Body and Movement: Basic Dynamic Principles

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Introduction

Embodiment is to the body as enaction is to movement.[1] In each instance, the primary term of the analogy attempts to embrace an animate reality in a way compatible with the science or strand of philosophy being practiced. In each instance, however, the primary term is uncongenial to the basic reality it aims to capture and describe. The lack of fit is indirectly but substantively attested to by indices of books on embodiment and enaction: either no entry exists for the tactile-kinesthetic/affective body and kinesthesia or paltry entries exist. In effect, the foundational ontological and epistemological reality of life is missing: *animation* is nowhere on the map.[2] The lack of fit and missing reality are furthermore attested to by the terms in which proprioception is discussed and the fact that a clear-cut distinction and substantive understanding of the difference between proprioception and kinesthesia is nowhere in evidence (see Sheets-Johnstone 1999 for more on this topic). Proprioception is, properly speaking, not a "matter of debate among philosophers" – seemingly, a matter of determining the correct

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[1]This essay concentrates attention on embodiment. An essay titled "Animation: An Essential, Fundamental, and Properly Descriptive Concept" concentrates attention on enaction and is forthcoming 2009 in *Continental Philosophy Review*.

[2]Opportunities for putting it squarely on the map clearly exist. Consider, for example, Hanna and Thompson's "animalist" solution to what they term "the mind-body-body problem," the latter referring to the tripartite sectioning of what they describe as "something" that is "at once a conscious subject, a living and lived body, and an objective material thing" (Hanna and Thompson 2003b, p. 24). In particular, Hanna and Thompson propose that mind and physical body are simply "*dual aspects* of one's lived body" (ibid.), and that lived bodies are *animal* bodies. Their appeal to "*dual aspect animalism*" (ibid., p. 30) is oddly devoid of any reference to animation, precisely that which would ground their solution in the empirical realities of animate life through reference to proprioception and kinesthesia, the tactile-kinesthetic body and coordination dynamics, and that would flesh out their reliance on "cognitive ethology" (ibid., pp. 31–32) as an academically reputable support for their animalist solution.

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answer to a multiple-choice question.[3] Properly speaking, proprioception is a matter of all manner of bodily organs that sense movement and deformations, a primordial form of animate awareness that began its evolutionary career in surface recognition sensitivity – tactility in the service of movement – that evolved into different external sensors registering movement – chordotonal organs, hair plates, sensilla, cilia, and so on – and that, with the advent of internal bodily organs sensing movement through muscular effort, evolved into kinesthesia (Mill 1976; Laverack 1976; Wright 1976; Dorsett 1976; see Sheets-Johnstone 1999 for a close examination and study of the data). As is evident, proprioception is the broader term with respect to kinesthesia. It refers to a sense of movement and position that includes tactility and gravitational orientation through vestibular sensory organs as well as kinesthesia. As its etymology indicates, kinesthesia in its primary, that is, experiential, sense denotes an awareness of *movement*, hence an awareness of *dynamics*, hence an awareness of *a qualitatively felt kinetic flow*. The flow may be felt as smooth, expansive, abrupt, attenuated, jagged, linear, curved, constricted, slow, and so on, including any and all possible combinations as the flow unfolds. Given the inherent qualitative spatio-temporal-energic character of kinesthesia, it is hardly surprising that discussions of body and of movement that omit kinesthesia from their register omit the very stuff of life and the qualitative nature of that stuff. They omit animation.

Understandings of body and movement that are grounded in the natural history of animate life begin with proprioception, with the beginning dynamics of life itself in surface recognition sensitivity, and thereby proceed naturally to understandings that encompass kinesthesia, affectivity, cognition, and the world, including a world of others. They encompass these aspects *naturally* because animation – the dynamics of life itself – naturally engenders kinesthesia, affectivity, cognition, and the world. Movement is in other words at the heart not only of being alive but of staying alive. In an existential as well as evolutionary sense, survival is a matter of effective movement, which means movement that is affectively and cognitively responsive to an ever-changing world that is not the same from 1 day to the next and that demands attentiveness in precisely the way an ant, a spider, a fly, or a human is attentive, not only to the expected and familiar, but to the unexpected or the unfamiliar, the ant, spider, fly, or human recognizing that what is out of the ordinary may perhaps be harmful. As Darwin noted on the basis of his lifelong studies of animate life, "Animals may constantly be seen to pause, deliberate, and resolve" (Darwin 1981 [1871], p. 46).

The moral to be drawn from natural history is that the joints at which humans carve are not necessarily the joints of nature. Artificial joints can indeed give rise to conceptual arthritis in the sense of enlarging the significance of a part, hardening it, and distorting the structure of the whole. They can in turn give rise to linguistic surgeries and therapies that attempt to sew the whole back together in something approximating

[3] See Thompson 2007, p. 464, n.3. Thompson cites José Bermúdez's, Dorothée Legrand's, and Shaun Gallagher's "arguments" (as Thompson puts it) as to what proprioception is, that is, whether it is equivalent to prereflective self-consciousness or not and whether the latter consciousness is a perceptual or non-perceptual experience, encapsulating one's body as object or as subject.

its original, wholly natural holistic form. With respect to these linguistic stop-gap measures and operations, researchers would do well to heed the cautionary advice of the Eleatic Stranger from the beginning of their labors. The Stranger cautioned the Young Socrates, "we certainly should divide everything into as few parts as possible" (Plato *Statesman* 287). Certainly if one does not follow the Stranger's advice from the beginning, one should at least insure that the integrity of the whole is preserved, which means that parts are not only put back together, but in a manner that both illuminates and is true to the foundational integrity and nature of the whole.

The moral from natural history and the lesson from Plato are both well illustrated by a fundamental concept in Husserl's writings. Husserl wrote of action, but he did not write of active or enactive organisms; he wrote of bodies, but he did not write of embodied organisms. He wrote of *animate* organisms. Animation is the ground floor, the ontological as well as epistemological bedrock of human self-understandings and indeed of human pan-animate understandings, understandings that include but do not separate out cognition as the point of entry to those understandings.

Embodiment

Present-day cognitive scientists as well as many researchers within both analytic and phenomenological philosophy are wedded to embodiment and its ready-to-hand derivatives – for example, "embodied experience" (Gibbs 2006), "embodied self-awareness" (Zahavi 2002), "embodied subjectivity" (Hanna and Thompson 2003a; Zahavi 2005), and so on. The marriage is one of convenience rather than nuptial depth, and this because cognitive scientists and analytic philosophers intent on profiting from phenomenology and phenomenologists intent on profiting from cognitive science would do well to be studying and describing in detail "the comet's tail of nature" (Husserl 1989, p. 350; on the latter topic, see also Sheets-Johnstone 2007). Fleshing out our foundations in nature requires attention to our natural history, both ontogenetic and phylogenetic. In a – word, it requires attention not to *embodiment*, but to *animation*, for it is in and through animation that we realize ourselves as living beings. We do not come into the world *embodied*. We come into the world *moving*; we are precisely not stillborn. We are indeed animated in basic ways concordant with other forms of animate life, forms whose daily rituals also include eating, sleeping, and mating, and whose affective relations with others and whose cognitive acuities are also central to their well-being.

Cognition is a dimension of *animation*, hence a dimension in the lives of animate organisms. The faculty did not somehow become "embodied" in and with humans – a unique, even *deus ex machina* feature, as it were – but runs the gamut of evolutionary forms of life. In Husserlian terms, not just humans but virtually all members of the Animal Kingdom, a biological category, *turn toward* (or away from) objects and other beings they find in their surrounding world. They are *receptive* (or non-receptive) of them, moving in ways concordant with the meanings those objects and other beings hold for them. More finely put, they move in ways concordant with their affectively

motivated and informed sensory-based cognitions. Members of the Animal Kingdom are indeed *animate* organisms in the full sense of animation, being attuned affectively, cognitively, and kinetically to the world around them. Once cognition is rightly recognized as being both an inherent and integral dimension of the fundamental reality of being alive and moving about effectively, efficiently, and intelligently in the world, there is no doubt that the word *animation* properly describes the bodily nature of cognition.[4]

From the vantage point of animation, three critical lacunae are discernible in both present-day cognitive studies of 'embodied cognition' and its cognates, and in present-day phenomenological studies of 'embodied subjectivity' and its cognates: an attention to kinesthesia and its relationship to fundamental human concepts; an attention to coordination dynamics within the ontogenetical purview of learning one's body and learning to move oneself; an attention to evolutionary biology and its relationship to the coherency or 'existential fit' of *Leib* and *Körper* (see Sheets-Johnstone 1986 on the latter topic). In no instance is it possible simply to 'add and stir', nor is it a matter of 'bridge-building'. On the one hand, first- and third-person perspectives are not simply essentially different perspectives. A first-person perspective necessarily precedes the taking of any third-person perspective: short of first-person experience, there would be no subject or object upon which one could take a third-person perspective. On the other hand, building bridges between first- and third-person perspectives is a hazardous enterprise. It can result in a transmogrification of one of the perspectives, the labor of bridge-building being not necessarily a labor of love and mutual understanding, but one aimed at exploitation if not conquest.[5] Moreover if "Nature is there from the first day" (Merleau-Ponty 1963, 1968; see also Sheets-Johnstone 1999, pp. 306–307), then it behooves us to inquire what precisely is there from the first day rather than either attempt linguistic conversions of Husserlian epistemological phenomenology into, for example, a Merleau-Ponty-based theoretical ontology of "sensible reversibility" (Stawarska 2003; see below) or into a theoretical neurology on the order of "sensorimotor profiles" (Nöe 2004), or attempt linguistic compressions of first- and third-person studies into a hybrid entity on the order of "naturalized phenomenology" (Petitot et al. 1999) or "neurophenomenology" (Varela 1996, 1999; Thompson 2007), or indeed, attempt a mechanics of life featuring sensory inputs and motor outputs far distant from the dynamics of living Nature (Hurley 1998). Though writing in a quite different context, phenomenologist Robert Sokolowski comes close to articulating the starting point for a foundational inquiry into Nature when he observes, "There is no basic consciousness without being awake," a "basic dat[um]" for

[4] An editorial concern that the word animation "does not express the bodily nature of cognition" is thus answered; no 'embodiment' needed.

[5] "We have chosen to take as a guideline the idea… that a successful scientific theory of cognition must account for *phenomenality*, that is, … for the fact that for a whole set of cognitive systems, and for the human one in particular, things have appearances. We will argue that on the basis of its past achievements in describing such phenomenality, Husserlian phenomenology can play a key role in helping to meet this requirement, provided that it can be naturalized, and even though Husserl himself strongly opposed naturalism. By 'naturalized' we mean integrated into an explanatory framework where every acceptable property is made continuous with the properties *admitted by* the natural sciences" (Roy, Petitot, Pachoud, and Varela 1999, pp. 1–2; second italics added).

which "[w]e have to thank our bodies" (Sokolowski 1972, p. 76). Indeed, our basic natural rhythm of wakefulness and sleep is a bodily phenomenon. To be at either pole – or anywhere in between – is to be alive – "alive and in the flesh and part of the living, incarnate cosmos," as D.H. Lawrence once wrote (Lawrence 1932, p. 200) – and to be alive is first of all to be *animate*. Even in sleep, we not only move in breathing, but we roll over, bend a knee, extend an arm overhead, stretch a leg, pull the covers up or fling them off. We in fact not only come into the world moving but we go out of the world *un*moving: we are no longer animate in the least part; we are precisely *still*.

Pointed attention to each of the three lacunae will illuminate the phenomenon of animation from a distinctive and crucially integral perspective. Moreover consideration of each in turn will disclose essential aspects of cognition and at the same time show how linguistic and conceptual malpractices hide the very phenomenon that many present-day cognitive scientists and phenomenologists seek to elucidate in their efforts to *embody*, oftentimes gratuitously and even to the point of tautology, not just cognition, cognitive science, and the mind but seemingly every topic of interest (save one)[6]: action (Gibbs 2006), experience (Gibbs 2006), a first-person perspective (Zahavi 2005), subjectivity (Zahavi 2005), practice (Toombs 2001), simulation (Gallese 2007), perception (Gibbs 2006), self-consciousness (Gallagher and Varela 2003), agents (Roy et al. 1999; Varela 1999), intended goals (Gallese 2001), and so on. To term something 'embodied' is akin to anointing it with an ontological salve. The salve putatively binds together mind and body, "the physical" and "the lived," or a first- as opposed to a third-person perspective on humanness. The term itself oftentimes appears gratuitous because the very phenomenon it modifies – for example, agent, action, experience – is already a corporeal-kinetic reality. Indeed, it appears at times tautological: it is as if the body is "embodied." Moreover when we put all features of life that are "embodied" together, we fall far short of an elucidation of human life, and in fact can end up with a meaningless formal declaration on the order of: "embodied agents, through their embodied sensory-motor systems and in their embodied practices, have embodied experiences that they can speak of from an embodied first-person perspective grounded in an embodied subjectivity and an embodied self-consciousness."

Kinesthesia and Fundamental Human Concepts

To begin with, in order to arrive at veritable understandings of kinesthesia and the fundamental concepts generated in and through movement, embodiers need to wean themselves away from sensory-*motor* talk and work toward languaging the

[6]To my knowledge, neither cognitive scientists nor phenomenologists have written of "embodied" emotion, an odd omission in their conjoint program of 'embodiment' since emotions are commonly labelled 'mental states'. Social psychologists and anthropologists have, on the contrary, embodied emotion. See, for example, Lyon and Barbalet 1994; Niedenthal et al. 2005, the latter only in terms of showing how "embodiment is critically involved in information processing about emotion" (p. 192).

realities of sensory-*kinetic* experience. This shift involves a shift toward *thinking in movement* (Sheets-Johnstone 1999, Body and Movement: Basic Dynamic Principles), a consistent everyday dimension of animation from infancy onward, not only in reaching and grasping something at hand or in weaving one's way amidst a throng of people on a crowded sidewalk, but in calculating the distance and time to drive from one place to another or in judging the force necessary to splitting a piece of wood. Everyday human experience involves thinking in movement; the everyday experience of animate forms involves thinking in movement.

Our capacity to think in movement is rooted in fundamental human concepts of space, time, and energy or force, all of which are rooted in the experience of movement itself, that is, in kinesthesia. It is of interest to point out in this context an introductory remark in a textbook on movement, specifically a chapter titled "Proprioceptors and Their Associated Reflexes." The authors state, "The voluntary contribution to movement is almost entirely limited to initiation, regulation of speed, force, range, and direction, and termination of the movement." Granted that the authors' approach is neuro-scientific and that their focal interest is in reflexes, still it is striking to read of the "limited" contribution of voluntary movement: not only are the inherently qualitative aspects of movement that constitute its experienced dynamics minimized, but what one might call the very character of living movement in its reality – its initiation and termination – are trivialized. In effect, not only are the felt qualitative dynamics of movement passed over – of which more below – but an integral affective dimension of voluntary movement is passed over: there is no acknowledgement of the motivations that lead to voluntary movement and that inform voluntary movement every step of the way, so to speak, not only in going to the refrigerator because one is unpleasantly hungry or to walk hesitantly to a meeting because one is leery of the agenda, but to rise determinedly out of bed in the morning to go to work in spite of feeling tired.

Speed, force, range, and direction of movement are aspects of movement that may be more finely described phenomenologically (for a full account, see Sheets-Johnstone 1966 [1979, 1980], 1999). Such a description elucidates the complexity of movement beyond the everyday natural attitude toward movement, an attitude that consistently involves wayward notions of movement, to wit: movement is a change of position; we have sensations of movement; movement takes place *in* space and *in* time. A phenomenological investigation of movement discloses qualitative dimensions of movement that testify to movement being a dynamic phenomenon, and being a dynamic phenomenon, it is: (1) falsely defined as a change of position, (2) falsely specified in terms of sensations, and (3) inaccurately described as simply taking place in space and in time. A brief summary of each quality will attest to the falsity and inaccuracy of the above notions and to the complexity of movement. It should be noted that the phenomenologically-disclosed qualities are separable only analytically; that is, they are always integral parts of a whole kinetic dynamic.

Tensional, linear, areal, and projectional qualities are qualities apparent in any movement – reaching for a glass, picking up keys on the way out the door, brushing one's teeth, standing up, sitting down, gesturing in concert with speaking, speaking

itself, and so on, throughout any ordinary day in Western life at least.[7] Being dynamically engendered, each quality is part of a total qualitatively felt dynamic. Tensional quality specifies the felt intensity of a movement, an intensity that may well change in the course of the movement, as in swinging a bat or a golf club to hit a ball, or simply in skipping. The felt and commonly shifting intensities of the movement constitute what is commonly termed its 'force'. Tensional quality captures the felt dynamics of the movement more finely, however, not only in its recognition of shifting intensities, but in terms of its recognition of varying tensional qualities felt through the body in the process of moving, precisely as in the preparatory backswing of a leg prior to its kicking forward and the coincidence of the backswing with an inhalation of breath, for example.

Linear quality describes both the linear design of a moving body and the linear pattern of the movement itself. Both aspects are obviously spatial in character. The linear design of a moving human body might be most readily described in the course of everyday life as upright. That uprightness, however – that *verticality* – not only changes as the result of sitting down, but constantly shifts in the course of everyday walking, for example, when legs are bending and arms are swinging, bringing in diagonal and quasi-horizontal dimensions to what is taken as the vertical line of the body. The ever-changing linear design is indeed part of a total body-in-movement *dynamics*. The same is true for the linear patterns created by movement itself. When we swing our arms back and forth, for example, the path of the movement traces a slightly curved line at our fingertips; the linear pattern traced by each of our feet when we walk traces a more complex line that comes close to describing a flattened circle. When we put the two paths together, precisely as in walking in a relaxed and easy manner, the created contralateral linear patterns of arms and legs attest to the complexity of the dynamics of movement. More complex still are the patterns described by arms moving forward and back, feet circling, and one's whole body moving up and down in jogging. The composite of lines that movement creates can indeed be surprisingly intricate.

Areal quality, like linear quality, has two aspects that again are obviously spatial. They derive from the moving body and from movement itself, areal design describing the former, areal pattern describing the latter. In quite general terms, the areal design of a moving body may be anywhere from constricted to expansive, its shape at the one extreme being small and inwardly oriented, at the other extreme being large and outwardly oriented. Similarly, the areal pattern of a movement may be generally described as anywhere from intensive to extensive, the spatial amplitude of the movement itself being anywhere from small to large. When we are contrite, we tend to shrink in size and stay put, the areal design of our body being small and the areal pattern of any movement we might make being equally small. In contrast, when we run down the street with open arms to greet someone, the areal design of our body is expansive, the areal pattern of our movement extensive. Again, in the context of

[7] The qualities of movement do not change according to where one lives or in which culture one is brought up. What does change are the appurtenances that are or are not part of one's everyday life: toothpaste, water from a faucet, a car, and so on.

any movement, areal design and pattern may be a composite, that is, design and pattern alike may be anywhere and go anywhere from one extreme to the other. In the course of sneaking up to grab something while no one is looking and then running away with it, for example, a child – or a thief – may be bent over and take small steps toward the object, then expand sizably along with taking larger steps in running away with it. The areal pattern of a movement may similarly extend to both extremes, as when a person in baseball on first base takes a few steps toward second, retreats, then dashes forward again to second and even around to home.

Projectional quality is apparent in the manner in which movement unfolds, the way in which tensional quality is kinetically manifest. Generally speaking, three different qualities are possible: abrupt, sustained, or ballistic. Infinite degrees of shading are possible within these basic qualities. Moreover, a movement may be a combination of the qualities as when one abruptly moves to catch a glass before it falls and proceeds to place it carefully on the table. While it is sometimes thought that an abrupt movement is always vigorous and explosive and a sustained movement always languid and delicate, such is not always the case: an abrupt movement may be weak, as when eyebrows go suddenly upward and one catches one's breath in moderate surprise; a sustained movement may be strong, as when one pushes a heavy box across the floor.

However brief the above delineations, it should be evident that fundamental concepts of space, time, and force derive from movement, that the concept of direction is rooted in linear quality, distance in areal quality, effort in tensional quality, and so on. The dynamic qualities of movement at the foundation of fundamental human concepts may in fact be exemplified at finer levels. The concepts of 'near' and 'far', for example, are not in the beginning a matter of measured distance at all. They derive from the areal quality of movement; they are rooted in the experience of something being within or out of reach, something being literally 'handy' or something demanding extended movement in order to be attained. Similarly, the concepts of 'weak' and 'strong' are rooted in the tensional quality of movement; they are again not a matter of something measured but a matter of the felt intensity of movement, a whimper, for example, that develops into progressively stronger, ongoing, and resounding wails and cries that engage the entire body in a crescendo of movement and movement-made sound. Clearly, however hidden away in textbooks, neglected in academic discourse, ignored in medical assessments of developing infants and young children, and in general overlooked entirely by people in education, kinesthesia is foundational to fundamental human concepts that develop early on and continue to inform the lives of humans ever onward.[8]

[8]It should perhaps be noted in this context that Mark Johnson's anchorage of 'the body in the mind' (Johnson 1987) shows how meaning is generated in and through bodily experience. His analyses are thus in a sense compatible with the basic dynamic principles outlined in this chapter. The compatibility is limited because foundational aspects of animation – kinesthesia, the tactile-kinesthetic body, the developing coordination dynamics of infancy, and the coherency of *Leib* and *Körper* – do not enter into the picture. Johnson's primary concern is language and in fact basic elements in his analyses – "image schemata" and "imagination" – are "embodied." In his most recent book with George Lakoff (Lakoff and Johnson 1999), "embodiment" figures even more strongly.

In sum, it is evident that (1) movement is not a change of position, but the dynamic reality of the kinetic change itself; (2) movement is a matter not of sensations but of a felt qualitative dynamic whose spatial, temporal, and force aspects are the spawning ground of fundamental human concepts; (3) any movement creates its own time, space, and force, and thereby its own particular dynamic.

Coordination Dynamics: Learning One's Body and Learning to Move Oneself

One can see further why kinesthesia – the experience of one's own movement – is not a matter of sensations, but of dynamics. Sensations are spatially pointillist and temporally punctual (for a full account, see Sheets-Johnstone 2003, 2006). Kinesthetic experience is in contrast an experience of an indivisible dynamic whole, a kinetic form that is an overall bodily-kinetic dynamic (for more on this contrast, see Sheets-Johnstone 2003, 2006). Kinesthetic experience is thus not like an itch or a chill or a throb.[9] Precisely with respect to its inherent qualitative integrity and flow, kinesthetic experience is not reducible to a series of before, now, and after moments on the order of one sensation following another as in a series of sharp pains. There is nothing inherent in the series that links the sensations together, certainly nothing on the order of the qualitative dynamics of kinesthetic experience or of the muscular innervations and denervations that neurologically constitute the dynamics, whether a matter of sweeping the floor, getting into a car, or reaching for and picking a book off a shelf. A flow of movement may be accentuated in various ways by shifting intensities or by shifts in direction, for example, or be qualitatively inflected in other ways as indicated above, but the flow is nonetheless coherent, precisely as when one picks up an apple, brings it to one's mouth, opens one's mouth, and bites into it. In a word, the differentially accented and directed flow – *kinesthetically felt movement* – is all of a piece and is experientially and neurologically so constituted.

As so constituted, the flow – the coordinated dynamic – is the basis of both habit and style, the latter a kinetic quality that is the social corollary of one's own personal habits. We recognize style in others and not in ourselves precisely because we are not commonly attuned to our own dynamics. Our attention is commonly consumed elsewhere. We may recognize another person's style outright or implicitly not only in his or her walk, but in his or her laugh or in the way he or she drives. With respect to ourselves, we develop habits of moving in the course of learning our bodies and learning to move ourselves, ways of doing that are at bottom coordinated dynamic patterns that in our adult life run off in consistent ways and that, being easily carried out and familiar, are commonly experienced at

[9] Sensations, however, may in some instances coalesce. A throbbing sensation, for example, may develop into a kinetic form. See Sheets-Johnstone 2006.

the margins of awareness: we tend not to be focally present to them. On the contrary, we are commonly focally attentive on accomplishing something, something as common and trivial as tying a shoelace or unlocking a door. Habitual movement patterns can, however, be made focally present. We can, for example, become aware of the dynamics of brushing our teeth. Indeed, were someone else to brush our teeth, we would immediately recognize that someone else was brushing our teeth, not just because we were not holding the tooth brush and not only because we could see someone in front of us holding and moving our toothbrush, but because *we would feel a foreign dynamics inside our mouth*. In short, when we turn attention to habitual movement patterns, we recognize our own kinetic melodies, indeed, our own *kinesthetic* melodies (Luria 1966, 1973); they bear the recognizable stamp of our own qualitatively felt movement patterns, our own familiar coordination dynamics.

Actually, to invoke 'embodiment' in some form in speaking or writing of action, experience, and so on, is adultist. Surely one would not describe an infant as an 'embodied agent' as it imitates an experimenter's tongue protrusions, for example, or as having an 'embodied experience' as it sucks on a nipple. Moreover if one asked an infant, "What matters most to your developing knowledge of the world?," he or she would answer "movement." As noted child psychologist Jerome Bruner observed, an infant's primary interest is in "agentivity," that is, agent and action (Bruner 1990). It is in and through movement that infants and young children discover aspects of themselves and of the world about them, aspects that do not disappear with age but that continue to inform their lives from beginning to end. Adult humans in various academic disciplines neglect movement and kinesthesia and indeed overlook having initially and originally learned their bodies and learned to move themselves. Their neglect and oversight are not rectified nor rectifiable by the term "embodiment" and its derivatives, and this because the coordination dynamics that develop in infancy and that perdure as foundational building blocks throughout our lives testify not to 'embodiment' but to animation, primal animation, and, in a complementary way to what prolific researcher and writer on coordination dynamics J.A. Scott Kelso aptly describes an "intrinsic dynamics", a dynamics grounded in the self-organizational patterns of living beings (Kelso 1995). Primal animation and an intrinsic dynamics infuse our being and define our aliveness; they are our point of departure for living in the world and making sense of it. An adultist stance overlooks these animate beginnings, these initial ventures into and explorations of movement. It overlooks as well the complex and subtle ways in which these literally animate beginnings were – and still are – integrally and inherently entwined with cognition and affect.

An investigation of our own habits teaches us about these animate beginnings; it teaches us about movement and kinesthesia directly, about how affects motivate and inform our movement, and about the built-in cognitive structures of movement. It teaches us how the particular coordination dynamics we articulate in walking, for example, are the result of the composite qualities of movement that we instantiate when we walk: it teaches us the basic fact that any movement creates its own space, time, and force, and thus a particular felt qualitative dynamic.

On the basis of this basic fact, it teaches us that we can change any habitual qualitative dynamic if we wish and instantiate a different dynamic. We can in fact make the familiar strange, and in so doing, discover what esteemed Russian physiologist Nicolas Bernstein termed 'degrees of freedom' in human movement. We can in other words create a range of different coordination dynamics, not only in changing our usual manner of walking – making it less tense, for example, or smoother, or more expansive – but in changing the way in which we write our name or move through any number of other everyday acts. We can furthermore make the familiar strange at the level of sheer movement itself by examining the degrees of freedom in turning to the side. For example, we might initiate the turn by a sideward extension of the leg, a twist at the waist, a twist at the shoulders, or a twist of the head, and the turn itself might be sharp, slow, slight, or sizable, its possible variations being virtually limitless. In sum, the "limitations" of voluntary movement are sizable freedoms, precisely as Bernstein showed. Because they are, learning our bodies and learning to move ourselves are not necessarily learnings restricted to infancy.

Evolutionary Biology and the Existential Fit of *Leib* and *Körper*

As has been emphasized, a sizable number of researchers consistently neglect movement and its experiential foundations in kinesthesia. The oversight is in truth surprising if not appalling in contexts where discussions of kinesthesia would be enlightening. Two examples from cognitive science readily make the point. In a near opening paragraph in a chapter on "Consciousness and Control of Action" in a section of *The Cambridge Handbook of Consciousness* titled "Cognitive Psychology," psychologist Carlos Umtilà states, "In the present chapter, I am concerned exclusively with motor (i.e., bodily) actions" (Umtilà 2007, p. 327); in an opening sentence in a chapter on "The Development of Consciousness" in a section of the same book titled "Developmental Psychology," psychologists Philip Zelazo, Helena Gao, and Rebecca Todd state, "This chapter examines the extent to which consciousness might develop during ontogeny" (Zelazo et al. 2007, p. 405). In the one instance, it is not only that without the parenthetical clarification there might indeed and for good reason be confusion about use of the term 'motor' with respect to animate actions, but that living consciousness is conjoined with a *motorology* in the first place and not with *kinesthesia*. In fact, no mention is made of kinesthesia at all. In the second instance, it is as if normal infants could be born and develop with no consciousness at all. As noted above, we come into the world moving; we are precisely not stillborn. Our animation is tightly bound to our tactile-kinesthetic bodies and to kinesthesia – in a word, to our consciously felt and consciously moving bodies. Moreover we are by nature *drawn to movement*, not only as Bruner's infant research shows, but as psychiatrist René Spitz's experimental studies of infants show. In fact, one might justly elaborate on Spitz's claim that we are by nature drawn to "the percept of the human face and eyes" (Spitz 1983, p. 149), namely, by noting that "the human face and eyes" *move* and consistently present

themselves to us *in movement*: eyes in looking and scanning, mouth in talking and singing, eyebrows in surprise and consternation, head in turning and tilting, the whole configuration of face in smiling and frowning, and so on.

Evolutionary biology and our own evolutionary heritage are relevant in just this context. To begin with, on the basis of his study of Hymenoptera, Darwin noted that "It is certain that there may be extraordinary mental activity with an extremely small absolute mass of nervous matter" (Darwin 1981, p. 145). He went on to observe specifically that "the wonderfully diversified instincts, mental powers, and affections of ants are generally known, yet their cerebral ganglia are not so large as the quarter of a small pin's head. Under this latter point of view, the brain of an ant is one of the most marvellous atoms of matter in the world, perhaps more marvellous than the brain of man" (ibid.). Clearly, members of the animal kingdom survive, if they do survive, not just because they are adept physically, but because they are consciously adept across a spectrum of faculties, precisely as Darwin indicates: they are affectively and cognitively attuned to their surrounds. They are animate in the full sense of being affectively and cognitively alive to themselves and to their surrounding world. Just such affectively and cognitively attuned living bodies are not distinct from, but of a piece with their physical bodies. They are thereby adept at making a living in a world that is never quite the same from 1 day to the next. Evolutionary anthropologist William Howells makes this point deftly and sharply in his observation that "hands and a big brain would not have made a fish human; they would only have made a fish impossible" (Howells 1959, p. 341).

To be consciously adept physically is to enjoy a livability in the world, to be existentially fit. An essential element of that fitness – that livability – is an awareness of one's own movement, without which instincts, mental powers, and affections, whether of ants or of any other creatures, would count for naught: an animal that knew not *how*, *what*, *that*, or *when* it was moving would be incapable of effective agency, indeed of agency at all.[10] The animal would not in fact be livable. Its livability, like its agency, is contingent on kinesthesia. The relationship between agency and kinesthesia is significant and is aptly exemplified in the well-known phenomenon of infant imitation. As elucidated at length elsewhere in a constructive phenomenology of animation (Sheets-Johnstone 1999, pp. 260–271), the capacity of infants to imitate mouth gestures (Meltzoff 1990; see also Gallagher and Meltzoff 1996; Meltzoff and M Keith Moore 1977, 1994), is tied not to a "body schema" or a "supramodal representational system" but to a tactile-kinesthetic body that is dynamically attuned to the world. Similarly, the "psychological primitive" that is there from the start (Meltzoff 1990) is not a crude stratum of intelligence but a burgeoning capacity to think in movement, a capacity that is foundational to adult human knowledge as well as a capacity that is clearly evident in animals such as tigers who hunt for a living. Misunderstandings and distortions of proprioception and kinesthesia occlude recognition of both a dynamically

[10]We might note that agency is empirically linked not to an ontological entity called a self but to an epistemological subject in the form of animation and kinesthesia.

attuned tactile-kinesthetic body and a capacity to think in movement. Misunderstandings and distortions in fact abound in discussions and explanations of infant imitation, often because, rather than hewing to empirical analyses tied to corporeal matters of fact, they are tethered to, or veer off into, theoretical entities, models, and exegeses. The error is not only on the side of cognitive scientists. An example from phenomenological writings just as readily shows how wayward theses and conclusions about infant imitation result from a neglect and even ignorance of movement and kinesthesia. The example is an fact chosen precisely because its focal concern is infant imitation.

In an article titled "Facial Embodiment in 'Invisible' Imitation," philosopher Beata Stawarska proposes and defends the thesis that an infant, in imitating, has a *visual* sense of its own face, which she calls "facial embodiment." This visual sense of its own face is a matter of the infant's "*detect[ing]*" that it is the target of the gaze of another in the process of imitating that other (Stawarska 2003, p. 149); that is, it "reads clues about the facial exterior proper [i.e., clues about its own face as a visible object] and develops the sense of being visible in a third-person mode" (ibid., p. 153). To support the credibility of its "read[ing] clues" and experiencing itself as visible "in a third-person mode" (ibid.), Stawarska "follow[s]" Baron-Cohen's postulation of an EDD (Baron-Cohen 1995), an "eye-direction detector," which she limns as "one of the mechanisms that allows the infant to recognize where the other is looking," adding that "This mechanism participates in establishing early self-other relations" (Stawarska 2003, p. 149). The fact that an EDD is a wholly hypothetical entity, a conjured "mechanism" in the brain, in essence a fantasized feature or "stall" along the cerebral mall, never surfaces. While Stawarska is at pains to show that infant imitation is not dependent on an internal representation any more than it is dependent on seeing oneself in a mirror or on some other form of specular representation (see Piaget 1962; Lacan 1977), she fails to understand the dynamic nature of both kinesthesia and proprioception, and indeed, to neglect kinesthesia near entirely, oddly mentioning at one point "internal kinesthetic sensations" (Stawarska 2003, p. 142), as if there were *external* kinesthetic sensations, and as if kinesthesia were a matter of sensations and not of an unfolding qualitatively felt kinetic dynamic in the first place, that is, the kinesthetic dynamic of protruding one's tongue. Moreover to speak on the one hand of young infants as having a "poor *motor* mastery of the body proper" (ibid., p. 145, italics added), of their learning gradually "to control and adjust their *motor* performance" (ibid., italics added), and of their "self's *motor* experience" (ibid., p. 148, italics added), and on the other hand, to speak of proprioception as "nonconscious, physiological information," (ibid., p. 146), and of "proprioceptive awareness" being "'a felt experience of the bodily position', such that one knows where a given bodily part is located without having to monitor it visually" (ibid., p. 147), and in fact to speak on both hands together of "exclusively motor non-perceptual proprioceptive information" (ibid.) is to elide any and all understanding of kinesthesia and developing coordination dynamics. The idea that "a sighted person's sense of facial expressions proper must *exceed* the sheer proprioceptive feedback" (ibid., p. 155) and the conclusion that in fact "facial embodiment proper exceeds proprioceptive feedback" (ibid., p. 158)

bypass not only phenomenological but "real-life, real-time" dynamic understandings of kinetic/kinesthetic/proprioceptive experience and even neurology.[11]

In bypassing recognition of the experienced dynamics of movement with a third-person orientation and vocabulary, Stawarska relies on "embodiment" to do the work of understanding both "the body proper" – *le corps propre*, the *Leib* – and its developmental relationship to *le corps tout court*, the *Körper* – the body "in a third-person mode." The experience of "being seen" – a "third-person" experience as Stawarska herself specifies – is, as indicated, an experience requiring a pointedly self-conscious awareness of oneself as *object* of another's gaze. Though Stawarska assures us that an infant "can feel herself to be the terminus of that gaze at a very early age" (ibid., p. 149), it surely stretches empirical credibility to think that newborns and young infants "at a very early age" (ibid.) who imitate the mouths gestures of others are self-reflective in this way. The marriage of *Leib* and *Körper* is in fact accomplished linguistically and mechanistically via "embodiment" instead of developmentally and experientially in a socially maturational sense. Indeed, what Hanne De Jaegher and Ezequiel Di Paoli term "participatory sense-making" in the context of offering an analysis of social cognition as an interactional dynamic process is nowhere in sight (De Jaegher and Di Paolo 2007); nowhere in sight either are intercorporeal sense-makings (Sheets-Johnstone 2008). The subtext thesis driving the enterprise is "*sensible reversibility*" (Stawarska 2003, p. 158), a vindication of Merleau-Ponty's notion of an "intertwining" or chiasm of touched and touching, seer and seen.

Infant imitation is exemplary of a host of topics in phenomenology and cognitive science that are in actuality grounded in the affective-cognitive-kinetic dynamics of animation. Shifting concern to this ground requires a shift in thinking – a paradigm shift in Thomas Kuhn's words. It requires thinking directly, intently, and unwaveringly along the lines of the body, reflecting at length on the aliveness of living bodies and all that that aliveness *by its very nature* encompasses in the way of movement, feeling, and cognition, all in an experiential sense. In imitating an adult's mouth gestures, a newborn infant is learning its body and learning to move itself. It engages in a "kinetic-kinesthetic *dynamic* matching" (Sheets-Johnstone 1999, p. 261), a transfer of sense from the visual body of another to its own tactile-kinesthetic body, discovering the dynamic possibilities and actualities of its own moving body in the process. Though not described or analyzed in such terms, infant imitation experiments testify to this fact just as they testify to responsivity and ratification of meaning (ibid., Consciousness). Such testimonials notwithstanding, an infant's actual transfer of sense from the visual body of another to its own tactile-kinesthetic body is unexplicated. While its impetus toward matching clearly lies in its own kinetic liveliness – its "primal animation" (Sheets-Johnstone 1999)

[11] Indeed, to speak of proprioception in terms of "proprioceptive feedback" is, to begin with, to speak in terms of a motorology, not of a living and lived-through dynamics as it unfolds and of that living and lived-through dynamics as a kinetic melody at the level of neurophysiological innervations and denervations (with respect to the latter, see Luria 1966, 1973).

and its "intrinsic dynamics" (Kelso and Scott 1995) – and in its dynamically attuned body, its actual transfer of sense remains topologically unexplained: how, in broad terms, does the infant know that the kinetic deformations it sees are replicable by kinetic deformations it can achieve?

The answer lies in both movement and topology, namely, in the fact that one changes shape as one moves, and in moving changes shape in invariant ways. The topological connection is experienced. In other words, self-movement is topologically distinct. It is experienced as distinct because topological specificity is inherent in the dynamics of self-movement, that is, in kinesthesia. Thus, when a fetus, even at 11 weeks, opens and closes its mouth, and later, at 4.5–5 months, slips its thumb into its mouth and sucks it (Furuhjelm et al. 1976), it is becoming topologically familiar with its body, specifically its mouth, the first and pivotally central topological attractor of human infancy (Spitz 1983; note too Furuhjelm et al. 1976, p. 52: "We develop from the head downward"). In short, the kinesthetic/kinetic dynamics of movement play out with topological specificity both on and within the body: tongue protrusions felt by the viewer and seen by the infant are in turn felt by the infant and seen by the viewer. Just as an infant's responsivity and its ratification of meaning have their origin in the *sensu communis* that is movement (Sheets-Johnstone 1999, Consciousness), so do its foundational topologically-informed transfers of sense. Indeed, its responsivity and ratification of meaning are grounded in topologically-informed transfers of sense rooted in the *sensu communis* of movement, movement that is both self-movement and the movement of others. (For more on intercorporeal sense-making, see Sheets-Johnstone 2008.)

In sum, pointed attention to lacunae in both present-day cognitive science and phenomenology shows that, whether a matter of science or philosophy, when a motorological or ontological "embodied" spin of one kind and another is put on animate sensibility, cognition, and affect, there is a distancing from animation and the experienced dynamics of the qualitative kinesthetic realities that inform the lives of animate forms. It is of interest to point out that the ground floor of cognition – animation – was recognized by Husserl not only in his abiding concept of *animate organism*, but in *his* concept of the phenomenon of "intertwining," which does not underwrite a reversibility, whether of the touched and the touching, the seer and the seen, or both, but a *unity* of mind and body – a "Bodily [i.e., *Körper*]-spiritual unity" (Husserl 1989, p. 352). Both concepts warrant careful and rigorous study. They validate in penetrating and acute ways the essentially dynamic nature of life itself and its "*double reality*" (ibid., p. 353).

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