

This paper is to be published in Aminima magazine:
<http://www.aminima.net/>

It addresses research undertaken at Symbiotica:
<http://symbiotica.uwa.edu.au>

My Year of Biomess: Life, death and transformation

I am writing now at the end of a year as artist in residence at the SymbioticA art and science collaborative research laboratory in the School of Anatomy and Human Biology at the University of Western Australia. When I started to think about what to call this article, the messy materiality of the processes involved in the work stand out as one of the most enjoyable and defining features of my time at SymbioticA. As I begin trying to sum up a years sojourn into this new territory, I find a sticky tangle of fibres woven between theory and practice, action and reflection, threading materials across the boundaries of the living and the non-living, through bodies and technologies, between waste and resource. How did I get tied up in all this?

My association with SymbioticA began in 2004 with an initial 3 month 'scoping' residency. At that time, my interest was in exploring the electromagnetic nature of the body, with a focus on 'making strange' the energetic transductions that take place between body and world outside of our ability to consciously perceive them. This manifested itself in a project to utilise a particular physical characteristic of bone – one which enables it to transduce between electromagnetic and sonic, or mechanical, forms of energy – to make audio speakers. The specifics of this work are dealt with in more detail below, but importantly, this project also opened the door for me to a new field of investigation regarding the nature of material transformation. What does it mean to buy bone from a butcher and transform it into a sound emitting device? Enacting a transformation such as this one, means enscribing a narrative on the material, performing a story with process. In making this type of work it becomes necessary to consider both what is being created with each material narrative and how each story should be told.

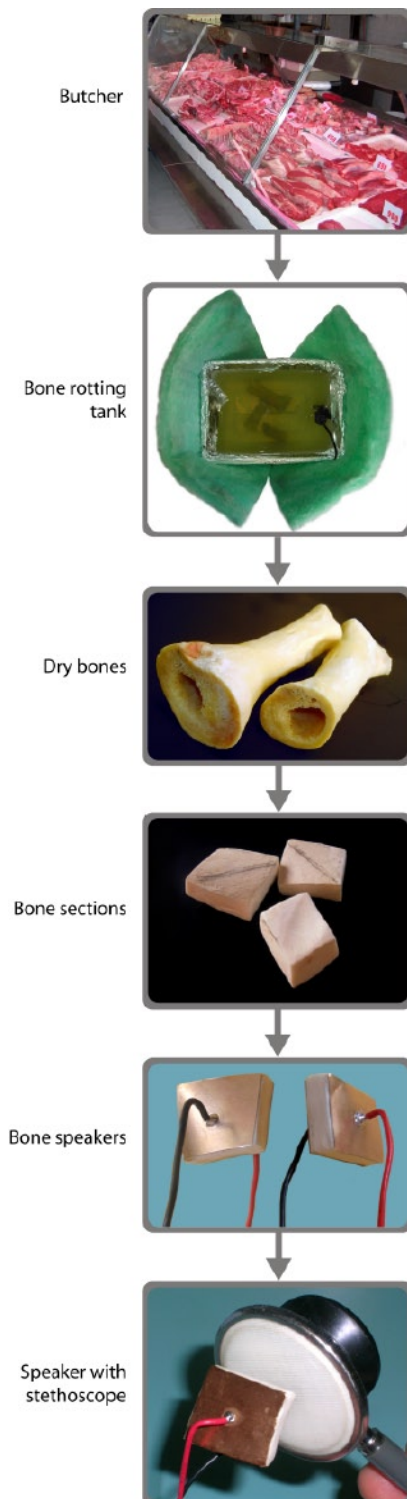
Although artists have always dealt with material process in one form or another, the materials and processes encountered in the life sciences and biotechnology industries represent a relatively new field of engagement, one in which relations between the living and the non-living, life, device and commodity become blurred if not entirely reconfigured. Hence, my approach to tracing material narratives became one of actively foregrounding or breaking open some of the issues and paradoxes that I encountered while working in this domain. My research developed through following established techniques and protocols towards unusual ends and putting together transformative material sequences in unorthodox ways. The stories that I performed were designed both to 'make strange' the history, origins and capacities of biological materials, to critique and question embedded conceptions of life and use-value, and to propose new composites and possibilities, in order that we might begin to consider our ethical and embodied relation to the word in a different light.

In the following sections I will discuss three research strands in more detail. As the primary focus of SymbioticA is on research not production, no exhibition was planned as part of the residency. However, there are now several works in development arising from this research. The impetus behind these works will also be discussed.

Bone

On my return to SymbioticA, I continued on with research, initiated in 2004, into the transductive qualities of bone. While the interest in the electromagnetic nature of the body was no longer the driving force behind this investigation, the intention of making bone strange remained. Importantly, I also came to understand the process of creating bone audio speakers as being one which constructs a narrative of transformation from life to device. There is nothing new about the use of biological materials in technological design – bone particularly has been used to fashion both

musical and more utilitarian instruments since ancient times. However, this work draws attention to a fundamental shift in the way in which many materials – and especially biological ones – are being approached and employed, not as static quantities but as dynamic, responsive technical components. The bone speakers represent only a crude realisation of this trend as it is manifested in areas such as synthetic biology and the crossovers between bio and nano technology, but, in doing so, they render this new story of instrumentalisation perceptible at the macro scale. By setting out to amplify this particular quality of bone, the narrative of the speakers holds the potential to engage some of the philosophical tensions invoked by the elision of life and device at an increasingly finer resolution and to disrupt traditional metaphorical constructions of the body, thereby challenging the way in which we understand and experience our own corporeality.



The physical quality possessed by the extracellular bone matrix, or hard part of the bone, that allows it to transduce between electromagnetic and sonic forms of energy is known as piezoelectricity. In practical terms, this means that when an AC signal of a particular frequency is applied to a section of bone in the correct manner it will physically expand and contract at that same frequency. In order to substantiate and actualise this property in the form of speakers I had to perform an incremental process of decontextualisation and recontextualisation, in which all traces of the bone's relation to its previous animal life (and death) were removed and a generic repeatable form was realised. After purchase, the bones were macerated in a tank of warm water to rot away the flesh. They were then soaked in alcohol to clean them and remove any further moisture and dried in a drying oven. Sections were cut at a 45 degree angle to the direction of the fibres in the bone and foil electrodes were applied to the two opposing flat surfaces of the sections. These 'speakers' were then driven with a sine wave signal at an amplitude of between 15 and 90 volts. Thus, the bony substance in its metallic housing had become re-inscribed with a new set of relations. A special measurement device, known as a laser interferometer, was used to measure the extent of the bone vibrations in response to the applied voltage. It was found that the speakers were most responsive around the 75-90 volt mark, between 500 and 4000 Hz (depending on the particular dimensions of each section), and that they were expanding and contracting at the scale of several nanometers. By this targeted series of transformations, the bone had become reoriented in its operation and use-value, from the unwanted remains of a butchered cow to a curious technical artifact, from the living functionality of bone transduction, to the non-living response of a dynamic substance, from a familiar object encountered primarily in the visual and haptic domains, to an unfamiliar one directed towards an aural experience. Or so I would have liked...

Despite the remarkable sensitivity of the human ear, the bone vibrations remained imperceptible to myself and my co-worker, William Wong, largely because they did not couple well to air and were dispersed before our ears could pick them up. However, in the very last days of the project we discovered that it was possible to hear the bones using a stethoscope. This became an important

element in thinking about how to exhibit the work, as the use of a stethoscope immediately brings a biomedical aesthetic into play. The tenuous nature of the bone sound is also important as it creates what I have come to describe as a 'belief intervention' in which an audience is forced to consider whether or not they believe in the 'fantastical' qualities being imputed to the bone enough to try and hear them – and in trying to hear them they are forced to reach out for and consider the limitations of their own perceptual abilities. Of course, the material history of the speakers remains the most fundamental element of the work; bringing into question the relationships and tendencies that we habitually ascribe to everyday things and in turn the lack of critical understanding that we have of the material production histories embedded in the commodities and devices around us.

Collagen



Collagen, like bone, is another substance familiar to popular culture. Though, while it features often in the pages of trashy magazines its production history and biological origin are not generally discussed. Collagen is a type of fibrous protein that makes up 20-25% of the total protein content of the mammalian body. It is a fundamental component of muscles, tendon, skin, bone, cartilage and teeth. The collagen used in cosmetic enhancement procedures and various other cosmetic products is usually derived from animal waste products such as cow skin. However, there have also been reports of collagen based products being manufactured using the skin of executed Chinese prisoners¹.

Initially, I became interested in collagen as part of my bone research, as it is the collagenous part of the bone matrix that displays piezoelectric characteristics. From here I began to think about the use of collagen in the cosmetic industry and its place in popular culture. This, in turn, led me to embark on an investigation of its material qualities, which unlike the bone speaker project, was not outcome driven. Rather, I was interested in what I could draw out from the process, history and quality of the material and use this to reflect back onto its commercial and cultural associations. I researched a protocol for extracting collagen from tendons and began working with cow tendons sourced from the butcher. Subsequently, I shifted my focus onto transforming the animal waste generated within the School of Anatomy and Human Biology itself by extracting collagen from tendons in the tails of rats that had been put down for experimental purposes. In doing so, my interest in the work widened out again from the use of collagen in the cosmetic industry to looking at the material transformations that I was engaging in as being a way to discuss human use of animals.

The material process that I eventually developed involved first creating a gel from the collagen extract and then evaporating this into a thin plastic-like film. I created one piece of 'plastic' from each rat tail. I also filmed the rats before they were sacrificed,



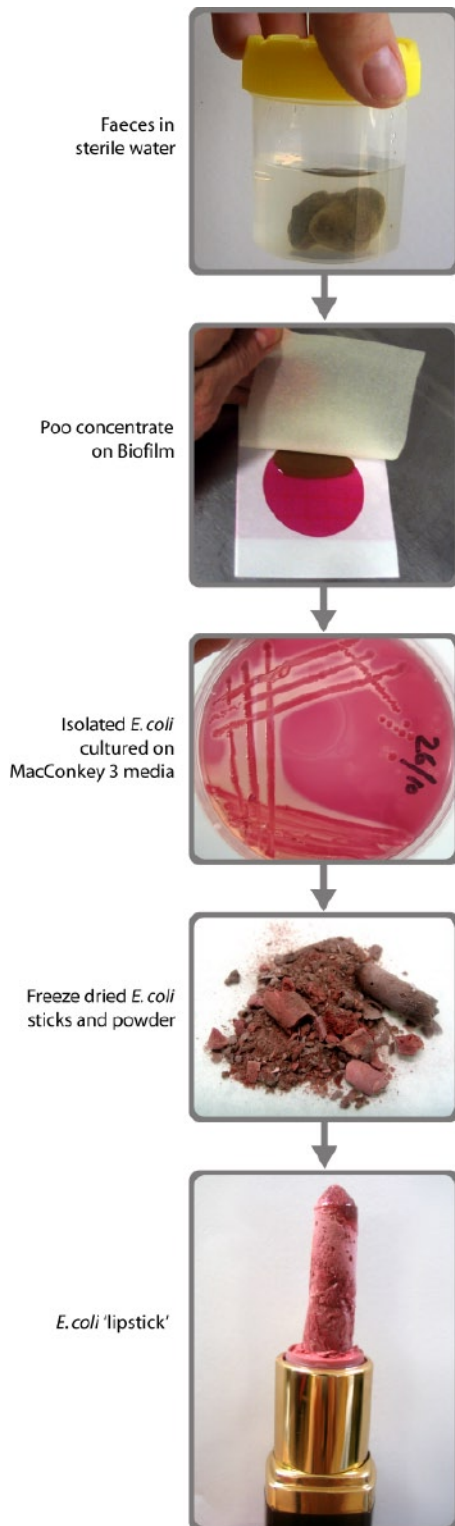
in order that the collagen film might be exhibited with a video accompaniment. This would serve both as a memorial to the rats whose tails had been used and as a portal to the process of transformation whereby an unremarkable piece of 'plastic' is generated from a living animal. Thus, in a similar manner to the bone audio speaker project, I am once again interested in rendering alternate material trajectories and 'making strange' the material histories embedded in seemingly mundane objects. Although, in this case the transition from life to non-life that is embodied by the collagen film is of greater importance than the capacities of the material.

During the process of working with the rat tails I began to examine how I felt about animal experimentation more closely. I was struck by the fact that this particular use of animals has become so much more politically fraught and socially unacceptable than many other circumstances in which animals are killed for human benefit or by human actions. Perhaps you might argue that food – in the form of meat – is more important or more central to survival than scientific curiosity. But what about all the vegetarians in the world who survive without eating meat, for example, or the fact that certain important western medicines would not exist without scientific research involving animal experimentation? What about roadkill? Is it so necessary to drive large automobiles at high speed? It is impossible to

escape the fact that in Western society we rely on animals as a resource and accept animal death as collateral damage to our lifestyle. I would not apply, without question, any general rule that delineates one form of 'collateral damage' as more acceptable than any other. Hence, I wanted to use my collagen work to make a piece that explored the issue of animal waste and also the expressed the inconsistencies of a generalised focus on animal testing over other types of animal use. While this work is still in development, I have begun by performing a collagen extraction on tendons from a kangaroo tail², for use in a manner which draws attention to roadkill as another form of collateral damage to be considered alongside animal experimentation.

A second thread winding out from my collagen investigations, ties back to my early interest in the cosmetic industry. Rather than evaporating the collagen gel into a film, it is possible to incorporate it into a moisturiser base for use as a skin cream. While the impetus in developing this work further would again be in 'making strange' the histories of everyday things, the focus here is on deconstructing the process of commodification, whereby a material is decontextualised, abstracted, value-added and sold as 'new'. Although it is obvious that 'new' things do not simply materialise out of thin air there is nonetheless a tendency to view them in an ahistorical manner. However, if we shift the emphasis from 'new' to 'newly transformed' we, as consumers, are immediately implicated, bodily, economically, ethically, in the web of transformative processes that make up our world. In this particular instance I am interested in breaking the smooth clinical surface of the neutraceutical aesthetic, to reveal a visceral through line between bodies, cutting across the boundaries of animal/non-animal, life and death.

E. coli



Escherichia coli is a bacteria that lives, among other places, in the mammalian lower intestine and makes up a significant proportion of human poo. It also resides in freezers and in culture in laboratories the world over. It is one of the world's most studied organisms and has been crucial to the advancement of microbial and molecular biology over the past 70 odd years. My interest in *E. coli* stems from its paradoxical status both as an abject component of fecal matter and as a laboratory tool, as a lifeform and as a technology, as waste and as a resource. During the process of my research I also became interested in the fertile territory that exists in the crossover between the history of shit in contemporary art and the medical and scientific history of the use of *E. coli*.

I began my work with *E. coli* by exploring its ability to move in response to an applied electrical current. This capacity, known as galvanotaxis, is also shared by other kinds of bacteria, certain types of cells within multicellular organisms and slime moulds. I was interested in the potential to use this particular quality of *E. coli* both to animate and 'make poo strange' and to explore the idea of a living organism as a technology. I obtained a laboratory strain of *E. coli* known to be highly motile and successfully produced a galvanotactic response. However, it was only possible to observe the bacteria in motion under a microscope, not, as I had hoped, to witness a whole colony move over time with the naked eye. Thus, like many of my early experiments, this work was the beginning of an investigative thread that would eventually lead me elsewhere.

Once again I began to focus on the narrative history of the material. I researched the strain I had been using and found that the K-12 strain of *E. coli* was originally isolated from the faeces of a diphtheria patient in Palo Alto, California, 1922³. At that moment it had made the transition from being endemic to the human body and its faecal waste, to having a biological laboratory for a habitat. In order that I might be able to amplify this strange trajectory for an audience, I set out to explore the process of extraction and transformation using my own shit. The extraction was fairly simple, involving the use of a particular type of nutrient media on which the *E. coli* grows a distinctive red in colour, making it easy to isolate it from other bacteria. Once I had isolated the *E.*

coli, I developed, through a round-about series of experiments, a process of culturing and freeze drying it into red-brown chalk-like sticks. These sticks were light and yet solid to touch and had the appearance of being some type of mineral substance. However, when placed into a warm broth of liquid media, a powdery fragment of the stuff would immediately re-hydrate and the millions of bacteria would again begin to proliferate. Thus, it seemed that the sticks of freeze dried

E. coli with all the appearance of stasis, were in fact only a moment of suspended animation. Like the other artifacts that I had generated as part of my research tracing processes of transformation from living organism to non-living substance, device or commodity, the *E. coli* stick carries with it a story that moves from gut to petri dish. Unlike these other artifacts, this apparently non-living object, embodies an active potential for self-transformation.

When thinking about how I might exhibit this work I am drawn to the idea of recycling – from waste to resource, between stasis and proliferation, from a bodily discharge and into a body of work, another form of life. I have been making *E. coli* ‘lipsticks’, in a comic gesture of cycling back from anus to mouth, and thinking about the economy of shit in the history of contemporary art. In this respect Pierro Manzoni’s 1961 piece Artist’s Shit, in which his canned poo was sold for the same price per gram as the going rate for gold at the time, stands out. While this work is obviously directed towards comment on the art world, it caused me to question whether comparing shit with gold is any longer such an entirely ridiculous juxtaposition in an era where there is an increasing tendency for living organisms and parts of bodies to be ‘enterprised-up’ at the hands of the biotech industry. I am also struck by the affective power of a biological powder in a post 9/11 world. While the *E. coli* found in the colon is generally non-pathogenic unless isolated from a sick person, or mistakenly introduced into the urinary tract, there is nonetheless some risk involved in dealing with such a concentrated form of bacteria. In extracting and amplifying the *E. coli* from my own shit I have abstracted it from the abject quality of the poo and yet at the same time magnified an aspect of its ‘dirtyness’. Thus, in its current form the work remains something of a paradox – both object and lifeform, playfully humorous and potentially harmful. How it might eventually be incorporated remains, as yet, to be seen.

Tying it all together

So there it is. The guts of the matter and a year of research, served up in a tight weave of story and speculation, histories and becoming, dissolution and reconfiguration. As I take a step back now, I can see a coherent texture begin to emerge. There is a persistent emphasis on the connection between things, across different states and contexts. Bodies are deconstructed and reconstructed and the politics of these transformations are examined. Nothing, it seems, is ever static. We are porously, viscerally enmeshed with the world at all times and so the extent of our responsibility is revealed. If nothing else, my year of biomes has produced a series of unorthodox material transformations that challenge certain habits of perception – especially our tendency to see the world in terms of fixed entities rather than processes of change – and provide the possibility of experiencing and constructing both the world and our place in it differently.

Thankyou to my Honours student William Wong, without whose help I would not have been able to realise my bone speakers. Thankyou to Professor David Sampson, Dr Julian Armstrong and the OBEL laboratory for hosting my bone research. Thank you to the Australia Council for the Arts for funding my residency. Last but not least, thank you to SymbioticA.

¹ <http://www.guardian.co.uk/china/story/0,7369,1568622,00.html> Referenced 9/02/07.

² Kangaroo’s are common victims of roadkill in Australia

³ <http://www.genome.wisc.edu/resources/strains.htm> Referenced 9/02/07.