

Movement: What Evolution and Gesture Can Teach Us About Its Centrality in Natural History and Its Lifelong Significance

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1. INTRODUCTION

When people speak or write of “embodied” in one form or another, as in embodied mind, embodied cognition, embodied language, embodied self, and so on, they implicitly look past if not outright deny the realities of evolution. Animate life evolves on the basis of different morphologies. Animals with differing morphologies establish not merely different niches but different modes of living, which in the most fundamental sense means establishing distinctive repertoires of movement—different ways of doing everyday things. Certain movements within one species’ repertoire may nevertheless coincide with certain movements within the repertoire of other species, as, for instance, the movement known as presenting, which occurs in multiple primate species in two different contexts: as a sexual invitation and as an aggression deterrent. That certain movements can have the same significance across species does not diminish the distinctiveness of any repertoire but attests to the evolutionary heritage of a species, namely its anchorage in morphology, that is, in bodily templates and possible variations of the same, all of which templates and possible variations translate into distinctive movement possibilities and definitive repertoires of movement.

From this real-life, real-time evolutionary point of view, animate forms of life are clearly not *embodied* forms of life but *kinetic* forms of life,

animate beings that are in essence morphologies in motion that move in *synergies of meaningful movement* on their own behalf and at times on behalf of others. An instance of the latter is evident in a male hamadryas baboon's helping a less grown one across a cliff, thus protecting a member of his troop by being aware of his own movement possibilities and the movement possibilities and limitations of others. The caption under a picture of two such baboons clearly indicates as much. The caption reads, "The young adult male gives his one-year-old female a gestural invitation to climb on his back; he then carries her across a difficult passage in the sleeping cliff" (Kummer 1968, 302). As commented elsewhere, the description "testifies to at least three distinct awarenesses on the part of both male and female baboon: an awareness that the expanse or jaggedness of the cliff is too difficult for the young female to manage; an awareness that the male can cross the passage himself; an awareness that the male can transport the female on his back across the passage" (Sheets-Johnstone 2008, 220). Such awarenesses attest to a form of thinking that allows moving harmoniously together. Indeed, thinking in movement is foundational to such awarenesses and help. It even testifies to movement's being at the core of fundamental intercorporeal practices, possibilities, and meanings. Animate forms of life clearly draw on their capacity to think in movement. In fact, precisely because the everyday challenges and realities of life are never exactly the same from one day to the next, and precisely because they are engaged in just such challenges and realities, such thinking may at times prove vital to their survival.

2. EVOLUTIONARY CONSIDERATIONS

However brief the above introduction, it should be evident that evolution is a matter neither of the evolution of minds nor of the evolution of embodied minds. Evolution is a matter of bodies, animate bodies that, precisely in virtue of their forming distinctive repertoires of meaningful movement, are *mindful bodies*. Mindful bodies have the capacity to think in movement. They thereby have the capacity to move in synergies of meaningful movement outside as well as inside their customary everyday repertoire of meaningful movement. Primatologists Michael Tomasello and Josep Call, in their book *Primate Cognition*, give us a particularly rich description of just such a capacity in chimpanzee play:

The initiation of play often takes place in chimpanzees by one juvenile raising its arm above its head and then descending on another, play-hitting in the process. This then becomes ritualized ontogenetically into an "arm-raise" gesture in which the initiator simply raises its arm and, rather than actually following through with the hitting, stays back and waits for the other to initiate the play, monitoring its response all the while. ... If the desired response is not forthcoming, sometimes the gesture will be repeated, but quite often another gesture will be used.

In other situations a juvenile was observed to actually alternate its gaze between the recipient of the gestural signal and one of its own body parts; for example, one individual learned to initiate play by presenting a limp leg to another individual as it passed by (an invitation to grab it and so initiate a game of chase), looking back and forth between the recipient and its leg in the process. (Tomasello and Call 1997, 244)

The juvenile chimpanzee's innovative invitation to play shows that thinking in movement can be creative as well as helpful to others. It can also be selfishly manipulative. What is described as the "tactical deception" of a female gorilla exemplifies this possibility. The female gorilla was observed walking with others in a relatively straight line along a narrow trail. Along the walk, the gorilla spied a choice vine that was partly hidden and sat down by the side of the trail at that point and began to groom herself. When the others were out of sight, she stopped grooming herself, rapidly climbed the tree, broke off the clump of vine, descended with it, and hastily ate it "before running to catch up with the group" (Whiten and Byrne 1988, 237). As noted elsewhere (Sheets-Johnstone 2019, 148), "As with walking and walking in formation with others, sitting down and grooming oneself are natural acts common to many primates. They can be used deceptively precisely for this reason. To be used for this reason, however, obviously requires thinking in movement: if I do such and such—such as sit down and groom myself—others will continue on their way, and when they are no longer in sight, I can get the choice food that is up there on the tree."¹ *If-then thinking* is in fact a fundamental form of thinking in movement. Such thinking is consistently described by philosopher Edmund Husserl in his phenomenological analyses of perception and cognition. Though not named as such, such thinking was furthermore richly described by nineteenth-century physicist-physiologist Herman von Helmholtz and in ways strikingly akin to descriptions by Husserl (see Sheets-Johnstone 2011a).

Ethological studies that utilize movement analysis systems can provide gateways to recognizing synergies of meaningful movement in the animate world and instances of thinking in movement. John Fentress's studies of mice (Fentress 1989), Ilan Golani's studies of golden jackals and Tasmanian devils (Golani 1976), and Moran, Fentress, and Golani's studies of ritualized fighting in wolves (Moran, Fentress, and Golani 1981) readily demonstrate the far richer significance of analyzing and understanding the kinetic dynamics of

1. It may be noted that corporeal concepts are evident throughout all the examples, concepts related to I and other(s), specifically, to the relationship of my body to the body or bodies of others, to the relationship of vision to movement and movement to vision, and so on. Corporeal concepts are thus basically *kinetic concepts* that include spatial, temporal, and energetic concepts as in the concept of what I must do in order to, for example, be understood, be safe, and be invisible to others.

animal movement over standard reports of animal “behavior” because they distinguish and specify the spatial, temporal, and energetic complexities of everyday animate life (see also Sheets-Johnstone 2012b, 46).² A further dimension of this richer significance is implicitly underscored in neurophysiologist Gerald Edelman’s experimental studies of automatons, particularly “Darwin III” that demonstrates how cognitive determinations of an object are based on freely varied movement (Edelman 1992, 93). The studies implicitly attest to the fact that animation is first and foremost a subject–world relationship, and that being such, it is naturally an integrated affective–kinetic–cognitive phenomenon: “animate beings are impelled to move on the basis of their interest in, or aversion to, what they perceive, what they recognize, and so on, and in turn, to move in ways semantically congruent with their experience” (Sheets-Johnstone 2012b, 46). To be noted in this context are in fact the meticulously detailed analyses of the relationship of movement to perception set forth in methodologically different but highly complementary ways by Husserl and von Helmholtz (*ibid.*; see also Sheets-Johnstone 1999a/2009 [Chapter VIII]). Their analyses show indisputably that “the relationship, far from being a matter of ‘behavior,’ is a movement-perceptual-cognitional relationship motivated by and articulated within an affective framework of some kind: interest, curiosity, or play, for instance” (Sheets-Johnstone 2012b, 47).

Coupled with the earlier field study observations of baboons and chimpanzees, the above-cited ethological studies, experimental programs, and analyses point to multifaceted realities of animation, and correlatively to the need to recognize not only that “behavior”—and for that matter, “action”—is not equivalent in any way to movement, but that conceiving cognition or affectivity a “state” of the organism is as misguided as conceiving movement a “motor” phenomenon. The two misconceptions are in fact not distant from each other: In one instance, there is an inattention to dynamics; in the other, an inattention to kinesthesia.³ The inattentions are impediments to a recognition of the foundational reality of movement, its grounding in evolutionary facts of animate life. These facts are not simply demonstrable in “higher” species; they are evident in ants and worms, for example, forms of life that are clearly *mindful bodies*. Of ants, Darwin writes,

It is certain that there may be extraordinary mental activity with an extremely small absolute mass of nervous matter: thus 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. (Darwin [1871] 1981, 145)

2. The ethological studies cited use the Eshkol–Wachmann system (Eshkol and Wachmann 1958). For sources on Labanotation, see, for example, Laban (1990) and Hutchinson (1970). For sources on effort/shape, see, for example, Bartenieff and Lewis (1980) and Bartenieff et al. (1970). For sources on Benesh notation, see Benesh and Benesh (2003).

3. For more on the inattention to dynamics and to kinesthesia, see Sheets-Johnstone (1953).

Darwin's observation is of particular moment in today's world of neuroscience in which *the brain*, the illustrious human one of course, seems a *deus ex machina* creation and thus to have no evolutionary equal. Moreover, of worms Darwin writes that their burrows "are not mere excavations, but may rather be compared to tunnels lined with cement." He goes on to observe that neither chance nor instinct alone can account for the worms' discriminating actions, that "[i]f worms have the power of acquiring some notion, however rude, of the shape of an object and of their burrows, ... they deserve to be called intelligent ... for they then act in nearly the same manner as would a man under similar circumstances" (Darwin [1881] 1976, 58).

Later researchers amplified Darwin's meticulously detailed observations of the natural world. Invertebrate zoologist Martin Wells, for example, describes the movement of anemones and concludes his observations as follows: "[T]he observation that anemones under constant conditions often move spontaneously, expanding, contracting and wandering about their tanks, can be taken as an indication that the nervous system of these animals, like that of higher forms, is capable of generating activity from within itself. Even a sea anemone, with no ganglia and a simple nerve net, is more than a mere reaction machine that will come to rest when its immediate needs for food, oxygen and shelter have been attained" (Wells 1968, 41–42). The spontaneous movement that Wells describes is nonprogrammed movement, hence not simply a reflexive response to something in the surrounding world. Furthermore, while Wells points out that "[g]enetic memory may suffice for some planktonic or parasitic organisms, living in environments where the range of likely events and the range of possible responses are small," he remarks, "we do not know," that is, we do not know whether genetic memory may suffice. In light of this ignorance, he comments, "it is fair to guess that even these animals sometimes change their responses as a result of individual experience, since every animal that has been closely investigated so far has been shown to learn something sometime" (*ibid.*, 148).

Wells's observations on "lower animals" are readily substantiated by Karl von Frisch's study of bees. Von Frisch wrote not only extensively about the perceptual and navigational abilities of bees but documented their *Tanzspraches*, the dances by which a dancing bee communicates information about a honey source to other bees in the hive: the distance of the source, the direction in which it lies in relation to the hive, and the richness of the source are communicated to other bees. Clearly, given the communicative function of the dances *and the kinetically symbolic means by which information is communicated*, the essential character of a dancing bee can hardly be called "behavior" or "action." As described elsewhere (Sheets-Johnstone 2011b, 453), the invariants of the *Tanzsprache* are meaningful and differentially meaningful according to "variables within the dance, that is, to distinct qualitative variables inherent in movement that communicate to others the distance, direction, and richness of a nectar source: distance by the spatio-kinetic contours of the dance; direction by the spatial orientation of the dance with respect

to the sun and to gravity; and richness of the food source by the vigorousness of the dance” (von Frisch 1964, 1967).

Thinking in movement is clearly evident in the *Tanzsprache*. Thinking in movement and the synergies of meaningful movement that result are just as clearly the work of *mindful bodies*. All are built-ins of animate life. They constitute what Darwin, in a notable comment in one of his Notebooks, termed the “stable foundation” that is needed to show that “mind is function of body.” Darwin wrote, “Experience shows the problem of the mind cannot be solved by attacking the citadel itself—the mind is function of body—we must bring some *stable* foundation to argue from” (Darwin [1838] 1987, 564). As pointed out elsewhere (Sheets-Johnstone 2010a, 159), what Darwin meant by the words “experience shows” may be interpreted in two possible ways. To begin with, “[Darwin] may have been referring to philosophers who attempt to show the nature of mind ‘by attacking the citadel itself,’” an interpretation that may of course be extended to present-day scientists, many of whose “attacks on the citadel itself” include experiential ascriptions to “the brain,” as in the perhaps classic ascriptions “If you see the back of a person’s head, the brain infers that there is a face on the front of it” (Crick and Koch 1992, 153) and “Nonhuman primates have brains capable of cooperative hunting” (Harding 1975, 255) (see also, e.g., Damasio and Damasio 1992; Zeki 1992). But Darwin may also very well have been referring to his own extensive, highly detailed first-person experiences of animate life, experiences that showed him in person that the mind was not something distinct from the body but precisely as he states, a “function of body.” His fine-grained descriptively rich study of emotions lends additional credence to this interpretation and indeed merits attention. While no outright recognition or mention of dynamics or kinesthesia appears in *The Expression of Emotions in Man and Animals*, Darwin’s descriptions are rich in terms of both. Consider, for example, his observation regarding terror:

With all or almost all animals, even with birds, Terror causes the body to tremble. The skin becomes pale, sweat breaks out, and the hair bristles. The secretions of the alimentary canal and of the kidneys are increased, and they are involuntarily voided, owing to the relaxation of the sphincter muscles, as is known to be the case with man, and as I have seen with cattle, dogs, cats, and monkeys. The breathing is hurried. The heart beats quickly, wildly, and violently. . . . In a frightened horse I have felt through the saddle the beating of the heart so plainly that I could have counted the beats. The mental faculties are much disturbed. Utter prostration soon follows, and even fainting. A terrified canary-bird has been seen not only to tremble and to turn white about the base of the bill, but to faint; and I once caught a robin in a room, which fainted so completely, that for a time I thought it dead. (Darwin [1872] 1965, 77)

Of moment too is Darwin's perceptive comment that follows his consideration of "a transport of Joy or of vivid Pleasure." He first describes such experiences as "a strong tendency to various purposeless movements, and to the utterance of various sounds," a tendency that is apparent "[in] young children, in their loud laughter, clapping of hands and jumping for joy; in the bounding and barking of a dog when going out to walk with his master; in the frisking of a horse when turned out into an open field" (ibid., 76). He comments,

Now with animals of all kinds, the acquirement of almost all their pleasures, with the exception of those of warmth and rest, are associated, and have long been associated with active movements, as in the hunting or search for food, and in their courtship. Moreover, the mere exertion of the muscles after long rest or confinement is in itself a pleasure, as we ourselves feel, and as we see in the play of young animals. (ibid.)

In short, sheer movement is an experience in itself. It can indeed be the gateway to feeling alive, an experience not to be missed (see Sheets-Johnstone [2010b] 2014).

The range of emotions that Darwin describes "in man and animals" is considerable: anger, despair, helplessness, love, pride, shame, astonishment, weeping, and many more. Moreover, his closing words in his "Concluding Remarks and Summary" are equally remarkable, particularly his observation concerning movement and language: "The movements of expression give vividness and energy to our spoken words. They reveal the thoughts and intentions of others more truly than do words, which may be falsified" (Darwin [1872] 1965, 364). Now obviously, we may feign an emotion just as we may also restrain ourselves from expressing an emotion, but as pointed out elsewhere we are able to do so only because *we are kinesthetically aware of the qualitative dynamics of movement that constitute the expression of the emotion*. We can thus feign gladness or delight in meeting someone whom we are actually not feeling pleased at all in meeting just as we can restrain laughing at someone's awkwardness or remonstrating aggressively at someone's insult to us. In short, there would be no basis for feigning or restraining if one were not already aware of "what comes naturally." That emotions can be and are reworked culturally—and familiarly—attests to their foundation in Nature; that is, cultures—and families—can suppress, exaggerate, distort, or elaborate what is evolutionarily given (for examples of such reworkings with respect to power, see Sheets-Johnstone 1994).

Of moment is in fact what Darwin describes as "the intimate relation which exists between almost all the emotions and their outward manifestations" (Darwin [1872] 1965, 365). Emotions are indeed not states of mind. They are indeed not either states of the body. Emotions are dynamic. *They move through us and move us to move* (Sheets-Johnstone 1999a/2009 [Chapter VIII], 2006a, 2012a, 2015). To become aware of the subtle and complex dynamic dimensions of fear or reticence, delight or anger, or of any

emotion as it is lived through and of how it moves us to move is to become aware not only of our motivations but of the way in which we typically take up an emotion and move in tune with our bodily felt impulses. It is hardly surprising then that *the dynamic congruency* of emotions and movement is of prime clinical significance (Sheets-Johnstone 1999a/2009 [Chapter VIII], 2010c). The qualitative dynamics of an emotion has a bodily felt specificity just as the qualitative dynamics of any movement has a kinesthetically felt spatio-temporal–energetic specificity. When we pay attention to these qualitative dynamics, we have the possibility of gaining insight into the natural and habitual affective dispositions that move us to move and into the dynamics of movement itself.

3. CRITICAL CONCERNS AND RECTIFICATIONS

What can deflect us from such attention are renditions of movement and emotions that fail to recognize their essentially dynamic character. The deflections are readily apparent in descriptions of movement in terms of “kinesthetic sensations.”⁴ As pointed out in many contexts (Sheets-Johnstone 2003, 2006b, 2011a, 2012a), sensations are *spatially pointillist and temporally punctual*, as a flash of light, an itch, a screech, a shove, a jolt, a whiff, and so on, attest. Such experiences are not basically kinetic phenomena; they do not evolve, waxing and waning, for example, or expanding and contracting in a qualitative dynamic. While they certainly have a qualitative character and can certainly carry an affective charge of one kind or another, and while they can most certainly move us to move, they are spatially localized and temporally confined. In a word, they do not flow forth or unfold.⁵ Movement precisely flows forth: It unfolds and kinesthesia is precisely the sense modality that gives us the qualitatively dynamic experience of that unfolding (Sheets-Johnstone 2010d). Thus, through kinesthesia we experience not “sensations,” but the spatio-temporal–energetic qualitative dynamic that constitutes movement.⁶ In

4. Husserl’s consistent use of the term “kinesthetic sensations” has likely influenced many researchers, but the context of Husserl’s use should surely be recognized as well. In particular, Husserl’s attention was not concentrated on movement as an experience in and of itself, but as a phenomenon “articulated” with perception; that is, his attention was focused simply on the fact that movement unfolds in conjunction with perception, that is, in a “two-fold articulation” (Husserl 1989, 63). He writes, “if the eye turns in a certain way, then so does the “image;”... We constantly find here this two-fold articulation: kinesthetic sensations on the one side, the motivating; and the sensations of features on the other, the motivated” (ibid.). In short, the qualitative dynamics of movement are not of moment.

5. As pointed out elsewhere, sensations may in some instances coalesce “to form either a kinetic perception or an affective feeling, as when, for example, in experiencing throbbing sensations, we attend not to each sensation *tout court*, but to the ongoing steady pulse of the throbbing and perceive a recurrent rhythm, a temporal continuity, or to the ongoing agony and distress of the throbbing and feel a relentless and unremitting pain, an affective continuity” (Sheets-Johnstone 2011a, 366).

6. For an analysis of the tensional, linear, areal, and projectional qualities that constitute the qualitative dynamics of movement, see Sheets-Johnstone (2015, 2012b).

effect, when researchers focus attention on bodily movement and write of “kinesthetic sensations,” they are writing in error (see, e.g., Colombetti 2011, e.g., 7, 8; 2017, e.g., 118, 120, 121). Their error might be termed a Zeno illusion for what appears to be operative is the fallacious notion that movement is the point by point travel of an object through space, be it an arm or an arrow. In virtue of that illusion, sensations dominate over dynamics and in fact squelch them: An awareness of the immediately and directly experienced qualitative dynamics of movement is nowhere evident.

Something similar in the way of error can be said of the writings of researchers who, in their renderings of real-life experience, remain posturally tethered rather than movement aware and proprioceptively tethered rather than kinesthetically aware (e.g., Bermúdez 2003; Gallagher and Cole 1998; Gallagher 2005; Gallagher and Zahavi 2012; Thompson 2007; Zahavi 1999). Many of these researchers follow Sir Charles Sherrington’s original coinage and definition of the term “proprioception”: Proprioception is “the perception of where the limb is” (Sherrington 1953, 249). In short, proprioception is a postural rather than kinetic sense. Philosopher Shaun Gallagher and neurophysiologist Jonathan Cole, for example, echo Sherrington’s postural specification when they explicitly state, “Proprioceptive awareness is a felt experience of bodily position” (Gallagher and Cole 1998, 137). Though they alter the nature of the experience, classifying it “felt” rather than “perceived,” they retain its postural anchorage. Gallagher and philosopher Dan Zahavi do likewise when they state, “Proprioception is the innate and intrinsic position sense that I have with respect to my limbs and overall posture. It is the ‘sixth sense’ that allows me to know whether my legs are crossed, or not, without looking at them” (Gallagher and Zahavi 2012, 162).

It is pertinent too in this evolutionary context to take note of a perplexing claim that is paradigmatic of the way in which people bypass a recognition of animate movement. The claim comes from Gallagher and Zahavi and reads, “Although I do not have observational access to my body in action, I can have non-observational proprioceptive and kinaesthetic awareness of my body in action” (ibid.). Whatever the meaning of a “non-observational ... awareness of my body in action”—for example, does “non-observational awareness” mean simply “knowing without *looking*”?—Gallagher and Zahavi’s claim clearly bypasses phenomenological understandings of *movement* and this, seemingly for the simple reason that “action,” like behavior, occludes genuine investigations and factual understandings of movement. As elsewhere critically described, action “package[s] movement in the same way that embodiment packages mind, subjectivity, self, and all those other otherwise vague and seemingly intangible less-than-physical existential realities” (Sheets-Johnstone 2011a, 477) (for texts that highlight action in this way, see, e.g., Grammont et al., 2010; Noë 2009; Roessler and Eilan 2003; Thompson 2007). It is hardly a wonder then that in talk of action, the integral qualitative dynamics of movement are occluded; packaging prevents their elucidation.

An odd use of “proprioception” should be mentioned in this context of bypassing the dynamic realities of movement. Philosopher Barbara Montero writes of proprioception as the movement faculty of both dancers and audiences of dance. Montero in fact makes a verb of the noun, claiming that audiences “proprioceive” a dance, and furthermore calls upon mirror neurons along the way to substantiate her claim (Montero 2006). Sizable good reasons have been given to question a reliance on mirror neurons to support such a claim (see Sheets-Johnstone 2012b). Moreover, Montero’s definition of proprioception is wayward to begin with: “Proprioception is the sense by which we acquire information about the positions and movements of our own bodies, via receptors in the joints, tendons, ligaments, muscles, and skin” (Montero 2006, 231). She thus attributes to proprioception the anatomical–neurophysiological structures of kinesthesia and in effect nullifies kinesthesia in the process. If proprioception is a sense, it indeed must have receptors, but to filch them from kinesthesia in order to fill the bill is hardly credible, much less honorable. It should be noted that Montero goes to some length to justify an audience’s “proprioceiving” a dance. She writes (*ibid.*, 238; see also Cole and Montero 2007),

I claim that in such a situation, we are proprioceiving *the dancer’s movements*. Although this is extending our use of the term “proprioception” I suggest that it is legitimate. In arguing for this it would be useful to know whether the proprioceptive centers of the brain are activated in this situation, which is unknown. (In fact, it is not entirely clear exactly which areas of the brain are responsible for proprioception, though we know that lesions in the left-parietal lobe can cause loss of proprioception.) Although we lack this information, I think that the analogy between the situation with which I am concerned and other cases of indirect perception (perception where we perceive one thing in virtue of perceiving something else) is close enough so that it is reasonable to call the situation ‘proprioception’ of another’s movement.

On the other hand, Montero does not actually nullify kinesthesia, but in fact relies on it, writing of “the audience member’s kinesthetic experience” (*ibid.*, 238) and of “the kinesthetic representation of motion in the audience member’s body” (*ibid.*, 239): “[W]hen proprioceiving (as I would like to put it) a dancer move, there is a causal chain that starts with the dancer on stage and culminates in your kinesthetic experience representing the dancer’s movement” (*ibid.*, 238).

Montero’s notion of proprioception is carried further in an article written with Jonathan Cole on “affective proprioception.” Montero and Cole state that “Proprioception has been considered, within neuroscience, in the context of the control of movement,” and that in the present instance, they will “discuss a possible second role for this ‘sixth sense,’ pleasure in and of movement” (Cole and Montero 2007, 299). They invoke “an evolutionary perspective,” in particular what they term “a Darwinian model” (*ibid.*), a model

based on survival, as in “feeling good might have preceded looking good, in movement, at least from an evolutionary perspective” (ibid., 300). More generally, they state (ibid., 308),

It is relatively easy to suggest that there was a good evolutionary pressure to reward exercise of the body (in the sense of controlled movement). In hunting, often over long distances and periods of time, those with endurance would obtain the kill. Similarly avoidance of predation presumably required accurate and skilled movement. Fitness in movement may also be associated with fitness in general and so fitness to reproduce. It is not too difficult to suggest that those who were physically strong and good movers were in some situations at a selective advantage (without suggesting that other abilities, e.g., intelligence, were not also a selection pressure)

Darwin certainly wrote about fitness, but as we saw earlier, he also wrote at length about emotions and indeed *about the sheer pleasure in moving*—about the “transport of Joy and of Vivid Pleasure,” of “purposeless movement.” In doing so, and as also noted earlier, he did not mention kinesthesia or the qualitative dynamics of movement, but he certainly recognized them implicitly in what he wrote. He furthermore implicitly recognized the *dynamic congruency* (Sheets-Johnstone 1999a/2009 [Chapter VIII]) of emotions and movement when he wrote of “the intimate relation which exists between almost all the emotions and their outward manifestations.”

What is lacking in contemporary writings on movement is an awareness of the basic qualitative dynamics of movement, dynamics that are *experienced kinesthetically* in dancing the dance and *experienced kinetically* in seeing the dance. It will be apparent in what follows that audiences of dance do not respond to the dance they experience by way of cilia, slit sensilla, or facial hairs, for example, that is, proprioception by way of external sensory organs as described by evolutionary biologists (Laverack, Lissman; see further below), but through the qualitative dynamics of movement itself.

Given the overall lack of awareness of the basic qualitative dynamics of movement in the above-described fallacious notions of kinesthesia, in the postural and proprioceptive obfuscation of movement and of kinesthesia, in the not uncommon packaging of movement in “action” and “behavior,” and in the promotion of proprioception as a sixth sense, it is relevant to call attention to bona fide evolutionary understandings of the evolution of sensory modalities of animate movement through biological studies of proprioception across a range of species. Among other things, it will indeed become apparent that audiences of dance respond to the dance they experience through the dynamics of movement itself.

As elsewhere described at length (Sheets-Johnstone 2011a), biologists studying invertebrate proprioception meticulously document “a diversity of possible proprioceptive acuities commensurate with the diversity of life itself” (ibid., 58), each possible acuity being not a postural sense but a form of

surface recognition sensitivity subserving movement (ibid., 59). The cilia of a polyp, for example, are sensitive to vibrations in the surrounding water, which vibrations prompt the polyp to bend its tentacles toward a food source. A locust is proprioceptively sensitive in a similar way: its facial hairs are sensitive to air currents. Displacement of its facial hairs facilitates its orientation in flying and its lift during flight. In short, water and air move, and such movement “agitates, deforms, or otherwise impinges” on animal bodies, not only moving them to move, but influencing how they move (ibid., 55). These biologists (Lissman; Laverack) furthermore suggest that external forms of proprioception in invertebrates evolved into internal forms in vertebrates. They thus implicitly suggest that an essentially *tactile* form of corporeal consciousness subserving movement evolved into a directly *kinetic* form of corporeal consciousness.

Proprioception is, from this evolutionary perspective, a differentiated faculty that began in surface recognition sensitivity, a sensitivity subserving movement through decompressions and deformations of outer sensory organs such as cilia, and evolved over time into internal sensory organs such as the chordotonal organs of Crustacea, organs that are sensitive directly to stresses within the body itself (Laverack 1976; Sheets-Johnstone 2011a). Just such internal sensory organs are found in jointed creatures and are the evolutionary antecedents of kinesthesia proper. In other words, the internal sensory organs found in muscles, tendons, and joints are “descendants with modification” (Darwin [1859] 1968) of the external and internal sensory organs of proprioception. They are *kinesthetically* rather than tactilely rooted and, being kinesthetically rooted, constitute a faculty that, unlike proprioception, is directly attuned to the movement of a creature’s body, subtending its direct experience of the qualitative dynamics of movement. In effect, from this evolutionary vantage point, the external-to-internal evolutionary modification of proprioception was the gateway to the evolution of a directly movement-sensitive consciousness. Kinesthesia, the faculty that in the nineteenth century was originally called “the muscle sense” (Scheerer 1987), endows animate beings direct experience of the qualitative dynamics of movement.

4. THE VALUE OF AN EVOLUTIONARY PERSPECTIVE

An evolutionary perspective offers us insight into our authentic sixth sense, namely kinesthesia. Along with tactility, kinesthesia is the first neurological sensory system to develop in utero and indeed the sensory modality that constitutes and remains our mother tongue. The concluding remark of neurophysiologist Marc Jeannerod at the close of his research studies on “conscious knowledge about one’s actions”—conscious knowledge of the actual experience of one’s movement—testifies to the lasting significance of our mother tongue: “There are no reliable methods for suppressing kinesthetic information arising during the execution of a movement” (Jeannerod 2006, 56). As commented elsewhere, “‘Information’ terminology aside ... Jeannerod’s declarative finding

speaks reams about the foundational ongoing reality and significance of kinesthesia” (Sheets-Johnstone 2014, 250; 2016, 24). As furthermore pointed out with respect to the nonsuppressible modality of kinesthesia (ibid., 2014, 258–59; 2016, 35),

[W]hat I kinesthetically experience in a *felt* bodily sense is a first-hand—or first-body—*felt qualitative dynamic experience of movement itself*. I feel the dynamics of my movement, “my” *not in the sense of ownership* (cf. Gallagher 2005; Gallagher and Zahavi 2012), but in the sense of “I move,” without the “I” being in any way substantively part of the immediate and direct experience, let alone reflectively constructed or inserted into that experience.

If asked to describe that immediate, direct, nonreflective, and nonmonitored experience (the latter in contrast to monitored as when learning a new skill or in stepping along a steep and narrow cliff), one could from a Buddhist as well as a phenomenological perspective specify simply “moving, moving”: “There is no one to whom this changing process belongs, there is no owner of it” (Kornfield and Goldstein 1987, 22; see also 144). In short, the inherent qualitative dynamics of “moving, moving” are experientially present and all that is experientially present.

An evolutionary perspective clearly gives us insight not only into human experience but into the different ways in which movement is the foundational ground on which all animate experience is generated, and in turn, why the felt tactile–kinesthetic/affective body and thinking in movement are basic to animate forms of life. Further still, an evolutionary perspective can lead us to consider how emotions are the “evolutionary descendants of somatic responses” (Johnstone 2012, 179), somatic responses such as shivering in cold or writhing in pain, responses that, unlike emotion, have no cognitional aspect other than “coldness/shivering” or “pain/writhing,” but responses that, like emotions, “are holistic, involving one’s whole body and coloring one’s perception and thinking” (ibid., 194). Moreover, somatic responses “are elicited automatically, as are emotions, quite independently of any voluntary effort on one’s part” (ibid.). Carl Gustav Jung similarly observes, “Emotion ... is not an activity of the individual but something that happens to him” (Jung 1978, 8–9), a happening that can be either taken up or muted (see Johnstone 2013 on “espousing an emotion”). In short, while somatic responses and emotions simply arise, we humans and other forms of animate life have the capacity to choose: We have the ability to move as we are moved to move, to restrain such movement, or to feign a different movement.

The social implications of our evolutionary heritage are equally significant, particularly with respect to emotions, and this from virtually the beginning of life. Infant psychologist Colwyn Trevarthen remarks, “Emotion is communicated in how one moves expressively, whether with or without words, and in patterns of rhythm, prosody or melody through time, as in theatre, poetry and music” (Trevarthen 2012, 474). What Trevarthen discusses in terms

of expressive movement figures centrally in infant psychiatrist and clinical psychologist Daniel Stern's rich descriptive examples of affect attunement. Such attunement of infants and their mothers testifies to the centrality of expressive movement in terms of the "quality of feeling" that is being experienced and that is being shared (Stern 1985, 142). Of particular relevance too is both how rigorously Stern differentiates attunement from imitation (*ibid.*, 138–142) and how, following his examples and analysis, Stern specifically documents attunement as "a distinct form of affective transaction in its own right" (*ibid.*, 145).

Though not commonly recognized and given their due, the global field studies of anthropologist Iraneus Eibl-Eibesfeldt are surely relevant to an evolutionary perspective and in particular to studies of the social context of emotion. Eibl-Eibesfeldt documents *pan-cultural affective bodily dynamics*, not only in smiling and laughing, but in disgust, surprise, and other emotions (Eibl-Eibesfeldt 1972, 1975, 1979, 1980). Cultures may and do rework what is evolutionarily given, suppressing, exaggerating, neglecting, or elaborating what is there naturally (Sheets-Johnstone 1994), but their reworking does not contravene evolutionary continuities, hence *pan-cultural affective bodily dynamics*. The writings and teaching practices of an ordained Buddhist monk, Jack Kornfield, whose later Ph.D. in clinical psychology gives him finely tuned understandings of the lively significance of emotions, are provocative and similarly of singular moment from both an evolutionary perspective and the social context of emotions. At one point, Kornfield writes, "Feelings are what connect us to life and to one another. To be able to feel is one of the extraordinary gifts of humanity. To neither suppress our feelings nor be caught by them, but to understand them—that is the art" (Kornfield 2000, 195). A few pages later, he writes, "To encourage an awareness of inner emotional richness during retreats, I sometimes recite from a list of five hundred feelings. These include: affectionate, ambitious, ambivalent, amused, antagonistic, antsy, apathetic, appreciative, argumentative, blissful, brokenhearted, calm, cheerful, claustrophobic, compassionate..."; the list goes on and on, ending in "prudish, sad, silly, sleepy, sober, spacious, sympathetic—and so on" (*ibid.*, 196–97).

A still further perspective on the social context of emotions from an evolutionary perspective is apparent in anthropologist Stuart Altmann's documentation of comsigns, interpersonal ways of moving that are common to all members of the species or all members of a particular society within the species, "at least at some stage in their life history" (Altmann 1967, 335–36). Comsigns are clearly semantic: They are meaningful to others and elicit movement from others in response, as, for example, a baboon's yawning: "In baboons, directed mouth-gaping, or 'yawning,' is a powerful threat; in contrast, undirected yawns are of little or no communicative significance" (*ibid.*, 332). Mounting too is a comsign, a movement common to both male and female primates. In fact, as ethologist Wolfgang Wickler points out with respect to rhesus macaques, "Mounting is not specific for oestrous nor, indeed, for the

male-female relation because males mount males, and females mount females,” and furthermore, “[f]emales may be seen mounting males” (Wickler 1969, 110). Moreover, presenting too is not solely a female sexual signal: “Presentation is not only exhibited by females in heat, but is also shown by females of all ages and at all ages of the oestrous cycle and even by males and very young animals. Regularly, if not exclusively, such presentation is directed toward a higher-rank partner and signifies general submissiveness” (ibid., 101). Quoting an earlier primate researcher, Wickler states, “Presenting is the submissive form of approach to a dominant animal as a sort of greeting” (ibid.), a fact that has been noted by virtually all primate researchers (see, e.g., Schaller 1972 on mountain gorillas; van Lawick-Goodall 1972 on Gombe Stream chimpanzees). Altmann points out that sexual dimorphism is the basis of exceptions to consigs. In particular, while mounting and presenting are movements possible to both female and male primates, only female primates present their swollen hindquarters in sexual displays and only male primates are capable of intromission (Altmann 1967, 336).

5. THE CENTRALITY OF MOVEMENT TO AN EVOLUTIONARY SEMANTICS

As the above specifications of the significance of an evolutionary perspective indicate, an evolutionary semantics is anchored in movement—in what may experientially be termed the tactile-kinesthetic/affective body—from both an ontogenetic and phylogenetic perspective. Examples were in fact given at the beginning of this essay of how animate forms of life are mindful bodies engaged in helping, inviting, and deceiving others, and how in each instance it is a matter of movement and of thinking in movement. It is all the more surprising, then, that movement is not a core concern of researchers whose objective is to understand aspects of animate life. Perhaps embodiments of one kind and another are considered by some a first step in that direction, but such a step is in fact wayward, for packaging of any kind is not only antithetical to a recognition of movement, but an impediment to a recognition of movement as the foundational reality of animate life, a reality that, as earlier indicated, is the stable foundation showing “mind is function of body.” While some researchers in various fields might exclaim “What! How can movement be the stable foundation? It won’t stay still!,” that is precisely the point. Animate forms of life are on the move in relation to themselves and to the world about them. Indeed, they do not stay still. They are not embodied minds but mindful bodies on the move (Sheets-Johnstone 2011a; see also Sheets-Johnstone 2011b).

Of interest in this context is use of the word “gesture”: “[t]he young adult male gives his one-year-old female a gestural invitation to climb on his back”; the ontogenetically “ritualized” “‘arm-raise’ gesture” that is a juvenile chimpanzee’s invitation to play is supplanted by a different “gestural signal” involving a “limp leg.” What are described as gestures toward others—a

“gestural invitation” to do such and such, for example—are in fact through and through a matter of *movement*, hence of a particular qualitative dynamic, a fact that is not uncommonly overlooked in writings on gesture and that requires critical oversight. Philosopher Giorgio Agamben’s “Notes on Gesture” are an extreme but all the more edifying example of the oversight. The highly detailed research studies of linguist and communication scholar Jürgen Streeck are, in contrast, exemplary of what might be described as a step in the right direction.

In a section titled “Notes on Gesture” in his book *Infancy and History*, Agamben writes of walking as “one of the most common human gestures” (Agamben 2007, 149). Walking, of course, is “one of the most common human *movements*.” In particular, putting one foot in front of the other—*stepping*—is not a gesture at all. When one walks, one in fact moves through a sequence of weight transferences, and not just from one foot to another, but most commonly *through* each foot from heel to toe. Moreover, any particular walk has a certain qualitative character. Putting one foot in front of the other constitutes a *dynamic movement pattern*, which may be rapid, slow, interspersed with pauses, intense, hesitant, determined, agitated, calm, contemplative, and so on, and so on. Indeed, a *dynamic congruency* is evident in one’s walk, a congruency that obtains between movement and emotion: Trust moves through the body and moves us to move in ways different from fear; sadness moves through the body and moves us to move in ways different from delight; surprise moves through us and move us to move in a range of ways from approach to avoidance that in general translates from an expansive to contractive, depending upon the nature of the surprise.

A further critical point warrants attention with respect to Agamben’s notion of gesture. When he takes “a step” as an example of gesture via Gilles de la Tourette’s meticulously crafted anatomical description and points out a similarity to Eadweard Muybridge’s sequential photographs of a person walking (ibid., 149–50), he is actually shaping animate realities to his own end, for de la Tourette’s description is clearly not reducible to a series “gestures.” It is a full-fledged bodily dynamic. In *Études cliniques et physiologiques sur la marche*, de la Tourette’s description begins with the observation, “With the left leg as support, the right foot is raised from the ground in a rolling motion from the heel to the tips of the toes, which are the last part to be lifted away”; it ends with the observation, “the left foot touches the ground at the heel just as the right is finishing its roll forward” (de la Tourette 1886, 21; quoted in Agamben 2007, 149).

What Agamben ultimately does is gauge gesture by its relation to verbal language or, as he puts it ontologically, by its relation to “being-in-language” (Agamben 2007, 155–56). To see gesture through the lens of “being-in-language” is precisely to miss its kinetic foundation and, further, to miss the real-life realities of infancy that include not just vitality affects as described by Stern, but basic corporeal concepts, nonlinguistic concepts arising naturally from experiences of movement and of thinking in movement (Sheets-Johnstone

1981, 2009 [Chapter II], 2011a [Chapter 12]). Indeed, as indicated above, fundamental human concepts are corporeal concepts (Sheets-Johnstone 1990), many of which originate in infancy—for example, concepts involving spatial relations such as *in*, *inside*, and *being inside* (Sheets-Johnstone 2009; 2011a). Such concepts are the spawning ground of verbal language (Sheets-Johnstone 2009, 2011a). Clearly, when we all took our first steps, that is, when we were all learning our bodies and learning to move ourselves (Sheets-Johnstone 2011a), we were not gesturing or trying to gesture: We were *moving* and were kinesthetically alive to our own movement. By epitomizing humans as “being-in-language,” Agamben is deflected from realizing a basic truth: He is deflected from the fact that infants are not prelinguistic; language is post-kinetic (ibid.; see also Sheets-Johnstone 2010c).

Agamben’s cursory dismissal of dance is a further indication of a wayward, idiosyncratic understanding of gesture that fails to recognize movement. He writes,

If dance is gesture, this is, however, because it is nothing but the physical tolerance of bodily movements and the display of their mediating nature. *Gesture is the display of mediation, the making visible of a means as such.* It makes apparent the human state of being-in-a-medium and thereby opens up the ethical dimension for human beings” (155; italics in original).

To begin with, to describe dance as “nothing but the physical tolerance of bodily movements” is to open the door to describing the creation of any art form—not to mention the living of life itself—as “the physical tolerance of bodily movements,” for though not giving prominence to movement as in dance, all are anchored in bodily movement. In dance, as in Pina Bausch’s “Café Müller,” for example, we experience intricate, finely controlled, and perfected movement that Pina anchors in the creation and dynamics of an artistic form that ultimately stands on its own. In their creation of works of art, painters, musicians, dancers, sculptors, and actors are in fact quintessentially *mindful bodies*, bodies fully attentive to their dynamics and the ongoing resultant effects of those dynamics in terms of an evolving aesthetic form. Agamben’s “being-in-a-medium” is an elegant obfuscation of the fact that we *are* bodies, animate forms of life. Such forms are not “being[s]-in-a-medium of one kind and another,” that is, embodied ontological specimens any more than they are embodied minds.

Jürgen Streeck’s aim in *Gesturecraft: The Manu-facture of Meaning* is “to elucidate some of the main ways in which gesture contributes to human understanding” (Streeck 2009, 5). He further defines his research as “observational research in the tradition of anthropological linguistics, micro-sociology, linguistic pragmatics, ethnography, and ethology; ... it is grounded in the micro-analysis of human action and interaction in non-experimental, everyday life settings” (ibid.). Though not dwelling on kinesthesia in a concentrated way and though not turning attention to the qualitative dynamics of

movement, Streeck's analysis of gesture is replete with kinetic insights and illuminations. For example, Streeck writes of the "kinesthetic form" of gestures (ibid., 154, 167), of the "kinesthetic experience" of gestures (ibid., 171), and of "body-internal kinesthetic perception" (ibid., 54), again, not in any way recognizing the felt qualitative dynamics of movement, but in a strikingly original way recognizing the sense modality of kinesthesia as the empirically present modality it is in "everyday life settings." It is of interest to point out too that linguists who study speech write of *articulatory gestures*, meaning the movements we make in making the sounds we make in speaking: We make syllabically formed sounds. In effect, what goes on inside our mouths when we speak is an ongoing series of movements of our tongue, lips, jaw, and supralaryngeal tract, all such movements flowing forth concomitantly with movements of our chest and torso in breathing. In short, the articulatory gestures of speech, like the manu-gestures of which Streeck writes, and like bodily gestures more generally, are grounded in movement, indeed, in animation, that basic capacity to move that defines the evolution of animate life.

In sum, an evolutionary perspective puts us in touch with primal animation, the intrinsic dynamics that informs all forms of animate life. However unacknowledged, it is surely significant that all research on animate forms of life other than human relies on the study of movement—movement that is unfortunately if typically perceived, conceived, and labeled "behavior" or "action," and in many instances not uncommonly performed by an embodied mind. These studies are thus missing an illumination much less understanding of our evolutionary heritage as an animate form of life, and the thinking in movement, the synergies of meaningful movement, and the qualitative dynamics of movement that integrally and essentially inform our lives.

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