Excitable tissues in motion capture practices:

The improvising dancer as technogenetic imagist

Malaika Sarco-Thomas

Introduction

In exploring the role of the sensing body in the development of technological interfaces in the contemporary arts, it is useful to begin by examining how a body itself operates as a technological interface with its environment. From a Heideggerian perspective, the body can be said to be instrumental- ist in its dealings with the world, also representing the influence and threat that technological practices pose to lived experience and our experience of 'the human'. The same can be said for the embodied techniques of dance improvisation practices.

While dance performances from the Judson Dance Theatre period began to interrogate relationships between dancing bodies and objects (Burt 2012), a number of improvisation practices since the 1970s have continued to derive source material from non-human and organic images in ways that encourage a kinetic, non-stylized response. Simone Forti's study of animal movements and interest in 'an animism' of non-human forms and textures (Hayes 1986: 11), and the environmentally responsive improvisation practices of Suprapto Suryodarma or Jennifer Monson are examples. Influential performance texts like *Body, Space, Image* (1993) and *A Widening Field* (2003) by Miranda Tufnell and Chris Crickmay encourage poetic ways of finding a somatically-informed, dialogic affinity with physical objects and places, using sensory encounters as starting points for creative work.

David Abram's *Spell of the Sensuous* (1997) similarly explains how an inherent human sensibility to understand the languages of non-human beings, identified through phenomenological processes, can activate a sense of kinship or connection with the biosphere. Comparably, practices of contact improvisation and Ki Aikido focus on the cultivation of awareness of relationships, with techniques for extending the perceptual acuity of a mover that are increasingly seen as being of value in a performer's training. Here, the emerging discipline of postphenomenology[i] offers a useful method to critique our relationship to corporeal technologies by questioning how relationships between people and things are mediated, rather than seeking to articulate reality solely through the context of human perception.

By investigating the benefits of a postphenomenological analysis of dance improvisation practices, this article offers a variety of outlooks on the tacit technologies of corporeal movement performed in relation to another body. Outlined below, results of this investigation include recognition of three useful technologies: the (dancing) body itself as a motion-capture device, the potential of improvisation as a modality of imaging in relation to another, and a diversifying field of somatic practices as a way to investigate this potential. I propose that such practices can generate kinaesthetically and affectively charged knowledge through models of sensuous participation with an environment.

Body as motion-capture device

The increasing use of prosthetic technologies in the arts provokes dialogue around how the body can be understood to be more than itself. This issue is foregrounded, for example, in Erin Manning's discussion of performances involving technologies that 'extend' the body, positing themselves somehow as 'more than' the body. In an attempt to articulate, in the company of

Deleuze and Guattari, Derrida, Artaud, Hayle and others, how the body is always already more than a body, Manning claims that 'new ecologies of experience' are rarely created under the conditions of 'technology-enhanced' dance performance that engage with prosthetic or motion-capture technologies (2009: 63–64). She goes on to propose that the body becomes choreographed by the technologies that seek to enhance it, effectively limiting its capacities for evolution and surprise or 'relational eventfulness' (2009: 65). In the spirit of articulating the body's 'more-thanness', Manning calls us to consider the original capacities of the body as a process of technogenesis:

> Technogenesis – ontogenesis of the bio-technological not as a technical additive to the biological but as an emphasis on originary technicity – suggests a working vocabulary. Here, the body is posited not as a stable category but as a creative vector of experiential space-time. Foregrounded is the body in movement: pure plastic rhythm. (2009: 66)

Moving his or her body via various modes of visualization and intention, a dancer acts as technician of his or her own plastic soma; by-products of this practice represent altered ways of experiencing one's extended environment. As Natasha Myers (2012) suggests in her sociological reading of the behaviours of life scientists, biologists who unconsciously develop embodied ways of animating the phenomena they research – for example, through gesture in an excited conversation about cell-bonding structures – similarly represent a particular kind of originary technicity, or vocabulary that expresses understanding about their subject matter.

The performance-based improvisation work of a number of dance artists presents routes towards practicing more nuanced perceptions of body and world, and posits performing as the practical solution to sharing immediate, embodied discoveries. Deborah Hay's daily practice of asking koan-type questions of her body, e.g. 'what if now is here is harmony?' while she performs her physical responses (2011), highlights movement as a performed response to the body's perception of 'now', 'here' and 'harmony' for example. Hay's mantra of 'whole body the teacher' (2005) grants authority to the language of movement produced from these

questions. Similarly, Action Theatre teacher Sten Rudstrom employs training methods which include translating unmediated, visceral responses to organic images (e.g. mud, rocks, moss) into performance using a combined palette of voice and movement, prioritizing a cycle of sensing, feeling and action that draws on somatic responses to an imagined organism as source material for performance (2005).

In a proposal that dance can also provide the starting point for an embodied analysis of biological phenomena, my own performance of *Twig Dances* (Sarco-Thomas 2010) employs a score in which the dancer seeks for translating into movement the perceived physical shape, growth patterns, texture, colours and anatomy of a plant, as he or she experiences them in that place and moment. As an observational practice of image translation, *Twig Dances* can be figured as a kind of motion-capture technology and a means by which to represent and understand observed or perceived biological phenomena.

Using the curling tendril of a sweet pea plant as impetus for a curved pathway of the arm, or the deeply scored ravines of oak bark as a pattern to enable the shoulders to rise and stretch away from the scapula, the dancer translates his sensuous observations immediately into imitative movement-sensations. By using Maurice Merleau-Ponty's theory of perception (1962) as a lynchpin between observation and experience, the score seeks to develop the performer's physical and perceptual skill in making detailed, embodied, and – as far as possible – qualitatively accurate observations about individual plant specimens.

By inviting an audience to witness a process of questioning the body as a perceptive tool, Hay, Rudstrom and myself use improvisation as an image- making technology. Hay invites the movements made by 'the whole body as teacher' (Hay 2005) to be seen as images by calling the score 'performance practice' and inviting imagined or real viewers into the space with her as she works (Daly in Hay 2000: xviii). In Rudstrom's case, the artist starts from an imagined image and translates it through motion (Rudstrom 2005). In the case of *Twig Dances,* the living plant is

perceived as it grows, often moving very little, with the dancer rendering various impressions of the plant's anatomy as motion through performance.

In this light, improvisational strategies can be seen as technologies to translate form and movement from many sources. As tools of translation, such technologies necessarily invite questions about the intentions and relations of the dancer to the image. As Manning writes, 'relational movement is always improvisational' (2009: 31).

Figure 1: Pinus pinea Twig Dance *by Malaika Sarco-Thomas in Dartington Gardens, 2010.*

Figure 2: Looking closely at Echinops ritro*, Dartington Gardens, 2010.*

Figure 3: Echinops ritro *Twig Dance, Dartington Gardens, 2010.*

Improvisation as a modality of imaging 'in relation To'

Where used as a technology for observation and incorporating new knowledge, improvisation needs to function both as a research practice and as an object of study. According to the recently termed discipline of postphenomenological critique (see

Hasse 2006; Ihde 1993, 2003; Verbeek 2005, 2006a, 2006b), any effort towards scientific research with the aid of perception-enhancing tools should rigorously question the technologies used to 'mediate our experience of the world' (Rosenberger 2009: 66). Paul Rosenberger outlines a plan for a postphenomenological analysis of imaging technologies in neuroscience as a way of better understanding how our relationships with these technologies influence our perception and understanding of the world. If phenomenology seeks to identify reality through our experience of the world, then for the philosophy of technology, postphenomenology draws on pragmatism with a focus on

- the relations between humans and the world
- analysing the technologies which mediate our experience of the world [and]
- identifying various specific ways the world is shaped by our experience of it through those technologies that make experience possible. (Rosenberger 2009: 66)

A similar approach can be useful in body-based practices that engage with phenomenological methods of research. Critical examination of observational capacities as articulated through the body, through equipment in the life sciences laboratory and through devices of motion-capture imaging, offers an opportunity to recognize the potential of all three kinds of instruments as means for comprehending and relating to biological processes.

Starting from the premise that neuroscientific research relies on new technologies for developing images of moving, living matter, and that phenomenology as a discipline can benefit from the approach of pragmatism (through querying the importance of an object by explaining its impact on practice) Rosenberger suggests a three-step approach to analysing our practical engagement with imaging technologies:

1. conceptualization of the disputed images [produced by technologies] as multi-stable,
2. identification of the competing variations [and]

3 examination of the roles played by mediating technologies in the interpretive strategies which enable each variation. (2009: 67)

This method could also be usefully applied to dance improvisation technologies, and highlights how, when developing any technologies, we become accountable for the changes they effect.

This relates to points made by life scientists interviewed by sociologist Natasha Myers who notes that the problem of using visual imaging technologies to illustrate and explain phenomena in the life sciences is precisely that these tools freeze and flatten data that is dynamic and alive. Even animated simulations of processes often inappropriately impose specificity or presume directionality. In an interview with two scientists explaining the challenges of representing their research on 'how proteins fold to acquire their active conformations in the cell', one scientist expresses her concern that '[computer-based] rethinking 'technobiopolitics' and the technogenetic potential of the body through changing our perceptual relations to space and species.

Figure 4: Plantago major*; an example of an image that becomes a score for a Twig Dance.*

Somatic response-ability: affectively charged knowledge

This intention to apprehend the world more fully through one's mind-body schema has clear implications for practices in somatics and performance. Though somatic practices are often identified as studies of first-person experiential research of the lived body, the necessary interaction with a physical and energetic environment provides the conditions to, in the words of the International Somatic Movement Education and Therapy Association,

- Focus on the body both as an objective physical process and as a subjective process of lived consciousness; [and]
- Recognize habitual patterns of perceptual, postural and movement interaction with one's environment. (ISMETA 2003 in Eddy 2009)

Projects that seek to unpack processes of lived consciousness and recognition of patterns of interaction with one's environment also hold promise for rethinking our means of psychic engagement with objects and place. Highlighting our capacity for responsive intelligence, somatic experiences of kinaesthetic empathy found through 'excitable tissues' in the dancer or performer, can bring about recognition of the body's inherent potential to sense and describe qualities in multiple non-human others. As theatrical or performative means of presenting research is becoming more widely recognized and practiced (White and Belliveau 2010), it makes sense to ask how and where somatic research can effectively be disseminated. Improvisation can be seen as a means of presenting first-person perception as research, both formally (as a performance score) and informally (as the gesticulating scientist inadvertently 'dances' while explaining a phenomena).

In her recent article 'Dance your PhD, embodied animations, body experiments and the affective entanglements of life science research' Natatsha Myers argues that 'the Dance Your PhD contests, as well as other performative modalities, can expand and extend what it is possible for scientific researchers to see, say, imagine and feel' (2012). In analysing the unselfconscious gestures of biologists, Myers suggests that the impulse to embody one's experience of a studied subject is a frequent by-product of research, and exposes a relationship of embodied 'withness' between a researcher and a phenomenon.

In relation to machine-based methods of scientific image-making, which have their shortcomings for capturing and representing life processes, Myers proposes that researchers who become enmeshed in the processes of their analysis develop a new way of embodied knowing:

> A gestalt shift makes it possible to see that it is not so much the phenomena that are caught, but the scientists themselves: they are the ones arduously entraining their bodies, imaginations and instruments to the rhythms of phenomena they desire to know. Indeed, practitioners can be seen hitching rides on and being pulled in by the phenomena they struggle to comprehend. This shift to a language of 'hitching onto' and 'getting caught by' signals researchers' capacities to *move with* and *be moved by* the phenomena that they attempt to draw into view.
> (2012: 177, original emphasis)

Described here is a process whereby scientists – or potentially dancers – who are intimately involved in witnessing a subject, become imperceptibly drawn into the act of observation to the point that they incorporate the phenomena into their bodily experience. Hands, arms and legs become 'excitable tissues', ready to become involved in interpreting the phenomena of study. In the same way that a dancer both moves with and becomes moved by the phenomena of a performance-based or choreographic task, a scientific researcher's improvised body-work constitutes an essential way of knowing his or her subject.

Myers writes, ‘by becoming proxies for a process, researchers can emulate a phenomenon in ways that generate kinaesthetically and affectively charged knowledge. A model or animation is thus not only a representation, but also a performative form of knowing’ (2012: 172), and contributes to a diversified field of technologies which could include what she calls the body’s ‘fleshy antennae’. Myers calls for valuation of the knowledge produced by embodied animation, writing that ‘theories of representation and communication in science must be reconfigured in order to account for the role of embodied animations in the production and propagation of scientific knowledge’ (2012: 177).

Recent attention to mirror neurons and kinaesthetic empathy offer other models for explaining this kind of affectively charged, performative form of knowing. Highlighting this capacity for responsive intelligence in the body can bring about individual agency and recognition of the body’s inherent potential as a motion-capture technology operable in real-time. Everyday scenarios of copying a dance instructor, gesticulating to describe a great sports moment, or performing comic impersonations draw on basic skills of imaging in motion. So-called somatic practices, which focus on responsiveness through sensory perception, encourage embodied first-person engagement with object and place and can offer a more focused opportunity to see the potential of imitation to enable affective, empathic participation with a larger sensuous environment.

Tapping into sensory images of the non-human may be seen to be part of a number of Postmodern and New Dance practices since the 1970s. In more abstract examples, Steve Paxton has spoken about taking care of the body

as ‘your animal’ (cited in Morrissey 2011), and Mary O’Donnell Fulkerson has invited students to map image-sensations of moss, stones, and fur onto the spine (1977). As Ramsay Burt (2012) has pointed out, a sense of response- ability or a ‘withness’ to non-human objects can be found in the work of the Judson Dance Theatre. Performances such as David Gordon’s *Chairs* (1974) and Yvonne Rainer’s *Terrain* (1963), can be seen as performances with objects in which a dancer develops a duet with a chair as the second performer, for example, as in the case of *Chairs*. As Burt suggests, this can be said to introduce a sense of the body as object-like, and likewise, open up potentials for seeing objects as body-like. In both cases, the dance performance becomes ‘technogenetic’ to cite Manning, recomposing the potential of bodies for audience and performer:

> This coming-into-emergence is a technogenetic experience. It is technogenetic because it recomposes the body. This recomposition takes form through a multiplicity of techniques. For Simondon (1969), a technique is a technology of emergence (an ontogenetic technology or technogenesis) through which new complex systems are composed. These techniques can be thought as associated milieus of potential. Associated milieus are ecologies that emerge through the very technogenesis that gives them form. (2009: 71)

The potential for such practices to highlight our capacity for reading a multitude of images – foreign objects, textures, organisms and processes – should not be underestimated. According to Manning, this is possible through the ‘machinic body’, the body provoked ‘to become in excess of its organism’, to become more than we think it already is. Bodies engaging with these techniques ‘become experiments in the making’ (Manning 2009: 71). This experimenting body could be seen as the world’s most exciting book – the catalogue of an infinite array of movement languages as read through the improvising technologist-performer.

Conclusion: a post-human book of motion

Through 'reading the world', an improviser proposes new ways of relating to other bodies and reveals the potential of dance as a translational process. The bobbing of the ripe plantain head on its stalk, as 'tried out' by the improvising dancer, becomes a route towards sensing the turgidity of one's own thoracic vertebrae and seeking to experience the qualities of bounce revealed in the other. Performing this bounce, the dancer takes responsibility as image-maker, translator, operator of technology and mediator of data. For the dancer or somatic practitioner, translation practices, rigorously used, can challenge and alert us to the thrill and intelligence of the act of perception. The translating body becomes a post-human book of motion.

Dramaturg and writer David Williams describes how the idea of 'a book of motion' influenced him in his early days as a performance maker. In responding to the question put forward by *Theatre, Dance and Performance Training* journal, 'What book or books have made a significant impact on your thinking about or conduct of your training and why?', he refers to an imaginary text called *A Book of Motion* that is depicted in Peter Greenaway's film *Prospero's Books*. According to the film,

> This is a book that at the most simple level describes how birds fly and waves roll, how clouds form and apples fall from trees. It describes how the eye changes its shape when looking at great distances, how hairs grow in a beard, why the heart flutters and the lungs inflate involuntarily and how laughter changes the face. At its most complex level, it explains how ideas chase one another in the memory and where thought goes when it is finished with … It drums against the bookcase shelf and has to be held down with a brass weight. (Greenaway 1991: 24)

Williams remembers this book as 'an imagined conflation of the complex systems of oceanography, aerodynamics, meteorology, gravity and biology, that also traces the unpredictable trajectories of the dance of remembering and forgetting in the processes of thought'. He writes,

> The very notion of such a book excited me, drawing my attention to something of the infinite array of kinds of movement, phenomenal and ideational. It was a kind of

> wake-up call into the dynamic motilities within which we are always already swimming. (Williams 2011: 117)

Maximizing perception of these dynamic motilities can be seen as a project of the somatic educator or practitioner, while dance improvisation performance can act as a translator and camera to these processes. Used consciously, in the case of dance artists, or unconsciously, in the case of Myers' gesticulating scientists, improvisation holds potential as a rich source of engagement with an extended sensuous environment.

Analysis through postphenomenological practices enables us to question the products of this engagement, asking how practicing improvisation scores shifts our understanding of the world. Improvisation artists and movement educators have a responsibility when working with imagery to acknowledge the schemas these improvisation technologies produce: body as camera, body as translator, body as cellular speech, body as book. Yet because the medium of dance is moving and not still, image translation made through the body brings a live three-dimensionality that is not possible through photography or video. Improvisation offers the potential for a body to consciously operate as a moving archive of perception.

In their article 'The corporeal body in virtual reality' Judith Sixsmith and Craig Murray examine how engagement with virtual reality environments can bring about transformative experiences of the body's sensory architecture. They draw on Marcel Mauss's work (1992) to put forward the idea that 'the body is our first and most natural technical object', and propose that 'techniques of the body work not only upon the body-object, but also upon the body-lived, producing our embodied experience' (Sixsmith and Murray 1999: 319). Going further, Manning also posits the sensing, moving body as an extended system that alters the relational space–time matrices in which they move, generating new, rhizomatic and relational systems:

> Sensing bodies in movement are open systems that reach toward one another seemingly, becoming through these relational matrices. As these bodies individuate relationally, they evolve beyond their ontological status, becoming ontogenetic. Technogenesis is the dynamic becoming of the sensing body in movement. (2009: 66)

Perception-enhancing technologies extend the reach of the body and generate new models of relating. Improvisation-based technologies that encourage movers to take perception seriously and explore affinities for moving 'like' another thing can develop the usefulness of our 'fleshy antennae' and provoke questions of how far these sensory motilities can be tools for research and communication. Engaging with such technologies through performance has the potential to provoke further examination of the kinaesthetically and affectively charged knowledges produced by one body moving, with curiosity, in relation to another.

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Contributor details

Malaika Sarco-Thomas, Ph.D., is a dance artist whose research spans dance improvisation, ecological philosophy, site-based performance, tree-climbing, guerilla tree-planting and community practice. Malaika studied dance, thea- tre, biology, Ki Aikido and improvisation at the North Carolina School of the Arts, Hollins University, Kyoto Art Centre, Dartington College of Arts and PARTS in Brussels and was awarded a Jack Kent Cooke Foundation Graduate Fellowship for her doctoral studies. She is Senior Lecturer and Award Leader in Dance at Falmouth University and co-organizes Contact Festival Dartington and Conference, an annual event supporting the development of practices in contact and improvisation.

E-mail: malaika.sarco-thomas@falmouth.ac.uk

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1. [1]Postphenomenology is proposed by Don Idhe as a contemporary approach to phenomenology that recognizes and questions the technological mechanisms that influence and condition our experience of the world (see Ihde's *Postphenomenology: Essays in the Postmodern Context*, 1993).