

Towards a New Class of Being: The Extended Body

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Abstract

The biomass of disassociated living cells and tissues is in the thousands of tons. These fragments do not fall under current biological or cultural classifications. The notion of the Extended Body developed by the TC&A (Tissue Culture & Art) Project can be seen as a way to define this category of life and, at the same time, an attempt to destabilize some of the rooted perceptions of the classification of living beings. The Extended Body is an amalgamation of the human extended phenotype and tissue life – a unified body for disembodied living fragments, an ontological device, set to draw attention to the need for re-examining current taxonomies and hierarchical perceptions of life. The Extended Body is a tangible metaphor for the Victimless Utopian ideal; at the same time, it paradoxically is an embodiment of the sacrifice of the victim.

The Extent of a Metaphor

A rough estimate would put the biomass of living cells and tissues, which are disassociated from the original bodies that once hosted them, in the millions of tons. In addition, there are tons of fragments of bodies (cells, tissues, organs) that are maintained in suspended animation in cryogenic conditions. All of this biomass requires an intensive technological intervention to prevent transformation to a non-living state. This type of being (or semi-being / semi-living) does not fall under current biological or even cultural classifications. The notion of the Extended Body can be seen as a way to define this category of life, maintaining the need for classification, while at the same time attempting to destabilize some of the rooted perceptions of classification of living beings. Much of this living biological matter can, in theory, be co-cultured and fused (cell fusion), or share its sterile environment (to varying degrees of success). Age, gender, race, species, and location do not play the same roles in the Extended Body as in other living bodies. Research on co-culturing animal and plant cells is currently being conducted. [1] This means that, in theory, every tissue in every living being has the potential to become part of this collection of living fragments. The Extended Body can be seen as an amalgamation of the human extended phenotype and tissue life; the fragmented body that can only survive by technological means: a unified body for disembodied living fragments, and an ontological device, set to draw attention to the need for re-examining current taxonomies and hierarchical perceptions of life. The Extended Body is by no means a fixed, scientifically binding order; it rather is a soft, artistic, and conceptual view of the subject of tech-intelligent agent 06.02

nologically mediated and augmented life.

The Life of Parts – The Being of the Semi-Living

The body cannot survive without organs and cells, but the latter two groups can survive without body.
[2]

The development of tissue culture in the early part of the 20th century ushered in a new type of being that requires a different ontology and, by extension, a different taxonomy of life. These beings are fragments of bodies kept alive with the aid of a new kind of body – a techno scientific one, in vitro (meaning within glass). Tissue culture evolved from a research field in itself (1910-1950s) to a research tool (1950s to present day), and then to a means of production (1990s to present day). The "population" of what can be referred to as partial life and semi-living entities proliferated to a vast amount of cells and tissues that are living and growing outside of the organisms from which they originated. These beings are rarely referred to as subjects; their existence (supported by the techno-scientific project) is indicative of the instrumentalism of life that manifests itself in utilitarian and economic value.

The traditional use of animals (human and non-human) cell and tissue cultures for research, diagnostic, and therapeutic (tissue engineering) ends is increasingly being surpassed by the use of cells and tissues for production of biological agents (mainly antibodies). Antibody production is now being done in large-scale bioreactors, as "demand for many antibodies is very intensive, leading companies to build more and larger manufacturing plants on the scale of tens of thousands of liters." [3] Other recent uses of tissue cultures include the attempts to grow tissue-engineered meat (sometimes wrongly referred to as violence-free meat), and the development of living toxicity sensors (Linda Griffith, MIT), experimental actuators [4], complex research models, and art. In addition, tissues, cells and organs are being harvested from recently dead and living "donors" for organ transplant, or are being stored in suspended animation in cryogenic conditions. Some of the cells and tissues are removed from the body, manipulated or only reproduced in culture, and then reintroduced into a body – not necessarily the original body or even the same species. Other semi-living entities can be found at the butchers and on the side of the road (among other places) where living cells can exist in the

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bodies and parts of animals. Even without technological intervention these cells and tissues survive for hours and days after the organism is considered to be dead (meat).

The questions that arise from the existence of a large biomass consisting of living fragments of bodies are rarely addressed. And when this existence is discussed, it is almost exclusively in an anthropocentric manner. Examples are Andrews and Nelkin in *Body Bazaar* (2001) who explore the legal implications of tissue commodity [5] and Waldby & Mitchell (2006) who investigate human tissue (predominantly blood) as a waste and as a gift in the context of the global economy. [6] Squier (2004), in her book *Liminal Life* [7], is moving a bit further by looking at partial lives as "themselves" and referring to them as Liminal Lives. However, she also focuses on human tissue and human embryos and the beneficial or potentially hazardous effects of these liminal lives on human society. In certain instances, popular media does refer in a non-direct way to these partial lives as partial beings. A recent example can be found in a *New Scientist* article describing Griffith and Shuler tissue chip hybrids (or Meta Chips). While Griffith states that "our vision is building the human body on a chip", the article is entitled "Dawn of the Zombies" since "You can poke them, prod them and pump them full of drugs, and they'll never complain." [8] All of the above examples fail to give an agency or even a proto-agency to the living fragments; these examples treat the semi-living as quasi-life at best and in most cases as equal to inert objects.

Thacker is moving towards a different consideration when he refers to the semi-living as "actants;" He asks: "Can there be a politics that effectively takes into account these nonhuman actants, entities that are much more than inert objects and yet much less than autonomous organisms? How can we keep from falling into the too easy habit of reducing all actants to agential origins (e.g., the notion that, yes, there are these nonhuman machines, but ultimately humans design and operate them)?" [9] TC&A's Extended Body is a small step towards answering Thacker's question.

The Metaphysical Question

When tissue culture started at the beginning of the 20th century, it required a new way of looking at the body as a community of discreet entities that can survive independently from the body. The use of the term "cell," coined by Hook (1667), derived from the morphological resemblance, according to Hook's observation, between cork cells and the structure of a beehive. However, Canguilhem observes, "Yet who can say whether or not the human mind, consciously borrowing from the beehive this term for a part of an organism, did not unconsciously borrow as well the notion of the cooperative labor that produces the honeycomb?" He answers his own question by saying, "what is certain is that affective

and social values of cooperation and association lurk more or less discreetly in the background of the developing cell theory." [10]

The example of the beehive further illustrates the complications involved in ideas of individuality. A Beehive can be seen as one organism, with the individual bees as organs / tissues / cells of that organism (E. O Wilson). However, we do have the tendency, due to the morphology and behavior of the individual bee (and due to our anthropomorphic tendencies), to perceive one bee as an independent organism.

Observations of the fragmentation of the body into individual cells, which can be kept alive as semi-autonomous beings stripped away from their original body and its complex immune system, drove Huxley, Wells, and Wells to write: "We may compare the body to a community, and the cells to the individuals of which this vast organized population is composed. It is very important to realize that this is not a merely allegorical comparison. It is a statement of fact, for – we resort here to the stress of italics – *single cells can be isolated from the rest of the body, and kept alive.*" [11]

If the body is a community of cells, how can one refer to the collection of cells that are growing outside the body? What is the "community" to which they belong?

Any cell – man, animal, fish, fowl, or insect – given the chance and under the right conditions, brought into contact with any other cell, however foreign, will fuse with it. Cytoplasm will flow easily from one to the other, the nuclei will combine, and it will become, for a time anyway, a single cell with two complete, alien genomes, ready to dance, ready to multiply. It is a Chimera, a Griffon, a Sphinx, a Ganesha, a Peruvian God, a Ch'i-lin, an omen of good fortune, a wish for the world. [12]

When cells and tissues are removed from the (context of the) host body and kept alive, they are also being stripped of many other aspects of what is perceived as a living individual. They are kept alive and grown in a technological environment that acts as a surrogate body. But, in the most fundamental way, they represent the ultimate bare life. These cells and tissues change morphologically, functionally, and in relations to space / time. Most isolated cells and tissues can survive and grow alongside cells and tissues of different individuals, species and "generations." In many cases, a fairly simple procedure will temporarily open up the cells and nuclei membranes to fuse two or more cells, creating a novel chimerical being that constitutes living parts of different individuals and species. In addition, important ingredients in (mainly) the nutrients provided to cells and tissues are derived from other living beings. One such ingredient is foetal calf serum, which is used across the board to feed cultures of many cell types and origins.

It becomes obvious that the dissociated tissues and cells conform to a lowest common denominator – they are alive, they need technological support and they can coexist. Therefore, they form a kind of community. This community does not conform to common biological and cultural classifications and presents both an ontological and epistemological challenge: ontological because it calls into question the definition of being in a very basic and fundamental way; and epistemological because it questions our knowledge production from the perspective of a fragmented out-of-context collection of "kind-of-alive" beings. It also reveals new perceptions with regard to the human position within the larger ecology.

Without being a vitalist, one begins to formulate ontological questions that need to be addressed: Does life have an intrinsic value that is different from the value of non-life?

Is life different from non-life in that it is a subject rather than an object?

Where does this Haecceity reside? [13]

Where can partial life and the semi-living be placed in the ontological and taxonomical charts?

Do all fragments of one individual, although located in different geographical locations, still have the essence of this individual? Or are they all fragments of the same species?

Is it the techno-scientific vessel that makes fragments a "one body / community" and a "one being"?

Classification

The semi-living does not seem to exist or conform to either Linnaean taxonomy or Molecular systematics (chemotaxonomy). The origin of most cells can be traced back to an organism that can be classified under these systems. Cells and tissue banks are still using this system to identify their "stock" and sometimes even add ethnicity to some human cell lines. There are cells in the collection that do not adhere to either Linnaean taxonomy or Molecular systematics (chemotaxonomy), such as the McCoy cell line, which is classified as mouse cells even though the cells' origin is identified as human. [14] In addition, the cell lines in the collection are actually sorted by unique names and catalogue numbers, partly because traditional taxonomies are not sufficient to deal with the collection.

Current taxonomy is rooted in 18th-century understandings of life and therefore carries some of the social values and scientific and ontological understandings of that time; for example, biblical understandings in which a species is defined according to morphological resemblance and the ability to give fertile offspring. Contemporary attempts at refining the system employ recombinant systematics based on data derived from DNA.

Besides enhancing current genotype [15], this system

excludes some of the more puzzling entities that exist today, such as chimeras, who have a few types of tissues with different DNA; or those semi-living entities that combine parts of living beings considered distinct in current taxonomies and are supported by the technology to maintain a form of life.

However, we would like to concentrate on the other "being" that falls in-between categories of the system of taxonomy, whether based on sexual selection or recombinant systematics – that of the Extended Body. We argue for a consideration of quasi-beings that are not animal (including human) as well as not fully living. These quasi-beings are liminal lives that are getting larger in population and in significance. These semi-living entities can convey to us new understandings of life and our own position within the fabric of living and non-living environments.

Humans – Animals Compared

In the dominant discourse exploring the human position within the living world, humans are compared and contrasted with other animals. This already takes a "speciest" position as a starting point for interweaving humans in the ecological fabric. We are suggesting that, rather than falling back into familiar arguments, we should adopt a new and fresh perspective that will force us to re-examine our position within a taxonomy that is increasingly dissolved, fragmented, and inadequate.

We may want to begin taxonomizing humans together with other animals (as humans are animals) and look for another mirror image for comparison and contrast; a broken mirror image that is not necessarily so much like us, but can be, literally, part of us.

In order to explain our position we would like to investigate Heidegger's division of the world into three ontological positions – objects (such as stones) as wordless; animals as "poor in the world;" and humans as world-forming.

We would like to qualify our analysis by asserting that the purpose of this paper is not to provide an analysis of Heidegger's philosophy (we are far from qualified for such an enormous task) but rather to use Heidegger's arguments as an aid for establishing a new position from which we can explore the different beings and semi-beings in the world.

Heidegger believes that animals have radically different modes of being in the world than humans. Animals lack the ability to perceive other entities in the world as beings (but they are capable of instinctive comprehensions of textures, scent, colors etc.). As a result of this lack, animals do not perceive themselves as beings either. Therefore they are "in poverty" in the world (Heidegger did not attach any evaluation to such a position). Humans, in contrast, can perceive beings as well

as comprehend their own "being-ness."

Heidegger's arguments are based on the latest discoveries in the life sciences of his time. The empirical evidence for his philosophical argument mainly is the work of the zoologist Emanuel Radl and Jakob von Uexküll.

The Bee Experiment

As previously discussed, bees can be seen as part of an organism (the colony / the community) rather than an individual being. Cells were not just named after the beehive but can be seen as analogous to the bee (as part of a community, according to Huxley). Therefore the bee experiment described in the following can be seen as an appropriate approach to exploring the position of the Extended Body. We should note, however, that there is some danger in applying Wilson's concept of sociobiology, where he equates the construct of the social insect (colony) to human society. (This comparison is reductionist and may lead to ideological propagation.) However, as a thought experiment, one can look at metaphorical relationships between cells and bodies (i.e. Huxley's community) and between humans and their extended phenotype (society, culture, technology).

Some scientific experiments have demonstrated that the worker bee is not indifferent to the scent and color of the flower from which it receives nourishment. The bee sucks honey from a flower with some particular traits (such as scent and color) and flies off. Most people will understand the latter as a conscious action performed by the bee once it realizes that the flower does not hold any more honey. Heidegger, however, questioned whether the reason why the bee stops sucking honey and flies off is in fact the bee's comprehension of the fact that honey is no longer present and available. Heidegger believed that the bee lacked any ability to be aware of the absence of honey as such.

To support his argument, Heidegger outlines an experiment in which a bee was placed in front of a bowl filled with more honey than it could consume at once. The bee began to suck the honey and, at a certain point, stopped and flew off (leaving some honey in the bowl). According to Heidegger, this behavior could be wrongly interpreted as the bee recognizing that it could not suck the whole amount of honey and therefore stopping. In another experiment, it was observed that if the bee abdomen is carefully cut away while the bee is sucking honey, the bee will continue to do so, regardless of the amount its body can accumulate (even when honey begins dripping out of the bee). This experiment led Heidegger to assert that the bee lacks the cognitive ability to conceive the existence of honey and is only acting instinctively (almost mechanically?).

This paper does not intend to discuss the flaws of the experiment or the fact that Heidegger carelessly jumps to conclusions. After all, the bee was stripped of its natural context and placed into a techno-scientific one – a

bowl with a large amount of honey. The bee was also physically "reduced" through the removal of its abdomen and was therefore coping with an extreme and unfamiliar situation. To explain the behavior of the bee, without any consideration for agency, is not necessarily the right approach. Paradoxically, one could argue that the bee may have been "consciously" behaving this way because of the stressful circumstances – in order to defy them.

There are arguments that humans may exhibit similar behavior when they are interfered with both physically or emotionally (one just needs to look at our Western obesity problem to realize that some of us have lost our ability to know when it is time to stop consuming).

We would argue that this experiment did not prove in any way that animals have no agency as such; one also cannot conclude that they are different from humans on the basis of this specific experiment. It may very well be that the bee can perceive other beings as such. In turn, our own "animality constraints" may diminish our capability of perceiving other beings as beings (such as Heidegger's ability to perceive a bee as a being that is able to perceive other beings as such).

If we trace back the analogy between cells and a beehive, we can understand one bee as a whole organism or as an organ in the organism / colony forming an "individual body." In other words, experimentation performed on a single bee can be compared to experimentation with tissue cells in a petri dish. Taken from the context of the bee-colony, the bee will behave in unusual ways, just like cells removed from the body. The bee can be seen as part of an extended body.

Our argument addresses notions of different scales of size, time etc., as well as different sensual perceptions (visuals, sound, smell or texture) that are determined by our biological makeup. All "beings" are constructed according to variables of these parameters. Furthermore, beings can exist within beings, parallel to other beings, engulfing other beings, partly immersed in other beings etc. and not be aware of such "beingness."

The Extended Body is a construct that may enable us to question the classification of the world according to humans / animals / non-living entities and look at the semi-livings that are located in between human-animal (cells of humans and animals fused together), human-object (a tissue-engineered construct consisting of human cells) and animal-object (a tissue-engineered construct consisting of animal cells) etc. Furthermore, these semi-livings can fall into any of these categories and still not conform to any one of our understandings of these categories.

We are all becoming part of the Extended Body, dependent on the techno-scientific project in order to extend our survival. Fragments of our bodies are poten-

tially becoming part of the Extended Body and fusing with other semi-living beings. The Extended Body engulfs all these cells, tissues of organs that are stripped of / removed from their host bodies – cells, tissues and organs without "natural" body – and are destined to be kept alive and often even proliferate in a new body that is techno-scientific. These bits of flesh can physically grow in different configurations, together or dismembered, regardless of their original host species, race, sex etc. This ability to co-culture, and in some cases even to hybridize, stems from the context into which the fragments are introduced. Hence, they are stripped from a body with an immune system and are introduced into a new "body" yet to be defined as a specific "being" that will not reject any foreign agent who / which may want to become part of it.

The Extended Body Point of View

The flexibility and versatility (vulnerability) of the Extended Body "opens up" a niche for new semi-living semi-beings. It is our intent to take their – the Extended Body – "point of view" in order to examine new taxonomies and our new relations with the living and semi-living world around us from a fresh perspective.

Honor Fell (1900-1986), one of the pioneers in the field of tissue culture, encouraged her scientists to adopt what she referred to as "the tissue culture point of view" [16] as a way to better understand the processes and needs of cells in vitro. In TC&A, we are trying to expand this non-anthropocentric aspiration to a somewhat more complex "entity," which is not human and not non-human, but rather a semi-living being. This way we hope to open up a fresh perspective from which to discuss humans' relations to other beings.

Our position may be somewhat reductionist, however not as reductionist as taking the DNA or the code point of view (the non-living / information-based point of view). We are taking a position that is reductionist with regard to the complexity of the living being; however, this reduction to a more visceral point of view enables, at least from a symbolic perspective, the engagement with different complexities, which are defining notions of living, non-living, species, race, gender, the individual, as well as the I (Am I a discrete being? Am I an accumulation of all my cells?).

The Victimless Utopia

However, everything is not all-engulfing and harmonious in the Extended Body metaphor (or in the Extended Body community, in which scarce resources can lead to a struggle for life and death, and the chance of contamination and death is almost inevitable).

One more complication arising from the Extended Body as a manifestation of the techno-scientific project is that it may create an illusion of a victimless existence. There

is a shift from "the red" in the teeth and claws of nature to a mediated nature. The victims are pushed farther away; they still exist, but are much more implicit.

Parts of the living are fragmented and taken away from the context of the host body (and this act of fragmentation is a violent act) and are introduced to a technological mediation that further "abstracts" their liveliness. By creating a new class of semi-being, which is dependent on us for survival, we are also creating a new class for exploitation.

As part of the TC&A project, we explore the ironies involved in the promise of a Victimless Utopia. In our Victimless Utopia series, we have explored the creation / construction of victimless meat in a project titled *Disembodied Cuisine*. [17] We ate, together with some brave volunteers, tiny semi-living frog steaks that were grown for more than two months in bioreactors and used not only expensive resources but also animal-derived ingredients in the nutrient media. [Fig. 1] We referred to them ironically as extreme Nouvelle Cuisine in the sense that they were luxury goods (and not necessarily tasteful ones). Still, the irony sometimes seems to be lost too easily, and now the discourse about a victimless society is being used by a university spin-off company that attempts to secure funding for tissue-engineered meat as a possibility for eating meat without killing the animal. [18]



Figure 1. The Tissue Culture & Art Project, *Disembodied Cuisine* installation, Nantes, France, 2003. Photo: Axel Heise.

We followed this project with *Victimless Leather - A Prototype of Stitch-less Jacket Grown in a Technoscientific "Body"* [19], presenting a miniature leather-like jacket grown out of immortalized cell lines (a mix of human and mouse cells) that cultured and formed a living layer of tissue supported by a biodegradable polymer matrix in a form of a miniature stitch-less coat. [Fig. 2] We were contacted by a commercial company requesting more technical information for potential commercialization of such an idea.

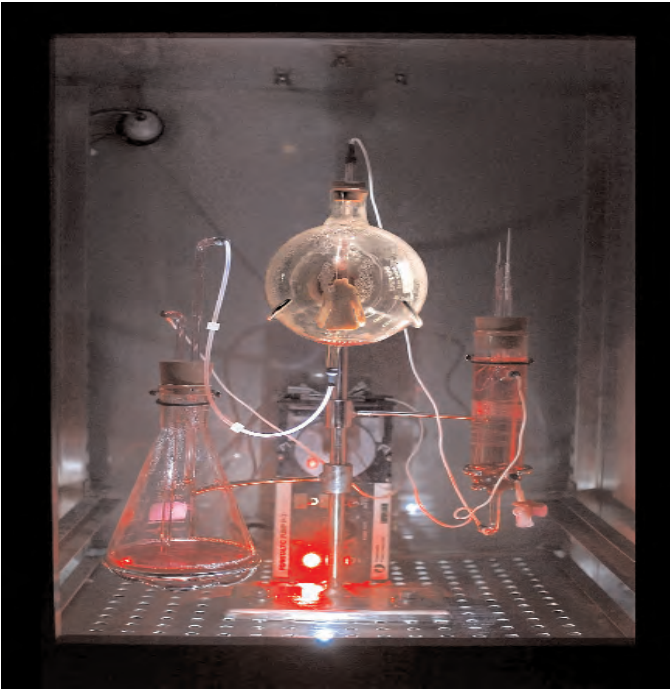


Figure 2. The Tissue Culture & Art Project, *Victimless Leather - A Prototype of Stitch-less Jacket grown in a Technoscientific "Body"* (2004). Bio-degradable polymer connective and bone cells.

This year we performed, for the first time, the *DIY De-Victimizers*, exploring the hypocrisies involved in our relationship with other living and partially living systems by taking the paradoxes and ironies involved in the production of a victimless utopia to somewhat extreme levels of absurdity.

We explored the creation of The DIY De-victimizer Kit as part of the Tissue Engineering & Art Workshop organized by "SymbioticA: the art and science collaborative research laboratory" at the School of Anatomy and Human Biology of the University of Western Australia and run in collaboration with Dr. Stuart Hodgetts. [Fig. 3]



Figure 3. The Tissue Culture & Art Project, *The DIY De-victimizer* (2006). Performance.

The DIY De-victimizer Kit Mark One (DVK m1) was set up to allay some of the guilt people feel when they consume parts of dead animals (as food, for aesthetics reasons or any other purpose) or cause the accidental

death of a living being (by a car, a lawnmower, or any other piece of technology). The kit can maintain and in some cases even proliferate and extend the life of parts of the deceased bodies, at least until the guilt recedes. The DIY DVK utilizes off-the-shelf items to construct a basic tissue culture facility; a few specialized nutrients are needed – some of which contain animal-derived material – but the latter is so far removed from the end user that for most people remorsefulness is usually not an issue.

We made use of the DIY DVK for a performative installation in which we experimented with bringing back to life (literally) parts of meats. We attempted to reverse the "destructive" effects of human technology by "re-life-ing" its victims and invited the audience to take an active role in the experiment by assisting us in caring for the fragments of life and making different ethical decisions with regard to these fragments' eventual fate.

Since this project had its debut in Barcelona, we felt compelled to reassess human relations to animals in the context of the Spanish bullfighting ritual. In drawing an analogy between participating in a bullfight ritual and eating McBurger, one may argue that in the bullfighting ritual, the killing of the animal for aesthetic / recreational reasons is more respectful, as it is exposed and even celebrated. However, the fate of the non-human animal is predestined. As an homage to the fighter bull, we re-lified its tissue and grew it over a miniature replica of a tourist-shop figurine in the shape of a bull. We contrasted the tissue from the bull with that from a burger and tried to obtain viable cells for re-life-ing. We also asked the audience to choose which one they would like to "kill," that is, bring back to its cultural accepted position of dead meat.

As humans' ability to preserve ecological conditions for their survival is questionable, so is the fate of the Extended Body that is dependent on human care for its survival. The Extended Body is an extension of our own (or other living) body that takes the definition and perceptions of what a body is in different and alternative directions. The Extended Body is growing in size, presence, complexity, and versatility and can be a point of departure for addressing our limitations in the understanding of ourselves as an integral part of the ever transforming ecology.

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References:

- [1] Research on two artistic projects involving the cultivation of plant and animal cells in the same environment currently is underway in SymbioticA; cell fusion between
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carrot and frog cells has been achieved in the 1970 by Harris.

[2] Written by Roger Morton as a response to *The Last Word* section in the *New Scientist*, June 10, 2006, No. 2555. This quote is taken from the response to the question, "When an insect is changing inside its cocoon, and has turned to slush, is it alive? And if so, in what way is it alive?," p.57. This is an interesting example as we can categorize the insect in its cocoon stage as a semi-living. However, this case is different from other semi-living explored in this thesis, as the insect in cocoon stage is not in need of an artificial support mechanism to survive and transform to the "fully living" state.

[3] <http://www.dddmag.com/ShowPR.aspx?PUB-CODE=016&ACCT=1600000100&ISSUE=0510&REL-TYPE=PR&ORIGRELTTYPE=CEL&PROD-CODE=00000000&PRODLETT=I;>
Drug Discovery and Development,
<http://www.dddmag.com/default.aspx>

[4] http://www-personal.umich.edu/~bobden/muscle_tissue_engineering.html

[5] L. Andrews and D. Nelkin, *Body Bazaar: The Market for Human Tissue in the Biotechnology Age* (Crown Publishers: New York, NY, 2001).

[6] C. Waldby and R. Mitchell, *Tissue Economies: Blood, Organs, and Cell Lines in Late Capitalism* (Duke University Press: Durham, NC, and London, UK, 2006).

[7] S. M. Squier, *Liminal Lives: Imagining the Human at Frontiers of Biomedicine* (Duke University Press: Durham, NC and London, UK, 2004).

[8] R. Orwant, "Dawn of the Zombies," *New Scientist* No. 2553, May 27 (2006), p. 40.

[9] Eugene Thacker, *The Global Genome - Biotechnology, Politics, and Culture* (The MIT Press: Cambridge, MA, 2005)

[10] François Delaporte (ed.), *A Vital Rationalist: Selected Writings from Georges Canguilhem* (Zone Books: New York, NY, 1994), p.162.

[11] H. G. Wells, Julian S. Huxley, G. P. Wells, *The Science of Life* (1929), p. 27.

[12] H. Harris, "Roots: Cell fusion" in *BioEssays 2: 4* (Wiley Periodicals, Inc., A Wiley Company, 1985), pp. 176 - 179.

[13] John Duns Scotus (vers 1266 - 1308). Haecceity (transliterated from the Latin haecceitas) is a term from medieval philosophy, first coined by Duns Scotus, which denotes the discrete qualities, properties, or characteristics of an object / person that make it a particular object / person. Haecceity is a person's or object's "thisness." Charles Peirce later used the term as a non-descriptive reference to an individual. See <http://en.wikipedia.org/wiki/Haecceity>

[14] <http://www.atcc.org/common/catalog/numSearch/numResults.cfm?atccNum=CRL-1696>. Little descriptive information about the origin of the McCoy cells appears in literature. They were first mentioned by Pomerat et al. [26143]. The cells were reported to have originated from the synovial fluid in the knee joint of a patient suffering from degenerative arthritis. In ca. 1965, Defendi et al., showed that McCoy cells (designated McCoy A) were indeed human cells. However, another sub-line (designated McCoy B) was, in fact, of mouse origin and possessed marker chromosomes characteristic of strain L mouse fibroblasts. McCoy cells that are presumed to be human, but actually are mouse cells have been disseminated from laboratory to laboratory throughout the world. Initial interest in McCoy cells followed the demonstration by Gordon and Quan [PubMed ID: 14268619] and Gordon et al. [PubMed ID: 4110420] that ionizing radiation (cobalt-60) greatly increased the susceptibility of McCoy cells to infection by chlamydia strains. A culture of the so-called McCoy cell line was received from the Center for Disease Control, Cell Culture Department, Atlanta, GA in March, 1984. Documentation of origin or passage history was not available. The cells have been used to propagate laboratory strains of the 15 recognized serotypes of Chlamydia trachomatis. The cell line has been satisfactory for chlamydia growth for at least 43 passages at ATCC. The cells are susceptible to chlamydia strains, and can be used to propagate chlamydia. Tested and found negative for ectromelia virus (mousepox).

MCCOY AND MCCOY-PLOVDIV CELL LINES IN EXPERIMENTAL AND DIAGNOSTIC PRACTICE – PAST, PRESENT AND PERSPECTIVES, *Journal of Culture Collections, National Bank for Industrial Microorganisms and Cell Cultures*, ISSN: 1310-8360, Vol. 4, Num. 1 (2005), pp. 3-16

[15] See O. Catts & I. Zurr, "Big Pigs Small Wings: On Genotype and Artistic Autonomy" in M. Cooper and A. Goffey (eds.), *Culture Machine 7 – Biopolitics* (2005).

[16] Cited in S. Squier, "Life and Death at Strangeways" in P. Brodwin (ed.), *Biotechnology and Culture: Bodies, Anxieties, Ethics* (Indiana University Press: Bloomington, IN, 2000).

[17] See <http://www.tca.uwa.edu.au/disembodied/dis.html>

[18] See *New Harvest*, <http://www.new-harvest.org/>

[19] <http://www.tca.uwa.edu.au/vl/vl.html>