RHYTHM AND CADENCE, FRENZY AND MARCH: MUSIC AND THE GEO-BIO-TECHNO-AFFECTIVE ASSEMBLAGES OF ANCIENT WARFARE

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Draft of 15 January 2009
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Forthcoming in Theory & Event, special issue on "Deleuze and War," edited by Brad Evans.

In one of many such passages in A Thousand Plateaus, Deleuze and Guattari describe the assemblage as the imbrication of the social and the somatic, this time using an example from ancient Greek warfare:

> Assemblages [agencements] are passional, they are compositions of desire. Desire has nothing to do with a natural or spontaneous determination; there is no desire but assembling, assembled, desire [il n'y a de désir qu'agencant, agencé, machiné]. The rationality, the efficiency, of an assemblage does not exist without the passions the assemblage brings into play, without the desires that constitute it as much as it constitutes them. Detienne has shown that the Greek phalanx was inseparable from a whole reversal of values, and from a passional mutation that drastically changed the relations between desire and the war machine. It is a case of a man dismounting from the horse, and of the man-animal relation being replaced by a relation between men in an infantry assemblage that paves the way for the advent of the peasant-soldier, the citizen-soldier: the entire Eros of war changes, a group homosexual Eros tends to replace the zoosexual Eros of the horseman…. Passions are effectuations of desire that differ according to the assemblage…. Affect is the active discharge of emotion, the counterattack [la riposte], whereas feeling [le sentiment] is an always displaced, retarded, resisting emotion (497-498 / 399-400)

We are going to use this passage as a jumping-off point to examine some of the geo-bio-techno-affective assemblages at work in ancient Greek and Near Eastern warfare. We will look at the phalanx, but for greater contrast, we will not focus on the "zoosexual" horsemen, but on the berserker "runners" and their putative involvement in the 1200 BCE collapse of the Bronze Age kingdoms, of which Mycenae and Troy are the most famous examples. To describe these imbrications of the social and the somatic, I will use the term "body politic" (Protevi 2001; 2009). I have explored some dimensions of affect in contemporary military training in Protevi 2008; here I am extending the analysis to ancient warfare.

The article will have two parts. In Part I, we're going to explore the ontology, biology, and history of affect. In each case we will put Deleuze and Guattari's work into the context of current research, primarily cognitive science, biology, anthropology, military history, and bio-

cultural musicology. (1) Exploring the ontology of affect will enable us to explain the exteriority of affect versus the interiority of emotion or "feeling." (2) Exploring the biology of affect will take us to the biophilosophical school known as Developmental Systems Theory (DST) as it intersects new research in neuroscience. From this perspective, affective bodies are experientially constructed, and that experience is open to the social. (3) In exploring the history of affect we will discuss cultural evolution and the anthropology of war. In Part II, we are going to concentrate on the use of music in ancient warfare, and the difference between the types of music used to trigger the berserker rage versus that used to entrain the phalanx.

PART I: THE ONTOLOGY, BIOLOGY, AND HISTORY OF AFFECT

ONTOLOGY OF AFFECT. For Deleuze and Guattari (hereafter "DG") "affect" comprises the active capacities of a body to act and the passive capacities of a body to be affected or to be acted upon. In other words, affect is what a body can do and what it can undergo. The use of this term derives from Deleuze's reading of Spinoza, in which Deleuze carefully distinguishes "affect," (affectus) as the experience of an increase or decrease in the body's power to act, from "affection" (affectio) as the composition or mixture of bodies, or more precisely the change produced in the affected body by the action of the affecting body in an encounter. Affectus or what we could call "experiential affect" is not representational, Deleuze remarks, "since it is experienced in a living duration that involves the difference between two states." As such an experience of difference, affectus is "purely transitive" (Deleuze 1988b: 49). In the main discussion of affect in ATP (313-4 / 256-7), DG do not maintain the Spinozist term "affection," but they do distinguish the relations of the extensive parts of a body (including the "modification" of those relations resulting from an encounter), which they call "longitude," from the intensities or bodily states that augment or diminish the body's "power to act [puissance d'agir]," which they call "latitude." In other words, the "latitude" of a body comprises the affects or the capacities to act and to be acted upon of which a body is capable at any one time in an assemblage. What are these "acts" of which a body is capable? Using one of the key terms of ATP, DG define affects as "becomings" or capacities to produce emergent effects in entering assemblages (Protevi 2006). These emergent effects will either mesh productively with the affects of the body, or clash with them. Meshing emergent effects will augment the power of that body to form other connections within or across assemblages, resulting in joyous affects, while clashing emergent effects will diminish the power to act of the body, producing sad affects.

For DG, knowledge of the affects of a body is all-important: "We know nothing about a body until we know what it can do [ce qu'il peut], in other words, what its affects are" (314 / 257). Affect is part of DG's dynamic interactional ontology, so that defining bodies in terms of affects or power to act and to undergo is different from reading them in terms of properties of substantive bodies by which they are arranged in species and genera (314 / 257). At this point in their text, DG illustrate the way affect is part of the process of assembling by reference to the relation between Little Hans and the horse in Freud's eponymous case study . While we will not do a thematic study of the horse in ATP, we should recall the prevalence of horses (alongside wolves and rats) in the discussions of affect in ATP: besides the Little Hans case, we also find the becoming-horse of the masochist being submitted to dressage (193 / 155), and of course the repeated analyses of man-horse assemblages in the Nomadology chapter (the stirrup, the chariot, etc.). We will return to the question of horse-man assemblages in ancient warfare, in particular to a recent thesis whereby the defeat of the light chariot forces by berserker "runners" is the crucial

factor in the defeat of Bronze Age kingdoms that mark the 1200 BCE collapse, leading to the eventual emergence of the polis / phalanx assemblage (Drews 1993).

Let us stay with the horse to illustrate affect as the capacity to become, to undergo the stresses inherent in forming a particular assemblage, by noting that in a grouping based on affect, a racehorse (carries a rider in a race; i.e., enters the racing assemblage) has more in common with a motorcycle than with a plow horse (pulls a tool that gouges the earth; i.e., enters the agricultural assemblage), which has more in common with a tractor.[1] This is not to say that what is usually named a "plow horse" or "tractor" cannot be made to race, just as "race horses" and "motorcycles" can be made to pull plows. These affects as changes in the triggers and patterns of their behavior would, however, constitute another becoming or line of flight counter their usual, statistically normal ("molar") usages; it would constitute their enlistment in assemblages that tap different "machinic phyla" (bio-techno-social fields for the construction of assemblages [ATP 406-11]) and "diagrams" (the patterns that direct the construction of assemblages [ATP 141]) than the ones into which they are usually recruited. Whether or not the bodies involved could withstand the stresses they undergo is a matter of (one would hope careful) experimentation. Such experimentation establishing the affects of assemblages, the potentials for emergent functionality, is the very process of transcendental empiricism.

To recap, then, DG follow Spinoza, defining affect as a body's ability to act and to be acted upon, what it can do and what it can undergo. DG operationalize the notion of affect as the ability of bodies to form "assemblages" with other bodies, that is, to form emergent functional structures that conserve the heterogeneity of their components. For DG, then, "affect" is physiological, psychological, and machinic: it imbricates the social and the somatic in forming a "body politic" which feels its power or potential to act increasing or decreasing as it encounters other bodies politic and forms assemblages with them (or indeed fails to do so). In this notion of assemblage as emergent functional structure, that is, a dispersed system that enables focused behavior at the system level as it constrains component action, we find parallels with novel positions in contemporary cognitive science (the "embodied" or "extended" mind schools), which maintain that cognition operates in loops among brain, body, and environment (Clark 2003; Thompson 2007). In noting this parallel, we should note that DG emphasizes the affective dimension of assemblages, while the embodied-embedded school focuses on cognition. While we follow DG's lead and focus on the affective, we should remember that both affect and cognition are aspects of a single process, affective cognition, as the directed action of a living being in its world (Protevi 2009).

In discussing affect, we should note that DG place feeling as the subjective appropriation of affect. An example would be the way pleasure is for them the subjective appropriation of de-subjectizing joyous affect: "pleasure is an affection of a person or a subject; it is the only way for persons to 'find themselves' in the process of desire that exceeds them; pleasures, even the most artificial, are reterritorializations" (ATP 156). In the same way, our lead passage implies that "feeling" (sentiment) is the subject's appropriation of physiological-emotional changes of the body, the recognition that "this is me feeling this way." DG's point about affect's extension beyond subjective feeling dovetails with the analysis we will develop of extreme cases of rage and panic as triggering an evacuation of the subject as automatic responses take over; as we will put it, drastic episodes of rage and fear are de-subjectivizing. The agent of an action undertaken in a rage or panic state can be said to be the embodied "affect program" (Griffiths 1997) acting independently of the subject. Here we see affect freed from subjective feeling. There can be no complaints about eliminating the "first person" perspective in studying these episodes, because

there is no "first person" operative in these cases. Agency and subjectivity are split; affect extends beyond feeling; the body does something, is the agent for an action, in the absence of a subject (Protevi 2008).

Let me give a brief example of research in social psychology that recognizes the ontology of affect in bodies politic, bodies that are socially constructed in "dialogue" with our shared genetic heritage. Nisbett and Cohen 1996 go below the conscious subject to examine physiological response, demonstrating that white males of the southern United States have markedly greater outputs of cortisol and testosterone in response to insults than a control group of northern white males (44-45). They go above the individual subject to examine social policy forms, showing that southern states have looser gun control laws, more lenient laws regarding the use of violence in defense of self and property, and more lenient practices regarding use of violence for social control (domestic violence, corporal punishment in schools, and capital punishment) (57-73). They also offer in passing some speculation as to the role played by slavery in the South in the constructing these bodies politic in which social institutions and somatic affect are intertwined and mutually reinforcing in diachronically developing and intensifying mutual reinforcement. No one should think that these Southern males have a significantly different genetic makeup from other groups (or better, that any genetic variation is larger within the group than is present between this group and others); the difference in reaction comes from the differences in bodies politic formed by different subjectification practices, that is, the differences in the way social practices have installed triggers and thresholds that activate the anger patterns we all share due to our common genetic heritage.

Thus, as we have seen, affect is inherently political: bodies are part of an eco-social matrix of other bodies, affecting them and being affected by them. As we will now see, important schools of biological thought accord with this notion of affect as bio-cultural.

BIOLOGY OF AFFECT. Let's first consider the neuroscience of affect. We'll focus on rage, as the triggering of this de-subjectizing affect was the target of constructions in the geo-bio-techno-affective assemblages of ancient warfare. Rage is a basic emotion, which is not to be confused with aggression, though it sometimes is at the root of aggressive behavior. A leading neuroscientist investigating rage is Jaak Panksepp, whose Affective Neuroscience (1998) is a standard textbook in the field. He argues that aggression is wider than anger (187), distinguishing at least two forms of "aggressive circuits" in mammalian brains: predation and rage (188). Predation is based in what Panksepp calls the "seeking" system, which is activated by physiological imbalances, those that can be experienced as hunger, thirst, or sexual need. In predatory hunting, based in seeking, the subject is still operative; there is an experience to hunting, we can experience "what it is like" to hunt. Now we must be careful about too strictly distinguishing predation and rage in the act of killing. Concrete episodes are most often blends of anger and predation; as one expert puts it: "Real-life encounters tend to yield eclectic admixtures, composites of goal and rage, purpose and hate, reason and feeling, rationality and irrationality. Instrumental and hostile violence are not only kinds of violence, but also violence qualities or components" (Toch 1992:1-2; italics in original).

Although in many cases we find composites of brute rage and purposeful predation, we can isolate, at least theoretically, the pure state or "blind rage" in which the subject drops out. We take the Viking "berserker rage" as a prototype, a particularly intense expression of the underlying neurological rage circuits that evacuates subjectivity and results in a sort of killing frenzy without conscious control. The notion of a blind, de-subjectified, rage is confirmed by

Panksepp's analysis of the "hierarchical" architecture of the neural circuits involved: "the core of the RAGE system runs from the medial amygdaloid areas downward, largely via the stria terminalis to the medial hypothalamus, and from there to specific locations with the PAG [periaqueductal gray] of the midbrain. This system is organized hierarchically, meaning that aggression evoked from the amygdala is critically dependent on the lower regions, while aggression from lower sites does not depend critically on the integrity of the higher areas" (Panksepp 1998: 196). We must admit that there are huge issues here with the relation of Panksepp's anatomical focus on specific circuits and neurodynamical approaches which stress that the activity of multiple brain regions are involved in the activation of any one brain function; this anatomy versus dynamics relation must itself be seen in the historical context of the perennial localist versus globalist debate. We are in no position to intervene in these most complex issues, but we should note that Panksepp's notion of hierarchical circuits does allow for the possibility that "higher areas provide subtle refinements to the orchestration that is elaborated in the PAG of the mesencephalon [midbrain]. For instance, various irritating perceptions probably get transmitted into the system via thalamic and cortical inputs to the medial amygdala" (196-7). While these "irritating perceptions" may simply stoke the system to ever-greater heights of rage, we do need to allow that in some cases conscious control can reassert itself. Nonetheless, Panksepp's basic approach, as well as the volumes of warrior testimony about the berserker rage (Shay 1995 being only the tip of the iceberg), licenses our description of the "pure" berserker rage as "blind" and de-subjectified.

Now it is not that the Viking culture somehow presented simply a stage for the playing out of these neurological circuits. To provoke the berserker rage, the Vikings, through a variety of training practices embedded in their customs, distributed traits for triggering the berserker process throughout their population. Presumably, they underwent an evolutionary process in which success in raiding undertaken in the berserker frenzy provided a selection pressure for isolating and improving these practices. (We will return to the question of cultural evolution below; for the moment, please note that I am not implying that genes were the target of that selection pressure.) In other words, the Vikings explored the bio-social machinic phylum for rage triggering in their military assemblages. While one researcher cites possible mushroom ingestion as a contributing factor (Fabing 1956), we will later focus on the role of dance and song in triggering the berserker state. In his important 1995 work, Keeping Together in Time: Dance and Drill in Human History, the noted history William McNeill notes that "war dances" produced a "heightened excitement" that contributed to the "reckless attacks" of the "Viking berserkers" (McNeill 1995: 102; see also Speidel 2002: 276).

There is no denying that the social meaning of blind rages differs across cultures—how they are interpreted by others and by self after waking up—as do their triggers and thresholds (Mallon and Stich 2000). But I think it is important to rescue a minimal notion of human nature from extreme social constructivism and hold that the rage pattern is the same in some important sense across cultures, given variation in genetic inheritances, environmental input, and developmental plasticity. Even with all that variation, there is remarkable similarity in what a full rage looks like, though how much it takes to get there, and what the intermediate anger episodes look like ("emotion scripts" [Parkinson et al. 2005]) can differ widely. Even James Averill, a leading social constructivist when it comes to emotion, relates "running amok" in Southeast Asian societies to Viking berserker rages. Averill writes: "Aggressive frenzies are, of course, found in many different cultures (e.g., the 'berserk' reaction attributed to old Norse warriors), but

amok is probably the most studied of these syndromes" (Averill 1982: 59; italics in original). It is the very commonality of "aggressive frenzies" that we are after in our notion of "rage pattern."

I propose that in extreme cases of rage a modular agent replaces the subject with what is called an "affect program," that is, an emotional response that is "complex, coordinated, and automated … unfold[ing] in this coordinated fashion without the need for conscious direction" (Griffiths 1997: 77). Affect programs (panic is another example) are more than reflexes, but they are triggered well before any cortical processing can take place (though later cortical appraisals can dampen or accelerate the affect program). Griffiths makes the case that affect programs should be seen in light of Fodor's notion of modularity, which calls for a module to be "mandatory … opaque [we are aware of outputs but not the processes producing them] … and informationally encapsulated [the information in a module cannot access that in other modules]" (93; my comments in brackets). Perhaps second only to the question of adaptationism for the amount of controversy it has evoked, the use of the concept of modularity in evolutionary psychology is bitterly contested.[2] I feel relatively safe proposing a rage module or rage agent, since its adaptive value is widely attested to by its presence in other mammals, and since Panksepp is able to cites studies of direct electrical stimulation of the brain (ESB) and neurochemical manipulation as identifying homologous rage circuits in humans and other mammalian species (Panksepp 1998: 190).[3] Panksepp proposes as adaptive reasons for rage agents their utility in predator-prey relations, further sharpening the difference between rage and predator aggression. While a hunting attack is by definition an instance of predatory aggression, rage reactions are a prey phenomenon, a vigorous reaction when pinned down by a predator. Initially a reflex, Panksepp claims, it developed into a full-fledged neural phenomenon with its own circuits (190). The evolutionary inheritance of rage patterns is confirmed by the well-attested fact that infants can become enraged by having their arms pinned to their sides (189).

Now that we have seen now neuroscientists discuss rage, and broached the issues of the unit of selection in cultural evolution and those of modularity and adaptationism in evolutionary psychology, we have to insist right now that we cannot think bodies politic as mere input / output machines passively patterned by their environment (that way lies a discredited social constructivism) or passively programmed by their genes (an equally discredited genetic determinism). We thus turn to an important school of thought in contemporary critical biology, "developmental systems theory" (DST), which is taken from the writings of Richard Lewontin (2002), Susan Oyama (2000), Paul Griffiths and Russell Gray (Griffiths and Gray 1997, 2001, 2004, 2005) and others (Oyama, Griffiths, and Gray 2001). With the help of this new critical biology we can see the body politic as neither a simple blank slate nor a determined mechanism, but as biologically open to the subjectification practices it undergoes in its cultural embedding, practices that work with the broad contours provided by the genetic contribution to development to install culturally variant triggers and thresholds to the basic patterns that are our common heritage. Griffiths uses the example of fear to make this point, but the same holds for the basic emotion of rage we discussed above. "The empirical evidence suggests that in humans the actual fear response – the output side of fear – is an outcome of very coarse-grained selection, since it responds to danger of all kinds. The emotional appraisal mechanism for fear – the input side – seems to have been shaped by a combination of very fine-grained selection, since it is primed to respond to crude snake-like gestalts, and selection for developmental plasticity, since very few stimuli elicit fear without relevant experience" (Griffiths 2007: 204).

DST is a primarily a reaction to genetic determinism or reductionism. Genetic determinism is an ontological thesis proposing that genes are the sole source of order of (that is,

that genes determine) physiological and developmental processes, beginning with protein synthesis and extending upward to organic, systemic, and organismic processes. No one has ever upheld such an absolute position if by that one means epigenetic conditions have no influence whatsoever, that developmental and physiological processes are determined the way a stone is determined to fall by gravity. The real target of critique by DST thinkers is the idea that there are two classes of developmental resources, genetic and epigenetic, and that genes provide the information or blue-print or plan or program, such that the epigenetic resources are the materials or background upon which and / or in which genes act (Oyama 2000; Griffiths and Gray 2001, 2004). The real question of so-called genetic determinism, then, is the locus of control rather than absolute determination.

Genetic reductionism is an epistemological issue. It's my impression that many practicing biologists think of reductionism as asking the question: can the portion of physiology and development due to genetic control be considered separately from the portion due to epigenetic influences?[4] The DST response to this question is known as the "parity thesis" (Oyama 2000; Griffiths and Gray 2001, 2004), which rests upon the idea that there is a distributed system with both genetic and epigenetic factors (e.g., at least cell conditions and relative cell position) that controls gene expression and protein synthesis. It's a mistake however to attribute portions of control to components of that system, such that one could isolate the portion of genetic control. That would be analogous to saying that prisoners are partially under the control of the guards, when it would be better to say they are under the control of the prison system in which guards play a role (alongside architectural, technological, and administrative components). In the view of Griffiths and Gray, the undeniable empirical differences in the roles played by DNA and by non-DNA factors does not support the metaphysical decision to create two classes of developmental resources, nor the additional move to posit genes as the locus of control and epigenetic factors as background, as matter to be molded by the "information" supposedly carried in genes (Griffiths and Gray 2001, 2004).

A second key notion for DST thinkers is "niche-construction." Rather than seeing evolution as the adaptation of organisms to independently changing environments (the organism thus being reactive), DST follows Richard Lewontin (2002) and others in focusing on the way organisms actively shape the environment they live in and in which their offspring will live. They thus play a role in selecting which environmental factors are most important for them and their offspring. Thus evolution should be seen not simply as the change in gene frequency (a mere "bookkeeping" perspective) but as the change in organism-environment systems, that is, the organism in its constructed niche (Griffiths and Gray 2005). Allied with niche-construction, a third key notion of DST is that the "life cycle" should be considered the unit of development and evolution. For DST adherents, the developmental system considered in an evolutionary perspective is the widest possible extension of developmental resources that are reliably present (or better, re-created) across generations. The "life cycle" considered in an evolutionary perspective is the series of events caused by this developmental matrix that recurs in each generation (Griffiths and Gray 1997, 2001, 2004). The evolutionary perspective on the developmental system and life cycle is thus different from the individual perspective, where events need not recur: a singular event might play a crucial role in the development of any one individual, but unless it reliably recurs, it will not have a role in evolution; DST thus avoids the specter of Lamarckism. In their evolutionary thinking, DST thinkers extend the notion of epigenetic inheritance from the intra-nuclear factors of chromatin markings to the cytoplasmic environment of the egg (an extension many mainstream biologists have come to accept) and

beyond to intra-organismic and even (most controversially) to extra-somatic factors, that is, to the relevant, constructed, features of the physical and social environments (for example, normal [i.e., species-typical] brain development in humans needs language exposure in critical sensitive windows) (Griffiths and Gray 1997, 2001, 2004; Jablonka and Lamb 2005).

Such a maximal extension of the developmental system raises the methodological hackles of many biologists, as it seems suspiciously holistic. These methodological reflections remain among the most controversial in contemporary philosophy of science. It would take us too far afield to explore fully all the implications of these debates, but we can see them as well in the background of the notions of developmental plasticity and environmental co-constitution found in West-Eberhard 2003. That the development of organisms is "plastic" and "co-constituted" with its environment means that it is not the simple working out of a genetic program. Rather, development involves a range of response capacities depending on the developing system's exposure to different environmental factors, just as those responses feed back to change the environment in niche-construction. Thus the notion of developmental plasticity displaces gene-centric notions of programmed development just as organism-environment co-constitution displaces notions of gene-centric natural selection in favor of a notion of multiple levels of selection.

We cannot enter the details of the controversy surrounding the notion of multiple levels of selection here, but we can at least sketch the main issues surrounding the notion of group selection, which plays a key role in any notion of bio-cultural evolution (Sober and Wilson 1999; Sterelny and Griffiths 1999; Jablonka and Lamb 2005; Joyce 2006). In considering the notion of group selection we find two main issues: emergence and altruism. If groups can have functional organization in the same way individuals do, that is, if groups can be emergent individuals, then groups can also be vehicles for selection. For example, groups that cooperate better may have out-reproduced those which did not. The crucial question is the replicator, the ultimate target of the selection pressures: again, for our purposes, the unit of selection is not the gene or the meme (a discrete unit of cultural "information"), but the set of practices for forming bodies politic. With the co-operation necessary for group selection, we must discuss the notion of "altruism" or more precisely, the seeming paradox of "fitness-sacrificing behavior." It would seem that natural selection would weed out dispositions leading to behaviors that sacrifice individual fitness (defined as always as the frequency of reproduction). The famous answer that seemed to put paid to the notion of group selection came in the concept of “kin selection.” The idea here is that if you sacrifice yourself for a kin, at least part of your genotype, the “altruistic” part that determines or at least influences self-sacrifice and that is [probably] shared with that kin, is passed on. But again, all the preceding discussion operates at the genetic level. We will claim that the ultimate target of selection pressure in group selection is the set of social practices reliably producing a certain trait by working with our genetic heritage. This need not have any implications for genetic fitness-sacrificing in group selection, if we restrict ourselves to bodies politic and the social practices for promoting behavior leading to increased group fitness. In other words, we are concerned with the variable cultural setting of triggers and thresholds for minimally genetically guided basic patterns.

The important thing for our purposes here is the emphasis DST places on the life cycle, developmental plasticity and environmental co-constitution. In following these thinkers, we can replace the controversial term "innate" with (the admittedly equally controversial) "reliably produced given certain environmental factors." In so doing, we have room to analyze differential patterns in societies that bring forth important differences from common endowments. In other

words, we don't genetically inherit a subject, but we do inherit the potential to develop a subject when it is called forth by cultural practices. It is precisely the various types of subject called forth (the distribution of cognitive and affective patterns, thresholds, and triggers in a given population) that is to be analyzed in the study of the history of affect.

HISTORY OF AFFECT. We have seen how DST enables us to explore the bio-cultural dimension of bodies politic by thematizing extrasomatic inheritance as whatever is reliably reproduced in the next life cycle. Thus with humans we're into realm of bio-cultural evolution, with all its complexity and debates.[5] We have to remember that the unit of selection here is not purely and simply genetic (indeed, for the most part genes are unaffected by cultural evolution, the classical instances of lactose tolerance and sickle-cell anemia notwithstanding), but should be seen as sets of cultural practices, thought in terms of their ability to produce affective cognitive structures (tendencies to react to categories of events) by tinkering with broadly genetically guided neuro-endocrine developmental processes.[6]

Regarding historically formed and culturally variable affective cognition, I work with Damasio's framework for the most part (Damasio 1995; 1999; 2003). Brain and body communicate neurologically and chemically in forming "somatic markers," which correlate or tag changes in the characteristic profile of body changes with the encounters, that is, changes in the characteristic profile of body-world interactions, which provoke them. Somatic markers are formed via a complex process involving brain-body-environment interaction, in which the brain receives signals from the body, from brain maps of body sectors, and from its own internal self-monitoring sectors. Thus the brain synthesizes how the world is changing (sensory input, which is only a modulation on ongoing processes), how the body is being affected by the world's changing (proprioception or "somatic mapping," again, a modulation of ongoing processes), and how the brain's endogenous dynamics are changing (modulation of ongoing internal neurological traffic or "meta-representations"). This synthesis sets up the capacity to experience a feeling of how the body would be affected were it to perform a certain action and hence be affected in turn by the world (off-line imaging, that is, modulation of the ongoing stream of "somatic markers"). I cannot detail the argument here, but a neurodynamical reading of Damasio's framework is broadly consonant with the Deleuzean emphasis on differential relations, that is, the linkage of rates of change of neural firing patterns, and on their integration at certain critical thresholds, resulting in "resonant cell assemblies" (Varela 1995) or their equivalent (Kelso 1995; Edelman and Tononi 2000). The key is that the history of bodily experience is what sets up a somatic marker profile; in other words, the affective cognition profile of bodies politic is embodied and historical.[7]

With this background, we see the limitations of much of the controversy around "cultural evolution" are due to the assumption that "information transfer" is the target for investigation (Runcimann 2005a: 13). But the notions of "meme" and "information transfer" founders on DST's critique – it's not a formed unit of information that we're after, but a process of guiding the production of dispositions to form somatic markers in particularly culturally informed ways. We have to think of ourselves as bio-cultural, with minimal genetically guided psychological modularity (reliably reproduced across cultures) and with a great deal of plasticity allowing for bio-cultural variance in forming our intuitions (Haidt 2001; Wexler 2006). In other words, we have to study political physiology, defined as the study of the production of the variance in affective cognitive triggers and thresholds in bodies politic, based on some minimally shared basic patterns.

All this means we can't assume an abstract affective cognitive subject but have to investigate the history of affect. But, the objection might go, don't we thereby risk leaving

philosophy and entering historical anthropology? Answer: we only "leave" philosophy to enter history if we've surreptitiously defined philosophy ahead of time as ahistorical. Well, then, don't we leave philosophy and enter psychology? Answer: only if we've defined philosophy as concerned solely with universal structures of affective cognition. But that's the nub of the argument: the abstraction needed to reach the universally "human" (as opposed to the historically variant) is at heart anti-biological. Our biology makes humans essentially open to our cultural imprinting; our nature is to be so open to our nurture that it becomes second nature. But just saying that is typological thinking, concerned with "the" (universal) human realm; we need to bring concrete biological thought into philosophy. It's the variations in and across populations which are real; the type is an abstraction.

Having said all that, we must be clear that we are targeting variation in the subjectification practices producing variable triggers and thresholds of shared basic patterns. Now almost all of us reliably develop a set of basic emotions (rage, sadness, joy, fear, distaste) we share with a good number of reasonably complex mammals (Panksepp 1999). Many of us also have robust and reliable prosocial emotions (fairness, gratitude, punishment – shame and guilt are controversial cases) we share with primates, given certain basic and very wide-spread socializing inputs (De Waal 2005; Joyce 2006). Although some cultural practices can try to expand the reach of prosocial emotions to all humans or even all sentient creatures (with all sorts of stops in between), in many sets of cultural practices, these prosocial emotions are partial and local (Hume's starting point in talking about the “moral sentiments”). Why is the partiality of prosocial emotions a “default setting” for sets of bio-cultural practices? One hypothesis is that war has been a selection pressure in bio-cultural evolution, operating at the level of group selection and producing very strong in-group versus out-group distinctions and very strong rewards / punishments for in-group conformity (e.g., Bowles and Gintis 2003).

There are difficult issues here concerning group selection and the unit of selection (Dawson 1999), but even if we can avoid the genetic level and focus on group selection for sets of social practices producing prosocial behaviors, we must still take into account a bitter controversy in anthropology about the alleged universality of warfare in human evolution and history (for a brief review of the literature from the anti-universalist position, see Sponsel 2000; for a book-length statement of the universalist position, see Otterbein 2004). There are three elements to consider here: the biological, the archaeological, and the ethnographic. (1) Regarding the biological, an important first step is to distinguish human war from chimpanzee male coalition and aggressive hierarchy, in short, the humans as "killer ape" hypothesis (Peterson and Wrangham 1997). Several researchers point out that we are just as genetically related to bonobos, who are behaviorally very different from chimpanzees (DeWaal 2006: 73; Fry 2007; see also Ferguson 2008). (2) Proponents of universal war often point to the archaeological record (Keeley 1997). Critics reply that claims of war damaged skulls are more plausibly accounted for by animal attacks (Fry 2007: 43). (3) Finally, we must couple the archaeological record with the current ethnographic record. But to do that we must distinguish simple hunter-gatherer (forager) bands from more complex hunter-gatherer tribes (with chiefs). The former have murder and revenge killing and / or group "executions" (sometimes by kin of the killer – weeding out the mad dogs), but not feuding or the "logic of social substitutability" which enables warfare (Kelly 2000; Fry 2007). We also have to look to current tribal warfare in the context of Western contact and territorial constriction and / or rivalry over trading rights (Sponsel 2000; Ferguson 1995).

The question would be how much war was needed to form an effective selection pressure for strong in-group identification and hence partiality of pro-social emotions? Richerson and

Boyd argue that between group imitation can also be a factor in spreading cultural variants (2005: 209-10). Richerson and Boyd cite the example of early Christianity, where the selection pressure for subjectificaiton practices of "brotherhood" and hence care for the poor and sick was the high rate of epidemics in the Roman Empire. So war need not be the only selection pressure, nor does group destruction and assimilation of losers have to be the only means of transmitting cultural variants. We will assume in the following section that we haven't had time for selection pressures on genes with regard to warfare (Dawson 1999). But we have had time for selection pressures on bio-cultural subjectification practices relative to warfare, that is, for example, how to entrain a marching phalanx versus how to trigger berserker rage.

If war was a selection pressure on group subjectification practices for forming different bodies politic, we have to consider the history of warfare. With complex tribal warfare, you get loose groups of warriors with charismatic leaders (Clastres 1989). Virtually all the males of the tribe take part in this type of warfare; IOW, there is no professional warrior class / caste, except in certain rare cases. The argument of Fry 2007 is that the Chagnon / Clastres school, which focuses on the Yanomami as prototypical "primitive" warriors, picked complex horticultural hunter-gatherers and missed the even more basic simple foragers, who represented the vast majority of human history. But that's okay, because we're not talking about genes, but about bio-cultural evolution, about group selection of affective practices. So we don't have to claim warfare is in our genes; we need only investigate the geo-bio-affective group subjectification practices, once warfare is widespread. And I accept that this spread is post-agriculture, even for complex tribal "primitive" societies, who have always had States on their horizon (both immanently as that which is warded off, and externally, as that which is fought against; again, see Ferguson 1995 for a political history of Yanomami warfare).

This tribal egalitarianism changes with agriculture and class society. We need not enter DG's "anti-evolution" argument and the notion of the Urstaat, though we can note some fascinating new research which broadly supports their claim, derived from Jane Jacobs (1970), of the urban origins of agriculture (Balter 1998; but see the nuanced multiple-origins account in Pringle 1998). Consider thus the situation in Homer: we see vast differences between the affective structures of the warriors (bravery), the peasants (docility) who support them, the artisans who supply the arms (diligence), and the bards who sing their praises and who thus reinforce the affective structures of the warriors: the feeling that your name will live on if you perform bravely is vey important. Thus here the selection pressure is for sets of bio-cultural practices producing specialized affective structures relative to position in society, that is, relative to their contribution to the effectiveness of wars fought by that society. Once again, our concern is with the bio-cultural production of bodies politic, which tries to reliably produce bio-affective states. The triumph of hoplite warfare marks a shift in bio-cultural production. Compare Aristotle's golden mean of courage with what the Homeric warriors meant by courage. For Aristotle, courage means staying in the phalanx with your mates: charging ahead rashly is as much a fault as cowardly retreat (Nicomachean Ethics E 3.7.1115a30; b25-30; cf. Hanson 1989: 168). But for the Homeric heroes, charging ahead rashly is all there is.

PART II: MUSIC AND ANCIENT WARFARE

We have now set up our research question. For a final preparation for our study of the role of music in the affective assemblages that trigger berserker rage or that entrain the phalanx, let us consider recent research which has proposed studying music in the context of bio-cultural evolution. The leading researcher of the Cambridge School of thought in this area, Ian Cross,

argues that music is ancient and universal for humans; so ancient that here we can consider a significant genetic component. Against two recent claims, Cross holds that Steven Pinker is wrong about music being only a spandrel and Geoffrey Miller is wrong about it being due to sexual selection, because they both think of music as contemporary Western music experience, as "patterned sound employed primarily for hedonic ends, whose production constitutes a specialised, commodified and technologised activity" (Cross 2003). Another member of the Cambridge school of thought on music and bio-cultural evolution, John Bispham, puts the contrary position as clearly as possible: "music is a culturally constructed phenomenon built upon universal biologically determined foundations" (Bispham 2004).

Now we must be clear that studying music in an evolutionary framework does not yield a simple adaptive story. Rather, it seems that various "proto-musical" capacities evolved separately and later were stitched together to yield human musical capacities. Bispham proposes that musical rhythmic behavior "be viewed as a constellation of concurrently operating, hierarchically organized, subskills including general timing abilities, smooth and ballistic movement (periodic and nonperiodic), the perception of pulse, a coupling of action and perception, and error correction mechanisms"; all of these "subskills share overlapping internal oscillatory mechanisms" (Bispham 2006: 125). These various capacities should be seen as "grounded in, and as having exaptively evolved from, fundamental kinesthetic abilities and modes of perceiving temporally organized events" (125). In sum, Bispham is against a straight line evolutionary story: "complex behaviors such as music evolved in a mosaic fashion, with individual components emerging or evolving independently or for independent reasons at times, and/or reforming with other components at other times" (126). This doesn't mean that any one mechanism wasn't selected for, just not the full combination as such, until much later, after independent evolution of the components. The evolutionary pressures that have shaped the fundamentally rhythmic and social aspects of our being lead Cross to claim that "infants appear to be primed for music"; in support of this, he cites important studies on rhythmic mother-infant interactions which are crucial for "primary intersubjectivity," "emotional regulation" and "emotional bonding" (Cross 2003; citing Trevarthen 1999 and Dissanayake 2000). In the same vein, Bispham classifies Dissanayake 2000 as looking for "the adaptive strength of rhythm and entrainment in the course of human evolution with reference to mother-infant interaction" (Bispham 2006: 125).

These early building blocks of musicality must come together to form our uniquely human rhythmic capacities. Ian Cross, for his part, insists that the cultural evolution of music cannot be about "memes" which are discrete and consist in "information transfer." The idea has to be that music is involved in the development of bodies politic. For our purposes, music is a powerful way of searching the machinic phylum for bio-social assemblage formation to draw out practices forming bodies politic that can be contribute to group functionality. The key here is to "interpersonal musical entrainment" as the uniquely human musical capacity. What distinguishes human music from bird song is that our music is dialogue, group activity, involving changes in response to changes by others (Bispham 2003). Thus a key capacity for investigation is entrainment, or group movement with the same pulse, which plays a major role in Bispham's analysis; entrainment is based on "internal oscillatory mechanisms [which] are attuned to external cues allowing us to build expectations for the timing of future events … and to interact efficiently with the environment" (Bispham 2006: 128). Since there are internal oscillatory mechanisms in a variety of domains of human behavior and cognition, this suggests that "entrainment in music constitutes an evolutionary exaptation of more generally functional

mechanisms for future-directed attending to temporally structured events" (128). Bispham pushes the analysis as far as to entertain the notion that "interpersonal entrainment is the key rhythmic feature in [all] human interactions," both musical and non-musical. Such interpersonal entrainment ranges from "loose, subconscious use of pulse as a framework for interpersonal / turn-taking interactions in, for example, mother-infant or linguistic interactions" to "a strict adherence to pulse (groove) in group behavior and synchronicity of output where participants are aware of the pulse framework and desire to maintain a degree of temporal stability and group-coordination (e.g., music and dance)" (129). However, Bispham claims that it's probably the case that the former precedes the latter ontogentically and perhaps phylogenetically and is less complex in psychological and physiological. So in his search for what is unique about human musical rhythm, Bispham pulls back from the broad framework to focus on musical pulse and period correction as the keys here; we will deal only with the first of these.

Regarding musical pulse, we have to remember that for almost all of human history, music has had to have been danceable, which sets up its capacity for group bonding (Dissanayake 2000; McNeill 1995). How does danceability come about? Bispham points first to "internal periodic oscillatory mechanisms overlapping with motor-coordination." The key for us is his conclusion that this provides "a mechanism to affect and regulate levels of physiological arousal" (129). In other words, music allows groups to get on the same emotional wavelength: "MRB is primarily rooted in providing a temporal framework, collective emotionality, a feeling of shared experience, and cohesiveness to group activities and ritualistic ceremonies"; indeed, "musical pulse is functional in regulating emotions and motivational states by means of affecting states of action-readiness" (131). It's important to stress that in an evolutionary perspective music is regulatory rather than merely expressive: music is "functional in regulating emotions and in communicating strategies for the regulation of emotion rather than as raw emotional expression per se" (131). Most importantly for our purposes, Bispham notes that such functional affective regulation by means of group music includes "military arousal" (130).

With this background, let us now narrow the focus to music and ancient warfare. First we can distance ourselves from the approach taken by Hagen and Bryant (2003), whose investigation of music as a "coalition signaling system" focuses on a genetic level of selection. They believe themselves licensed to do so because they assume the ancient universality of warfare, but we have seen above how this is based on highly questionable assumptions. We will instead focus on much more recent events, in particular on the differences between the bio-social assemblages of the berserker rage triggered by the war dance, and the entrainment of the phalanx by cadence marching. To set the stage, let us reconstruct the commonly accepted chronology of military assemblages in the ancient Near East. The separation of military and priestly power, according to William McNeill, had "distinct historical origin in ancient Sumer, when, in the language of their epic of creation, 'kingship came down from the gods' to challenge priestly management of society around 3000 BC. The rise of kingship in Mesopotamia, as it happens, was also connected with the earliest known manifestation of the tamer version of war dances—close-order drill" (1995: 105). Reading the epic of Gilgamesh as recording the establishment of kingship from pressures of barbarian raiding and fighting between adjacent cities over water rights, McNeill sees evidence of close-order infantry spearmen @ 2450 BCE. Now McNeill holds that Sumerian military-political independence from priestly-religious authority was "exceptional" and due to bio-social entrainment: "I suggest that the psychological impact of drill may well have been critical in keeping the military-political structure of ancient Sumer independent of, and sometimes at odds with, priestly-religious authority" (107).

The key change is the replacement of early infantry by light chariots as mobile archery platforms, the dominant form of military assemblage in the Bronze Age kingdoms (McNeill 1995: 108-109; Drews 1993; Ferrill 1997). After the 1200 BCE collapse (on which we will focus shortly), around 875 BCE we see archers directly on horseback, as riders, whose "ability to concentrate superior force at any given spot, almost at will" (McNeill 1995: 109) is sure to remind all readers of DG of nomad tactics, the ability to hold an open field, to move with "intensive speed" and so on (ATP 381). These 9th century riders are the "zoosexual" horsemen noted by DG, whose relation to the succeeding form of the phalanx with the rise of the polis in the 8th and 7th centuries BCE is exceedingly complex and beyond the scope of this article to explore fully (Detienne 1968).

Now whatever the precise details of the emergence of the phalanx, we are clear that marching played a major role in the purest expression of the phalanx, the Spartans (Lazenby 1985). Now there are a number of preliminary issues to be discussed here, none of which we can treat in depth, but which we can at least note. First of all, the Spartans were the only polis to devote much time to training for warfare, a point of pride for the Athenians (Hanson 1989: 31; see also Pritchett 1974: 214). Second, I find myself compelled once again, at the risk of fatiguing my readers, to insist that the unit of analysis for us in discussing phalanx warfare must be the set of bio-social practices for directing the development of the affective structures of bodies politic, not the all-too-cognitivist notion of "bundles of information or instructions" allowing for the "exosomatic" transmittal of "sets of norms, values and beliefs" (Runciman 1998: 734). With all that in mind, a commonly cited passage from Plutarch confirms the internal emotional bonding and the intimidating effect on their opponents that Spartan musical march into battle had: "And when at last they were drawn up in battle array and the enemy was at hand, the king … ordered the pipers to pipe the strains of the hymn to Castor; then he himself led off in a marching paean, and it was a sight equally grand and terrifying when they marched in step with the rhythm of the flute, without any gap in their line of battle, and with no confusion in their souls, but calmly and cheerfully moving with the strains of their hymn into the deadly fight. Neither fear nor excessive fury is likely to possess men so disposed, but rather a firm purpose full of hope and courage, believing as they do that Heaven is their ally" (Plutarch, Lycurgus, 21-22).

Before we begin our final section on the role of berserkers in the 1200 BCE collapse, we should remark upon a reading, focusing upon corporeal entrainment, of the huge role played in Athenian thought by the difference between the phalanx at Marathon and the rowers of Salamis. According to McNeill, "the Athenian fleet developed muscular bonding among a larger proportion of the total population … ancient trireme crews pulled their oars in unison by conforming to the beat of a mallet on a special sounding board; and this may have strengthened their visceral response to keeping together in time … the upwelling of common feeling among the Athenians concentrated among citizens too poor to equip themselves for the phalanx" (McNeill 1995: 117). We find here a possible bio-social explanation for what is usually explained as class bias in Plato's privileging of Marathon over Salamis (Laws 4.707a). McNeill ties muscular bonding to "ideals of freedom and equality under the law … limited to the militarily active segment of the population…. Practices that had emerged (at least in part) from keeping together achieved lasting influence when translated into words and transmitted to later generations in literary dress" (McNeill 1995: 118).

Let us now return to the affective assemblages at work in the 1200 BCE collapse, to the discussion of which all the preceding has prepared us. While DG follow Detienne in discussing the distinction of the Dark Age riders and the Classical Age phalanx, there is an earlier

confrontation of military assemblages that sets the stage for that transformation. Our major source here will be Drews 1993. Drews proposes a "military explanation" for the 1200 BCE collapse. He first eliminates the standard explanations: earthquakes, migrations, ironworking, systems collapse, and raiders. Systems collapse might be a condition of weakness of kingdoms, but cannot explain the physical destruction of so many palaces right around 1200 BCE, since it is a "process and structure" explanation that cannot deal with the "event" of the destruction (88). While systems collapse is often then coupled with the earthquake or migration hypothesis to explain the "incidental" event of palace destruction, Drews insists the collapse cannot be seen as simply "internal development—the consequence of deterioration in internal systems"; you need to look to the agency of the attackers and the military weakness to which they were responding (89). On the other hand, for Drews the "raiders" hypothesis is correct, but incomplete (91). The key question is why were they only successful at 1200, when before they were only a nuisance? (93) Drews's innovation comes from examining the makeup of Ancient Near Eastern imperial armies. Here we find that light chariots were the main weapon system, as mobile archery platforms. As successful as the light chariots were, they became vulnerable to "a new kind of infantry" (97). These new footsoldiers "used weapons and guerrilla tactics that were characteristic of barbarian hill people but had never been tried en masse in the plains and against the centers of the Late Bronze Age kingdoms" (97).

We need to recognize that Drews admits the speculative character of his work on the level of history (97-98), since we are going to add further, biocultural and neurological, speculation on top of that. Plunging ahead, in any event, the Drews thesis is that barbarian troops "awoke to a truth that had been with them for some time: the chariot-based forces on which the Great Kingdoms relied could be overwhelmed by swarming infantries …" (104). These phrases will draw the notice of every reader of ATP: "swarming" is the key term in the nomad creation of smooth space, or better the smoothing force of the nomad war machine, which can pop up anywhere in the field in the manner of a "vortex" (ATP 381). Let us continue: not only is the light chariot an assemblage in the Deleuzoguattarian sense, bringing together horses, chariot, driver, archer, and bow into an emergent functional structure (105-106), but we also see Drews supporting DG's thesis of the precedence of the "social machine" over technology. Only with changes in the social structure could the assemblage be fully integrated: "the chariot became militarily significant when it was combined with another intricate artifact, the composite bow, which also had been known for a long time but had until then been a luxury reserved for kings or the very rich" (105-6).

The question of Homer's mistakes in portraying the use of chariots as "battle taxis" is fairly well-known and is deftly handled by Drews: "I would suggest, then, that Homer was basically ignorant of chariot warfare because the heroic tradition originated in a society of infantrymen, in which the chariot was indeed nothing more than a prestige vehicle" (117). So much is familiar, but here's the twist that establishes Drews's importance for our interests: "Homer's Achaeans were … responsible for putting an end to chariot warfare and to the domination of the horse-tamers [cf. Hector's sobriquet]. They were, that is to say, infantrymen of the new type—fleet of foot, skilled with the javelin or throwing spear, and also carrying long swords—who spelled the doom of the great chariot forces of the Late Bronze Age" (118). Drews insists that before the 1200 BCE Catastrophe the footsoldiers supported the chariots, performing the hand-to-hand combat in plains battles (141-2) and doing the fighting in the hills, where chariots couldn't go (147). We see here the outlines of the geographical dimension of the ancient warfare multiplicity, which Drews confirms in his analysis of the fighting styles of the

skirmisher-runners, who were barbarian recruits from those very hill regions: "Mobility rather than solidarity was essential" (152). In another aspect that will delight readers of ATP, but which we cannot pursue, Drews indicates the becoming-animal of the prototypical runner, who was "ferocious in his horned or feathered helmet" (152; see also Speidel 2002; 2004). A final geo-bio-social element deserves recognition, that is, the differentials in physical conditioning between the barbarian hill runners and the plains-dwelling peasant: "service as skirmishers was undoubtedly hazardous and demanding and must have required a great deal more stamina, skill, recklessness, and perhaps ferocity than could be found in the typical resident of Ugarit, Messenia, or Memphis" (157).[8]

The key question for us must be: what is the affect of Achilles the fleet footed? We all know the answer: speed and rage at close range. As much as anyone in our culture, Achilles is the prototype of the berserker rage (Harris 2001; Shay 1995). Drews is clear that the runner / raiders fought in the style that DG associates with the steppe nomads: "With a long sword as his primary weapon for hand-to-hand warfare, the raider required an 'open' space, in which his agility and fleetness could be exploited" (210). Now of course we know that Homer paints Hector as having same affect, but according to Drews's novel interpretation, Troy itself is a horse (chariot) city that is sacked by the raiders (211). Drews' point is that in Homer's portrayal Achilles and the Greeks fight as did the barbarian hill people who had been incorporated into the complex armies of the Bronze Age kingdoms, but then discovered they could defeat chariots. Whatever the worth of these speculations as literary criticism, the important point for us is the affect of the runners from the hills who made up the skirmishers of the imperial armies. Here we turn to a fascinating article by Michael Speidel, who makes the argument that the hill people were Indo-European, fighting in berserker style (Speidel 2002: 258). Despite his wonderful descriptions of the berserkers, Speidel unfortunately talks about the "berserk mind" (259) where we must insist that "body politic" is a much better term. Speidel does, however, use a great, if slightly pleonastic, term for their tactics, one that is again sure to draw the attention of readers of ATP: the berserkers fought as in a "swirling whirlwind" (259).

To focus on our concern on the construction of bodies politic: what were the techniques to bring out the berserker rage? Music is primary among them. Speidel tells us that "to do deeds of berserk daring, one had to be raging mad…. Shouting and singing were ways to raise such rage. Early Greek and Roman warriors screeched like flocks of raucous birds—a mark of manhood. [Speidel 2002: 273: citing Iliad 3.2-6 and Aeneid 7.705]. In an important point to which we will return, Speidel notes the cross-cultural effectiveness of the war song in provoking the berserker rage: "with a song of thunder and wind, the young Marut warriors of the Rig Veda awakened Indra's prowess. Husky Thracian, Celtic and Germanic war songs, like crashing waves, heartened warriors" (273). We should also connect Speidel's next point with the research on musical pulse and the insistence on dance we found in the Cambridge School researchers, Cross and Bispham. Speidel writes: "Dance emboldened even more. Not only Tukulti-Ninurta's berserks danced on the battlefield: Vedic Indians did the same…. Dances, though done by all the early warriors, mattered particularly to berserks as they fanned their fury" (Speidel 2002: 273-274). Speidel cites only "adrenaline levels" (276) as the physiological component of the berserker rage, but we can do better with our understanding of Panksepp and bio-cultural triggering.

I'm going to speculate that these dances and songs were rhythmic in DG's sense, rather than cadences like phalanx marches (ATP 313; see Bogue 2003; Turetsky 2004; Grosz 2008). Now given the complexity of the conceptual network DG use to discuss living systems in ATP,

we can only sketch some of the relations among the key terms: milieus and codes, strata and territories. We begin with "milieu," which is a vibratory, rhythmic, and coded material field (313) for bodies (strata) and territories (assemblages). Heterogeneous milieus are "drawn" by rhythms from chaos, while territories form between ever-shifting milieus. Now milieus are coded – the "code" is the repetition of elements such that milieus are a "block of space-time constituted by the periodic repetition of the component" – but the rhythm is always shifting in "transcoding" (313). Thus "rhythm" is the difference between one code and another: "there is rhythm whenever there is a transcoded passage from one milieu to another, a communication of milieus, coordination between heterogeneous space-times" (313). DG's rhythm is differential: "rhythm is critical; it ties together critical moments" (ATP 313). "Critical" here means a threshold in a differential relation, a singularity in the linked rates of change of a living system in its ecological niche.

So we can speculate that through a co-evolutionary process with success in warfare as a selection pressure, the barbarian hill peoples (and others who searched the same "machinic phylum") experimented with war dances and songs to hit upon critical points in setting up brain frequency patterns that triggered evolutionarily embedded rage circuits or "affect programs" as Griffiths 1997 calls them. Panksepp gives us a clue as to why dance and song were the elements of experimentation: "[Certain brain] areas presumably code the affective content of certain irritations, including vocalizations, and may give specific sounds direct access to RAGE circuitry" (Panksepp 1998: 197; capitalization in original). Along with the angry tone of the war cry (and here elements of auto-affection must be taken into account – you can participate in an escalating affective episode by your own efforts, as we all know, just as you can calm yourself down with some deep breaths), the exertions of the dance help sensitize the system, that is, lower the threshold for the triggering of the rage episode: "increased activity in baroreceptors of the carotid arteries monitors levels of blood pressure and can facilitate the sensitivity of RAGE circuitry" (Panksepp 1998: 198). We can only speculate as to the neurodynamics of the internal dynamics and intermodal processing of the auditory and propioceptive sensations of the dance / song, but we can see here an intermeshing of differential multiplicities, that is, in DG's terms, rhythm as "critical." The expression of our potential for berserker rages depends upon the correct combination of many different layers of events, which the cultural evolutionary process of adjusting the war dance / song to the triggering of such rages set about exploring. Speidel seems to sense there must have been a biological component of the imbrication of social and somatic in the bio-social-affective assemblage, writing that similarities in berserker style, if not due to contact, "must be due to human traits common to the structure and functioning of all warrior societies" (286).

Now we cannot draw too sharp a distinction between berserker rage and phalanx fighting. Speidel contrasts the "mindlessness" of berserkers and "disciplined fighting" of Greeks and Romans (279). But the phalanx doesn't just march. After the clash, we find the chaotic melee, where some form of rage was certainly called upon. One account understatedly questions whether the soldiers in the melee were "rational" and speculates that here the soldiers were on "'automatic pilot'" (Hanson 1989: 159; scare quotes in original). We will read this "automatic pilot" as a de-subectivizing rage state. On the other hand, however chaotic the melee, it was still a clash of phalanxes and thus required both discipline and rage. We are in no position to do more than speculate as to the means by which such balance was achieved, but we are almost irresistibly tempted to use the well-worn Apollo and Dionysus trope about the Greek phalanx warrior, who "was thus asked to accomplish two difficult and almost mutually exclusive tasks: to

unleash a wild fury in the initial crash, and then to maintain complete mastery of this savagery, to guide each step into the enemy columns with complete discipline" (Hanson 1989: 169).

AFTERWORD

We have been unable to do much more than to prepare the ground for further research. But we can at least see the potential for integrating current research in a wide range of scientific fields with DG's notion of the machinic phylum that bio-cultural evolution searches through in setting up affective assemblages.

WORKS CITED

Averill, James R. 1982. Anger and Aggression: An Essay on Emotion. New York: Springer.

Balter, Michael. 1998. Why Settle Down? The Mystery of Communities. Science 282.5393 (20 November): 1442-45.

Bispham, John. 2004. Bridging the Gaps – Music as Biocultural Phenomenon. ESEM Counterpoint 1.

Bispham, John. 2006. Rhythm in Music: What is it? Who has it? And why? Music Perception 24.2: 125-134.

Bogue, Ronald. 2003. Deleuze on Music, Painting and the Arts. New York: Routledge.

Bowles, Samuel and Herbert Gintis. 2003. The Origins of Human Cooperation. In Peter Hammerstein, ed. The Genetic and Cultural Origins of Cooperation. Cambridge MA: MIT Press.

Clark, Andy. 2003. Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence. New York: Oxford University Press.

Clastres, Pierre. 1989. Society Against the State: Essays in Political Anthropology. Translated by Robert Hurley in collaboration with Abe Stein. New York: Zone Books.

Damasio, Antonio. 1994. Descartes' Error. New York: Avon.

Damasio, Antonio. 1999. The Feeling of What Happens. New York: Harcourt.

Damasio, Antonio. 2003. Looking for Spinoza. New York: Harcourt.

Dawson, Doyne. 1999. Evolutionary Theory and Group Selection: The Question of Warfare. History and Theory 38.4: 79-100.

Detienne, Marcel. 1968. La Phalange: problèmes et controverses. In Jean-Pierre Vernant, ed. Problèmes de la guerre en Grèce ancienne. Paris: Ecole des hautes études en science sociale: 157-88.

DeWaal, Frans. 2006. Primates and Philosophers: How Morality Evolved. Princeton: Princeton University Press.

Diamond, Jared. 1992. The Third Chimpanzee: The Evolution and Future of the Human Animal. New York: HarperCollins.

Dissanayake, Ellen. 2000. Antecedents of the temporal arts in early mother-infant interactions. In N Wallin, B Merker, and S Brown, eds. The Origins of Music. Cambridge MA: MIT Press: 389-407.

Drews, Robert. 1993. The End of the Bronze Age: Changes in Warfare and the Catastrophe ca. 1200 B.C.. Princeton: Princeton University Press.

Edelman, Gerald and Giulio Tononi. 2000. A Universe of Consciousness: How Matter Becomes Imagination. New York: Basic Books.

Ferguson, Brian. 1995. Yanomami Warfare: A Political History. Santa Fe: School for American Research Press.

Ferguson, Brian. 2008. Ten Points on War. Social Analysis 52.2: 32-49.

Fracchia, Joseph and Richard Lewontin. 1999. Does Culture Evolve? History and Theory 38.4: 52-78.

Fracchia, Joseph and Richard Lewontin. 2005. The Price of Metaphor. History and Theory 44.1: 14-29.

Fry, Douglas. 2007. Beyond War: The Human Potential for Peace. New York: Oxford University Press.

Griffiths, Paul. 1997. What Emotions Really Are: The Problem of Psychological Categories. Chicago: University of Chicago Press.

Griffiths, Paul. 2007. Evo-devo meets the mind: Toward a developmental evolutionary psychology. In Robert Brandon and Roger Sansom, eds. Integrating Evolution and Development: From Theory to Practice. Cambridge MA: MIT Press: 195-226.
Griffiths, Paul and Russell Gray. 1997. Replicator II – Judgement Day. Biology and Philosophy 12: 471-492.
-------. 2001. Darwinism and Developmental Systems. In Susan Oyama, Paul Griffiths, and Russell Gray, eds. Cycles of Contingency: Developmental Systems and Evolution. Cambridge MA: MIT Press: 195-218.
-------. 2004. The Developmental Systems Perspective: Organism-environment systems as units of development and evolution. In Massimo Pigliucci and Katherine Preston, eds. Phenotypic Integration: Studying the Ecology and Evolution of Complex Phenotypes. New York: Oxford University Press: 409-430.
-------. 2005. Discussion: Three ways to misunderstand developmental systems theory. Biology and Philosophy 20: 417-425.
Grosz, Elizabeth. 2008. Chaos, Territory, Art: Deleuze and the Framing of the Earth. New York: Columbia University Press.
Hagen, Edward and Gregory Bryant. 2003. Music and dance as a coalition signaling system. Human Nature 14.1: 21-51.
Haidt, Jonathan. 2001. The emotional dog and its rational tail: A social intuitionist approach to moral judgment. Psychological Review. 108: 814-834.
Hanson, Victor Davis. 1989. The Western Way of War. Berkeley: University of California Press.
Harris, William. 2001. Restraining Rage: The Ideology of Anger Control in Classical Antiquity. Cambridge MA: Harvard University Press.
Jablonka, Eva and Marion J. Lamb 2005. Evolution in Four Dimensions: Genetic, Epigenetic, Behavioral, and Symbolic Variation in the History of Life. Cambridge MA: MIT Press.
Jacobs, Jane. 1970. The Economy of Cities. New York: Vintage Books.
Joyce, Richard. 2006. The Evolution of Morality. Cambridge MA: MIT Press.
Keeley, Lawrence. 1997. War Before Civilization: The Myth of the Peaceful Savage. New York: Oxford University Press.
Kelly, Raymond. 2000. Warless Societies and the Origin of War. Ann Arbor: University of Michigan Press.
Kelso, J. Scott. 1995. Dynamic Patterns: The Self-Organization of Brain and Behavior. Cambridge MA: MIT Press.
Lazenby, J F. 1985. The Spartan Army. Chicago: Bolchazy-Carducci Publishers.
Lewontin, Richard. 2002. The Triple Helix: Gene, Organism, and Environment. Cambridge MA: Harvard University Press.
Lewontin, Richard. 2005. The Wars Over Evolution. New York Review of Books (20 October). http://www.nybooks.com/articles/18363. Retrieved 5 December 2008.
Mallon, Ron and Stephen Stich. 2000. The Odd Couple: The compatibility of social construction and evolutionary psychology. Philosophy of Science 67 (March): 133-154.
Mareschal, Denis, Mark H Johnson, Sylvain Sirois, Michael W Spratling, Michael S C Thomas, and Gert Westermann. 2007. Neuroconstructivism: How the Brain Constructs Cognition. Volume 1. New York: Oxford University Press.
McNeill, William. 1995. Keeping Together in Time: Dance and Drill in Human History. Cambridge MA: Harvard University Press.
Nisbett, Richard E. and Dov Cohen. 1996. Culture of Honor: The Psychology of Violence in the South. Boulder CO: Westview Press.

Otterbein, Keith. 2004. How War Began. College Station: Texas A&M Press.
Oyama, Susan. [1985] 2000. The Ontogeny of Information: Developmental Systems and Evolution. 2nd ed. Durham: Duke University Press.
Oyama, Susan, Paul Griffiths and Russell Gray. 2001. Cycles of Contingency. Cambridge MA: MIT Press.
Panksepp, Jaak. 1998. Affective Neuroscience. New York: Oxford University Press.
Panksepp, Jaak. 2003. Damasio's Error? Consciousness & Emotion 4.1: 111-134.
Parkinson, Brian, Agneta Fischer and Athony Manstead. 2005. Emotions in Social Relations: Cultural, Group and Interpersonal Processes. New York: Psychology Press.
Peterson, Dale and Richard Wrangham. 1997. Demonic Males: Apes and the Origins of Human Violence. New York: Houghton Mifflin.
Pringle, Heather. 1998. The Slow Birth of Agriculture. Science 282.5393: 1446-50.
Pritchett, W Kendrick. 1974. The Greek State at War. Part II. Berkeley: University of California Press.
Protevi, John. 2001. Political Physics: Deleuze, Derrida, and the Body Politic. London: Athlone Press.
Protevi, John. 2006. Deleuze, Guattari, and Emergence. Paragraph: A Journal of Modern Critical Theory 29.2: 19-39.
Protevi, John. 2008. Affect, Agency, and Responsibility: The Act of Killing in the Age of Cyborgs. Phenomenology and the Cognitive Sciences 7.3 (2008): 405-13.
Protevi, John. 2009. Political Affect: Connecting the Social and the Somatic. Minneapolis: University of Minnesota Press.
Richerson, Peter and Robert Boyd. 2005. Not by Genes Alone: How Culture Transformed Human Evolution. Chicago: University of Chicago Press.
Rosch, Eleanor. 1978. Principles of categorization. In Eleanor Rosch and Barbara Lloyd, eds., Cognition and Categorization. Hillsdale NJ: Lawrence Erlbaum.
Runciman, W.G. 1998. Greek Hoplites, Warrior Culture, and Indirect Bias. Journal of the Royal Anthropological Institute 4.4: 731-51.
Runciman, W.G. 2005a. Culture Does Evolve. History and Theory 44.1: 1-13.
Runciman, W.G. 2005b. Rejoinder to Fracchia and Lewontin. History and Theory 44.1: 30-41.
Shay, Jonathon. 1995. Achilles in Vietnam. New York: Scribner.
Sober, Elliott and David Sloan Wilson. 1998. Unto Others: The Evolution and Psychology of Unselfish Behavior. Cambridge MA: Harvard University Press.
Speidel, Michael. 2002. Berserks: A History of Indo-European "Mad Warriors." Journal of World History 13.2: 253-90.
Speidel, Michael. 2004. Ancient Germanic Warriors: Warrior Styles from Trajan's Column to Icelandic Sagas. New York: Routledge.
Sponsel, Leslie. 2000. Response to Otterbein. American Anthropologist 102.4: 837-41.
Sterelyny, Kim and Paul Griffiths. 1999. Sex and Death: An Introduction to the Philosophy of Biology. Chicago: University of Chicago Press.
Thompson, Evan. 2007. Mind in Life: Biology, Phenomenology, and the Sciences of Mind. Cambridge MA: Harvard University Press.
Toch, Hans. 1992. Violent Men: An Inquiry Into the Psychology of Violence. Washington DC: American Psychological Association.
Trevarthen, Colin. 1999. Musicality and the intrinsic motive pulse: Evidence from human psychobiology and infant communication. Musicae Scientiae, special issue: 155-215.

Turetsky, Phil. 2004. Rhythm, Assemblage, and Event. In Ian Buchanan and Marcel Swoboda, eds. Deleuze and Music. Edinburgh: Edinburgh University Press.
Varela, Francisco. 1995. Resonant Cell Assemblies: A new approach to cognitive functions and neuronal synchrony. Biological Research 28: 81-95.
Watt, Douglas. 2000. Emotion and Consciousness: Part II: A Review of Antonio Damasio's The Feeling of What Happens. Journal of Consciousness Studies 7.3: 72-84.
West-Eberhard, Mary Jane. 2003. Developmental Plasticity and Evolution. New York: Oxford University Press.
Wexler, Bruce. 2006. Brain and Culture: Neurobiology, Ideology, and Social Change. Cambridge MA: MIT Press.

NOTES

[1] It would be very interesting one day to put DG's notion of affective categorization in connection with Elizabeth Rosch's prototype theory (Rosch 1978). Both challenge the Aristotelian notion of categories based on a set of necessary and sufficient conditions defining an essence. What we would need to do is to define a Deleuzoguattarian pedagogy that enables us to see the world in terms of affects, that is, to see the world as a theater for transcendental empiricism: what can bodies do? We have to experiment!

[2] For a sane and balanced overview of the controversies surrounding Evolutionary Psychology in general, see Laland and Brown 2002; for a rip-roaring attack on it, see Rose and Rose 2000. For an article-length overview, see Griffiths 2006.

[3] Homologies are organs in different species united by common descent. Analogies are organs in different species united by similar function. Panksepp 1998: 17 has a brief discussion.

[4] Personal communication from John C. Larkin, Louisiana State University.

[5] Cultural evolution is tied in with debates surrounding sociobiology and evolutionary psychology. An informative exchange can be examined in Fracchia and Lewontin 1999; 2005; and Runciman 2005a and 2005b. See also Lewontin 2005, commenting on Richerson and Boyd 2005.

[6] For background on the interplay of genes and experience in neural development see Wexler 2006; Mareschal et al 2007.

[7] Damasio's somatic marker theory, and more generally his somatic theory of emotion, are not without critics, who reject the somatic theory as based in what they see as an outmoded James-Lange tradition. Even among those sympathetic to the somatic theory, controversies remain concerning the precise role of cortical versus midbrain and brainstem structures in generating basic emotions. Some of the debates within the field are accessibly summarized in Watt 2000 and Panksepp 2003 (on Damasio 1999 and 2003, respectively).

[8] Diamond 1992 discusses water-borne parasites weakening the peasant population in irrigation regimes. An underexplored area of geo-hydro-bio-politics.