent to the organism they were derived from is a phenomenon that depend on biological technologies. Manipulations of a whole organism have been done as part selective breeding practices. They are now being practiced as part of molecular biology, which enable more precise and faster control over the manipulation as well as cross species merge. Artists dealing with genetics consider the genetic code in a similar way to the digital code. As a result the manipulation of life becomes 'manipulation of a code' (though with 'real' physical consequences). From our own perspective, manipulations in the level of the tissue, raises the most intriguing epistemological and ethical questions, as there is no existing discourse that deals with it. This is because this is the manipulation of tissues is visceral. Also, growing parts of an organism independent to it complicates notions of what life self and identity are.

### The Tissue Culture & Art Project (TC&A)<sup>1</sup>:

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<sup>1</sup> <http://www.tca.uwa.edu.au>

The Tissue Culture & Art Project (TC&A) is exploring the manipulation of living tissues as a medium for artistic expression; it looks at the level above the cell and below the whole organism. We are using tissue engineering and stem cells technologies to create Semi-Living sculptures. The Semi-Livings are made of living tissues from complex organisms grown over/into three-dimensional constructed substrates. At this stage our Semi -Living entities grow in artificial conditions, which imitate body conditions - in bioreactors. This new palate of manipulation, at least at this stage, is significantly linked to ethical concerns and to emerging philosophical issues.

The TC&A is introducing a new class of object/being in the continuum of life: the Semi-Living are sculpted from living and non-living materials, and are new entities located at the fuzzy border between the living/non-living, grown/constructed, born/manufactured, and object/subject. While the Semi-Living rely on the vet/mechanic, the farmer/artist or the nurturer/constructor to care for them, they are not human imitations and do not attempt to be human replacements. Rather they are a new class of art/being that is both similar and different from other human artefacts (human's extended phenotype) such as selectively bred domestic plants and animals. These entities consist of living biological systems that are artificially designed and need human and/or technological intervention for their survival and maintenance.

As artists we are examining the semi-livings as evocative objects<sup>2</sup>; prompting the re-evaluation of our perceptions of what is life and our treatment towards other forms of life. Our evocative objects changes perceptions of what is art its ethical boundaries and the limitations of engagement with art pieces.

Our Semi-Living sculptures need to be kept in sterile conditions, immersed in nutrient media and kept at a temperature that suits their needs (mammalian tissue in 37°, fish and amphibians can be left at room temperature). For their survival they need to be protected and fed on a daily basis. As a result of these needs, the exhibition of the semi-living sculptures in galleries (or other public spaces) involves new technicalities and rituals as part of the artistic experience. A basic tissue culture laboratory needs to be put in place as an integral part of the exhibit, That involves construction of an enclosure area, a laminar sterile hood, the artificial environment for the semi-living art pieces (a bioreactor) laboratory consumables and the basic safety requirements of Bio-Safety 1 laboratories, and all as integral to the conceptualisation and theatrical intentions of the installation.

Our installation involves performative elements that emphasise the intellectual and emotional impact which results as part of the exhibition of new artistic forms of life: *The Feeding Ritual* that occurs every day in which we invite the audience to view the feeding of the semi-living sculptures and to stress notions of caring for them. At the end of every installation we are faced with the ultimate challenge of an artist – we have to kill our creation. Transferring living material through borders is difficult and not always possible, and as there is usually no-one who is willing to ‘adopt’ the Semi-Living entities and feed them (under sterile conditions) daily, we have to kill them. The killing is done by taking the Semi-Living sculptures out of their containment and letting the audience touch (and be touched by) the sculptures. The fungi and bacteria which exist in the air and on our hands are much more potent than the cells. As a result the cells get contaminated and die (some instantly and some over time). *The Killing Ritual* also enhances the idea of the temporality of living art and the responsibility which lies on us (humans as creators) to decide upon their fate.

#### The different Semi-Livings:

Interaction with living or semi-living art is potentially a whole sensory experience. Life smells, it can make sounds, it is tactile (furthermore, its well being can sometime depends on tactility) and it is reactive to its environment.

Semi-living sculptures are made out of parts of complex organisms that with artificial support mechanisms can survive independently of a body.<sup>3</sup> Already in 1916, Eduard Uhlenhuth, one of the pioneers in tissue culture has declared ‘Through the discovery of tissue culture we have, so to speak, created a new type of body in which to grow cell’.<sup>4</sup>This ‘new type of body’ is in a sense a new life form.

The semi-living sculpture is stripped of its immune system and at this stage needs to be protected from the external environment. One of our aims (that we share with other professional of the tissue engineering field) is to be able to grow an external protective membrane layer that will

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<sup>2</sup> The term ‘Evocative Object’ coined by Professor Sherry Turkle, originally in regards to computers and other E-toys. For more see: Turkle, *The Second Self: Computers and the Human Spirit* (London: Granada, 1984).

<sup>3</sup> Parts of an organisms can be sustained alive for long period of times (and in case of cell lines – forever) while the organism from which the cells where taken from can cease to live. Furthermore, the biomass of the semi-living can be larger than the biomass of the original host.

<sup>4</sup> Landecker, Hannah, ‘*Building “A new type body in which to grow a cell.”*’ Tissue Culture at the Rockefeller Institute, 1910-1914’ Rockefeller University Centennial, NY: November 2000. Accepted for publication in conference volume, Rockefeller University Press. Date still unknown.

enable the 'release' of the semi-living to the external environment and will enable a direct interaction with the audience<sup>5</sup>.

Up to date we have grown/sculpted semi-living in different shapes, forms and tissue types and encouraged symbolic interaction with them. For example in the Tissue Culture & Art(ificial) Wombs installation (firstly presented in Ars Electronica festival 2000) we grew semi-living worry dolls. It is based on a Guatemalan tradition which kids tell their worries to the dolls, than put them under their pillow with the belief that the dolls will take the worries away. We have grown (living) semi-living worry dolls inside a bioreactor. Alongside the bioreactor we put a computer or 'a worry machine' in which people were encouraged to write their worries to the semi-living worry dolls. We have promised the audience that we will whisper their worries to the dolls with the hope that they will take their worries away. By logging to our web site you can view peoples worries from all around the world (and add your own). This document is also a reflection of current anxieties in regard to our own work, the ethics of biological art and biotechnology in general.

In a later project we have began to 'request' from our semi-living for some information, tapping to the hazy area of sentience. Growing neural tissue (the 'thinking' units) and retrieving electrical data from it, we have created what we refer to as 'a semi-living artist'. We have picked up electrical activity from neural tissue and transferred it to a computer program that drove a robotic arm and manipulated a musical score.<sup>6</sup> We used a sound sensitive switch to control the audio output as a source of electrical stimulation feedback to the neurons.

Our latest project titled 'Disembodied Cuisine'<sup>7</sup> explores another way of treating/interacting with living systems - by consuming them as food. According to Claude Levi-Strauss throughout history humans have instituted a strict division between what can and cannot be eaten. However, these divisions are not always clear, and we must practice some kind of hypocrisy in order to be able to love and respect living things as well as to eat them. Dogs are an example of such confusion; in some cultures they are "man's best friend" (pets), and also ornaments that are selectively bred for aesthetic qualities. Dogs in other cultures are being eaten. Peter Singer refers to such division as: Speciesism in Practice – Animals as food<sup>8</sup>. In the "Disembodied Cuisine" we will attempt to grow frog skeletal muscle over biopolymer for potential food consumption. A biopsy will be taken from

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<sup>5</sup> By that the Semi-Living entities will become part of the environment., though without the ability to sexually reproduce.

<sup>6</sup> This project was developed by SymbioticA Research Group: Guy Ben-Ary, Phil Gambleb, Dr. Stuart Bunt, Ian Sweetman, Gili Weinberg, Oron Catts, Ionat Zurr and Matt Richards.

<sup>7</sup> Disembodied Cuisine will be debuted in an international biological art exhibition" L'arte Biotech' in Nantes, France March 2003

<sup>8</sup> Singer Peter, Practical Ethics (NY: Cambridge University Press 1993) p.62.

an animal which will continue to live and be displayed in the gallery along side the growing “steak”.<sup>9</sup> This installation will culminate in a “feast”.

This piece deals with one of the most common zones of interaction between humans and other living systems and will probe the apparent uneasiness people feel when someone ‘messes’ with their food. Here the interaction/relationship with the Semi-Living is one of consumption and exploitation. However, it is important to note that it is about “victimless” meat consumption. As the cells from the biopsy proliferate the ‘steak’ in vitro continues to grow and expand, while the source, the animal from which the cells were taken, is healing. However, by making our food a new class of object/being – a Semi-Living – we are risk making the Semi-Living a new class for exploitation.

#### The uneasiness:

Why do we feel uneasy and even threatened in regard to the manipulation of life outside of the bounds of the evolutionary game? According to Gould “There is no progress in evolution. The fact of evolutionary change through time doesn't represent progress as we know it. Progress is not inevitable. Much of evolution is downward in terms of morphological complexity, rather than upward. We're not marching toward some greater thing.”<sup>10</sup> Human intervention in evolutionary biological processes is usually done ‘in the name of progress’. Humans are accumulating better control; though not necessarily better understandings of the long-term results of such interventions

The Semi Living entities complicate notions of art and notions of life. They are forcing us to realise that our cultural norms and values are not yet equipped to deal with the new knowledge in biology and the new creations made possible by biotechnology. Any technology is a double-edged sword, and the uses of technology rely on complex interdependent relationships with the dominant ideologies at the time. Therefore, looking at the prevailing ideology of our times we are looking at our artistic semi-living as evocative entities, which tangibly offer alternative and contestable futures. Some of the questions we are asking address the ethical limits of scientific, commercial and alternatively artistic investigation; can artists use modern biology as a palate to create living or semi-living creations? Are there ethical boundaries for an artistic investigation? Who is responsible for the life of the artworks? Can the naturl-ish qualities of the semi-living act

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<sup>9</sup> ‘Every moving thing that lives shall be food for you; even as the green herb have I given you all things. But flesh with its life, which is its blood, you shall not eat.’ Genesis 9:3-4:

<sup>10</sup> Stephan G. Gould cited in “The Pattern of Life's History,” *The Third Culture*, NY: Simon & Shuster, 1995, p. 52

as a surrogate to the “real” nature that seems to vanish from the lives of urban humans? Is that an answer for E.O Willson’ Biophilia? (4).<sup>11</sup>

There are many issues that have to be resolved by humanity as a whole before we can proceed with large-scale exploitation of modified/designed living biological systems. Current human cultural tools are ill equipped to deal with the extent of manipulation of life offered to us by modern biology. This is of grave concern, as decisions, which are being made now will determine the directions in which exploitation of living systems take. It is of particular concern as we are entering an era of conflict and intolerance to the other, coupled with an extreme form of capitalism and profit taking. Artistic inquiry such as the creation of Semi-Living sculptures, hopefully forces us to deal with these issues.

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<sup>11</sup> Wilson Edward.O. *Biophilia*, Cambridge, MA; Harvard Univ. Press, 1984.