

MIND IN LIFE, MIND IN PROCESS: TOWARD A NEW TRANSCENDENTAL AESTHETIC AND A NEW QUESTION OF PANPSYCHISM

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ABSTRACT

The essay examines the idea of “biological space and time” found in Evan Thompson’s *Mind in Life* and Gilles Deleuze’s *Difference and Repetition*. Tracking down this “new Transcendental Aesthetic” intersects new work done on panpsychism. Both Deleuze and Thompson can be fairly said to be biological panpsychists. That’s what “Mind in Life” means: mind and life are co-extensive; life is a sufficient condition for mind. Deleuze is not just a biological panpsychist, however, so we’ll have to confront full-fledged panpsychism. At the end of the essay we’ll be able to pose the question whether or not we can supplement Thompson’s “Mind in Life” position with a “Mind in Process” position and if so, what that supplement means both for his work and for panpsychism.

INTRODUCTION

Philosophical linkages often fall into the “strange bedfellows” category, and while for some the linking of cognitive science, biology and phenomenology in Evan Thompson’s *Mind in Life* (2007) is quite strange enough, this essay seeks to show a further unexpected connection between Thompson’s work and a post-structuralist classic, Gilles Deleuze’s *Difference and Repetition* (1994). In particular, we will examine the idea of “biological space and time” found in Thompson (2007: 154-7; see also Jonas 2003: 86) and Deleuze (1994: 70-79). As we will see, tracking down the “new Transcendental Aesthetic” found in these thinkers will intersect new work done on a very old idea, panpsychism. Both Deleuze and Thompson can be fairly said to be biological panpsychists. That’s what “Mind in Life” means: mind and life are co-extensive; life is a sufficient condition for mind.¹ Deleuze is not just a biological panpsychist, however, so we’ll have to confront full-fledged panpsychism. At the end of the essay we’ll be able to pose the question whether or not we can supplement Thompson’s “Mind in Life” position with a “Mind in Process” position and if so, what that supplement means both for his work and for panpsychism.

To begin, let’s notice that the Mind in Life position continues the twentieth-century trend of displacing human, language-expressed, top-level, reflective rational consciousness as the sole or prime or most basic or most important candidate for cognition, a position which would have corporeal practical engagement as a privative form, as sloppy or distorted or approximate theory. We see this displacement in the phenomenological tradition, in Husserl’s analyses of passive synthesis and the life world, as well as in Heidegger and Merleau-Ponty, where embodied

practical engagement is primary. In this displacement of rational reflective conscious thought, we also see the connection with Deleuze, who picks up the post-Kantian demand, explicit in Solomon Maimon, for genesis rather than mere conditioning (see the new translation of Maimon's *Essay on Transcendental Philosophy* [2010]; for commentary, Jones 2009 and Smith 2009). Rather than the Kantian deduction of conditions of human rational reflective consciousness, Deleuze holds we have to show the genesis of real experience from within experience. The post-Kantian challenge relayed by Deleuze is to show how space and time, categories, and Ideas develop in "dynamic genesis," starting with the sheer atomic exteriority of sensations to one another (what Deleuze will call *mens momentanea* [1994: 70]) and moving to "virtual Ideas."²

The key concept shared by Deleuze and Thompson is that the sort of cognition for which Kant posited his transcendental conditions develops from a fundamentally biological cognition, what Thompson calls "sense-making." The Mind in Life claim is that fully conceptual recollection and recognition, the active intellectual relation to past and future, is founded in "sense-making" or "enactive cognition" (what Deleuze will call the linkage of perceptual and organic syntheses). Mind in Life, read as coextensivity, means that life is fundamentally autopoiesis and cognition is fundamentally sense-making. Thus Mind in Life means "autopoietic sense-making," or the control of action of an organism in its environment. Sense-making here is three-fold: 1) sensibility as openness to environment; 2) signification as positive or negative valence of environmental features relative to the subjective norms of the organism; 3) direction or orientation the organism adopts in response to 1 and 2.

This founding of human cognition in enactive cognition entails a new transcendental aesthetic, the a priori but always concrete genesis of organic time and space. The essential temporal structure of any organism is the rhythmic production of a living present synthesizing retentions and protentions, conserved conditions and expected needs. The essential spatiality of any organism comes from the necessity of a membrane to found the relation of an organism to its environment; there is an essential foundation of an inside and outside by the membrane, just as there is an essential foundation of past and future by the living present. We thus see the necessity of (at least) a notion of biological panpsychism: every organism has a subjective position, quite literally a "here and now" created by its founding of organic time and space; on the basis of this subjective position an evaluative sense is produced which orients the organism in relation to relevant aspects of its environment (Protevi, forthcoming).

MIND IN LIFE AND BIOLOGICAL SPACE AND TIME

In the de-centering of reflective consciousness we sketch above we see three moves, two familiar, the other being the novelty of the Mind in Life positions. First, the familiar phenomenological move of showing how high-level thought, exemplified in science, is a transformation of the life world or of Dasein's practical involvement (depending on whether you prefer a Husserlian or Heideggerian vocabulary). This is a synchronic shift of position within adulthood: adults are not first and foremost scientists in everyday life; they are instead practically and corporeally engaged with the world. In other words, we have to show how "know-that" (science) is a transformation of corporeal space-time (a reformed Transcendental Aesthetic) and corporeal "know-how" (a reformed Transcendental Analytic). As Donn Welton puts it, for Husserl: "the objects that we do find in Kant's Analytic, full-blown objects of science, belong to a higher order and are not experientially basic. Constitution at this higher level must be

understood not as elementary but as a transformation of what is elemental....” (Welton 2000: 299).

Second, another familiar move: genetic phenomenology. Or at least it’s familiar now thanks to the efforts of Donn Welton, Anthony Steinbock, and other “New Husserlians” who have mined the archives containing Husserl’s manuscripts (Steinbock 1995; Welton 2000; Welton 2003). Here we have to trace the development of corporeal space-time and corporeal know-how from embryo to adult, that is, along the developmental or ontogenetic time scale. This is where we get a first reformulation of the Transcendental Aesthetic. In *The Other Husserl*, Donn Welton shows how the Transcendental Aesthetic is renamed in Husserl: instead of the Kantian opposition of sensibility and understanding (judgment) we have Husserl’s opposition of experience and judgment (understanding). Because we have passive synthesis in what Kant would have as merely passive sensibility, there is a noematic sense in perception, prior to active understanding / judgment, and these passive syntheses include associative, kinesthetic, and time-consciousness syntheses (Welton 2000: 298). Directly addressing Husserl’s genetic undercutting of Kant’s Transcendental Aesthetic, Welton writes:

At yet a deeper and final level of genetic analysis Husserl discovers that space and time themselves are not just “forms” but are generated, on the one hand, by the interplay of position, motility, and place, and on the other, by the standing-streaming flow of the process of self-temporalization itself. Husserl’s studies of the self-generation of space and time are clearly the most difficult of all his genetic studies. (Welton 2000: 254)

Our key question, then: is “dynamic genesis” or Husserlian “genetic phenomenology” restricted to the ontogenetic time scale, that is, the development from embryo to adult?

If it is so restricted, then we need a new name for the third move, which is the key novelty of the Mind in Life position: we have to do “evolutionary” genetic phenomenology (and not just ontogenetic). In Deleuze’s terms, we have to do dynamic genesis on the evolutionary time scale. That is to say, we have to show how single-celled organisms generate their own concrete space and time (a biological Transcendental Aesthetic) as well as display “sense-making” (a biological Transcendental Analytic) AND how this develops along the evolutionary time scale into the potentials for what will develop along the human developmental time scale, that is, genetic phenomenology proper as the constitution of corporeal space-time and corporeal know-how, from embryo to adult. And then finally we can trace the synchronic transformation of corporeal space-time and categories / Ideas into science or human “high reason.”

Now if we can have a genetic phenomenology on the evolutionary time scale – if “evolutionary genetic phenomenology” makes sense – then we have to talk about its basis, an empathy condition based on our living experience. To address what the sense-making or affective-cognitive “metabolic situation” of the single-celled organism, we ourselves have to be living beings. First, here is Jonas:

On the strength of the immediate testimony of our own bodies *we* are able to say what no disembodied onlooker would have a cause for saying: that the mathematical God in his homogeneous analytical view misses the decisive point—the point of life itself: its being self-centered individuality, with an essential boundary dividing ‘inside’ and ‘outside’...” (Jonas 2003: 79; italics in original)

Thompson agrees:

empathy is a precondition of our comprehension of the vital order, in particular of the organism as a sense-making being inhabiting an environment... [A] bodily empathy ... widened beyond the human sphere to ground our comprehension of the organism and our

recognition of the purposiveness of life [Thompson here refers to Husserl, *Ideas II* and *Ideas III*]. Empathy in this sense encompasses the coupling of our human lived bodies with the bodies of other beings we recognize as living, whether these be human, animal, or even—particularly for biologists with a “feeling for the organism” [Thompson here refers to Evelyn Fox Keller’s biography of Barbara McClintock]—bacteria.” (Thompson 2007: 165)

Using this empathy condition to explore the experience of even the simplest living beings, Thompson and Jonas straightforwardly talk of a new transcendental aesthetic as “biological time and space” (Thompson 2007: 155; citing Jonas 2003: 86). We find this expressed as a living present found in the simplest of organisms, a synthesis of retention and protention in the concrete form of metabolism and need (Jonas 2003: 85-86).

For Jonas, a physico-mathematical account misses the ontological emergence that makes of life an “ontological surprise,” and the organism a system, a “unity of a manifold.” (We will return to the question of emergence and panpsychism.) The organism is “whole” as “self-integrating in active performance”; it is an “active self-integration of life” (Jonas 2003: 79). The “functional identity” of organisms relative to the materials it metabolizes is constituted “in a dialectical relation of *needful freedom* to matter” (Jonas 2003: 80; emphasis in original). Both elements, need and freedom, constitute the “transcendence” of life, and this transcendence constitutes a living present, a metabolically founded transcendental aesthetic or a priori form of organic time: “self-concern, actuated by want, throws open ... a horizon of time ... the imminence of that future into which organic continuity is each moment about to extend by the satisfaction of that moment’s want” (Jonas 2003: 85). For Jonas, echoing Heidegger’s grounding of Dasein’s spatiality in its temporality in *Being and Time* #70, organic space is founded by organic time: an organism “faces outward only because, by the necessity of its freedom, it faces forward: so that spatial presence is lighted up as it were by temporal imminence and both merge into past fulfillment (or its negative, disappointment)” (Jonas 2003: 85). Jonas then draws the consequences for the question of the adequacy of purely mathematical physics for the phenomenon of life; in other words, he shows the necessity of a dynamic genesis from instantaneity to the living present: “with respect to the organic sphere, the external linear time-pattern of antecedent and sequent, involving the causal dominance of the past, is inadequate.” With life on the scene, “the extensive order of past and future is intensively reversed,” so that the determination of “mere externality” by the past has to be supplemented by the recognition that “life is essentially also what is going to be and just becoming” (Jonas 2003: 86).

DELEUZE AND ORGANIC SYNTHESSES: BIOLOGICAL TIME

While Thompson and Jonas discuss space and time together, we will have to first discuss biological time in Deleuze, then, to discuss spatiality, we will have to move to Gilbert Simondon, on whom Deleuze relies for the discussion of membranes. We will then be able to discuss the Deleuze-Simondon position on biological space-time.

Chapter 2 of *Difference and Repetition* is devoted to Deleuze’s work on “repetition for itself.” The first step, on which we concentrate, is the discussion of the first passive synthesis of time, or habit, which produces the “living present” as the a priori form of organic time.³ To begin his account of dynamic genesis, Deleuze must get down to the most basic synthesis; he must show how beneath active syntheses (thought) are passive syntheses (perception) and beneath passive perceptual syntheses are passive organic syntheses (metabolism).⁴ The challenge is to

describe passive syntheses in differential terms, so as to avoid the “tracing” of empirical identities back to transcendental identities; avoiding such “tracing” is a basic principle of Deleuze’s thought (Smith and Protevi 2008).

Syntheses are needed to join together a disjointed matter or sensation, since in themselves, material or sensory instants fall outside each other, exhibiting “a perfect independence on the part of each presentation . . . one instant does not appear unless the other has disappeared – hence the status of matter as *mens momentanea*” (Deleuze 1994: 70). Deleuze goes on to distinguish three levels of synthesis of the zero-degree level of instantaneity:

0. Instantaneous presentation and disappearance: “objectively” as matter and “subjectively” as sensation
1. Passive syntheses (contraction or habit producing a living present)
 - a. Organic syntheses (metabolism synthesizing matter)
 - b. Perceptual synthesis (imagination synthesizing sensation)
2. Active synthesis (memory as recollection and thought as representation synthesizing perceptions)

Deleuze will distinguish the organic and perceptual syntheses by showing that organic syntheses perform a contraction or induce a habit in their own, material, register. For Hume and Bergson, as Deleuze reads them, the psychological imagination moves from past particulars to future generalities, so that from a series of particulars we come to expect another of the same kind. Deleuze will abstract the process of “drawing a difference from repetition” as the essence of contraction or habit and show that it occurs at the organic level as well as on the level of the passive perceptual imagination (Deleuze 1994: 73).

In order to isolate organic syntheses as prior to perceptual syntheses (themselves prior to active intellectualist syntheses), Deleuze radicalizes Hume and Bergson, who by themselves leave us at the level of sensible and perceptive syntheses” (Deleuze 1994: 72). But these perceptual syntheses refer back to “organic syntheses,” which are “a primary sensibility that we *are*” (Deleuze 1994: 73; emphasis in original). Such syntheses of the elements of “water, earth, light and air” are not merely prior to the active synthesis that would recognize or represent them, but are also “prior to their being sensed.” So, each organism, not only in its receptivity and perception, but in its “viscera” (that is, its metabolism), is a “sum of contractions, of retentions and expectations.” Here we see the organic level of the living present of retention and expectation. Organic retention is the “cellular heritage” of the organic history of life and organic expectation is the “faith” that things will repeat in the ways we are used to. So Deleuze has isolated a “primary vital sensibility” in which we have past and future synthesized in what is literally a “living present.” At this level, the future appears as need, as “the organic form of expectation,” and the retained past appears as “cellular heredity” (Deleuze 1994: 73).⁵

Now we must distinguish two genres of contraction: (1) contraction as activity in series as opposed to relaxation or dilation, and (2) contraction as fusion of succession of elements. With the second form of contraction, we come upon the notion of a “contemplative soul” which must be “attributed to the heart, the muscles, nerves and cells” (Deleuze 1994: 74). Deleuze knows the notion of an organic “contemplative soul” might strike his readers as a “mystical or barbarous hypothesis.” but he pushes on: passive organic synthesis is our “habit of life,” our expectation that life will continue. So we must attribute a “contemplative soul” to the heart, the muscles, the nerves, the cells, whose role is to contract habits. This is just extending to “habit” its full generality: habit in the organic syntheses that we are (Deleuze 1994: 74).

We cannot follow all the marvelous detail of Deleuze's text in which he discusses "claims and satisfactions" of organic life, going so far as to talk of the "beatitude of passive synthesis" (Deleuze 1994: 74). Nor can we follow his wonderful analyses of rhythm, which will reappear in the notion of the refrain in *A Thousand Plateaus* (Deleuze and Guattari 1987).⁶ We have to move to the question of membranes and organic spatiality.

SIMONDON AND MEMBRANES: ORGANIC SPACE-TIME

As we have seen with Jonas, the essential spatiality of metabolism comes from the necessity of a membrane to found the relation of an organism to its environment; there is an essential foundation of an inside and outside by the membrane, just as there is an essential foundation of past and future by the living present. The interest of the new biological Transcendental Aesthetic is to see its intertwining of space and time in the relation of membrane and metabolism.

Prior to the publication of *A Thousand Plateaus* in 1980, Deleuze only mentions biological space founded by membranes a few times, always with reference to Simondon. So let us turn to the section of Simondon's *L'Individu et sa genèse physico-biologique* entitled "Topologie et ontogénèse" (Simondon 1995: 222-27), in order to discover what he says about how membranes and metabolism entail a biological Transcendental Aesthetic.⁷ The basic concept of Simondon's work is the process of individuation or "transduction" starting from a metastable field.⁸ In Simondon's work, a metastable field does not contain individuals; it is pre-individual, but poised for individuation. Simondon's usual figure for transduction or individuation from a metastable field is crystallization: in the super-saturated field, there are gradients of density, but no crystalline forms nor crystals as individuated entities. There is the potential for crystallization, made actual when provoked by an external shock. From a metastable field, a process of individuation allows for the distinction of an ever-processual individual and milieu. Individuation as "transduction" is thus an always-ongoing maintenance of metastability between individual and milieu.⁹

Let us follow Simondon's treatment of biological space-time, the new biological Transcendental Aesthetic, in *L'Individu*. To establish the singularity of the living being [*le vivant*] "it would be necessary to exhibit [*produire*] the topology of the living being, its particular type of space, the relation between a milieu of interiority and a milieu of exteriority" (Simondon 1995: 223). The key is that the new biological Transcendental Aesthetic is topological, not Euclidean. We cannot be fooled by the seemingly Euclidean or "absolute" inside-outside in single-celled organisms,¹⁰ for "the essence of the living being is perhaps a certain topological arrangement that cannot be known on the basis of physics and chemistry, which utilize in general a Euclidean space" (Simondon 1995: 223). While it's the case that there is an "absolute" inside-outside of the single-celled organism, it's not a Euclidean spatiality, but the dynamic and topological maintenance of metastability that counts:

For this organism, the characteristic polarity of life is at the level of the membrane; it's in this region [*à cet endroit*] that life exists in an essential manner as an aspect of a dynamic topology which itself maintains the metastability by which it exists. (Simondon 1995: 224)

So we see how it's the dynamic topological process of individuation that constitutes biological space-time. The interior is the accumulated past, the exterior the forthcoming future. Concerning the relation of interiority and the past, Simondon writes: "the entire mass of living matter which is in the interior space is actively present to the exterior world at the limit of the living being: all

the products of the past of the individuation [*de l'individuation passée*] are present without distance and without delay” (Simondon 1995: 225). While interiority constitutes the past, exteriority constitutes the future: “The fact that a substance is in the milieu of exteriority means that that substance can come forth [*peut advenir*], be proposed for assimilation, [or] wound [*léser*] the living individual: the substance is to come, is futural [*est à venir*]” (Simondon 1995: 225).

The full contours of the new, biological Transcendental Aesthetic come into focus as past and future combine in a living present constituted by the membrane:

At the level of the polarized membrane, the interior past and the exterior future face one another [*s'affrontent*]: this face off [*affrontement*] in the operation of selective assimilation is the present of the living being [*le présent du vivant*], which is made up of this polarity of passage and refusal, between substances which pass into the past [*substances passées*] and substances which come forth futurally [*adviennent*], [substances which are] present [*présentes* used here as an adjective] one to the other by means of [*à travers*] the operation of individuation... (Simondon 1995: 226)

However, we must never reify the membrane: it is the process of individuation maintaining a dynamic topology that constitutes the new Transcendental Aesthetic of living present as relation of interior and exterior, past and future: “the present is that metastability of the relation between interior and exterior, past and future; it’s in relation to this allagmatic¹¹ activity of mutual presence that the exterior is exterior and the interior is interior” (Simondon 1995: 226).

To conclude, we can note that Simondon is quite clear that the new, biological Transcendental Aesthetic he articulates in his philosophy of transductive individuation is a departure from Kant: “Topology and chronology are not a priori forms of sensibility, but the very dimensionality of the living being as it individuates itself [*la dimensionnalité du vivant s'individuant*]” (Simondon 1995: 226).

LIFE AND CREATIVITY

The following section is something of a departure from a strict focus on space and time, but as the topic is so important, let us consider Simondon’s definition of life, which is quite close to that of autopoiesis.

Life is self-maintenance [*auto-entretien*] of a metastability, but a metastability that requires a topological condition: structure and function are linked, for the most primitive and profound vital structure is topological. (Simondon 1995: 224)

Simondon’s definition is quite close to the definition of life in autopoiesis, but there are some notable differences. The similarity comes from the notion of self-maintenance of a topological dynamics in which structure and function are linked. But the “metastability” thematized by Simondon is an interesting twist. The binary logic of autopoiesis—conservation or dissolution—had to be supplemented by the dynamic notion of “adaptivity” developed by Ezequiel DiPaolo (2005), and explicated by Thompson in *Mind in Life*. The reason for this supplement is that autopoiesis is only sufficient for the maintenance of the organism’s self-identity. To account for sense-making, Thompson turns to Di Paolo’s notion of adaptivity: “A distinct capacity for ‘adaptivity’ needs to be added to the minimal autopoietic organization so that the system can actively regulate itself with respect to its conditions of viability and thereby modify its milieu according to the internal norms of its activity” (Thompson 2007: 148).

But what about Simondon's "metastability"? Can this term, discussed in terms of virtuality by Deleuze, be covered by "adaptivity"? It would take more time than we're able to devote to it here, but we can pose a few points for further development (Protevi, forthcoming). The key for us is to see that adaptivity requires a dynamic emergent self unifying a multiplicity of serial processes. We might say that autopoiesis entails synchronic emergence, whereas adaptivity entails diachronic emergence. Notice the dynamic monitoring of multiple processes Di Paolo isolates here as necessary for generating singular norms of each organism:

Only if they are able to monitor and regulate their internal processes so that they can generate the necessary responses anticipating internal tendencies will they also be able to appreciate graded differences between otherwise equally viable states. Bacteria possessing this capability will be able to generate a normativity *within* their current set of viability conditions and *for themselves*. They will be capable of appreciating not just sugar as nutritive, but the direction where the concentration grows as useful, and swimming in that direction as the right thing to do in some circumstances. (DiPaolo 2005: 437; emphasis in original).

The comparison of enactive biology and Deleuze is complicated, however, by Deleuze's notion of intensive individuation processes. Deleuze is a process philosopher, one focused on creativity and novelty (Shaviro 2009). We can truly say that autopoiesis is not a substance concept, at least insofar as substance is seen as reified, for what is conserved in autopoiesis is not the organism as stable thing, but the organism as self-maintaining membrane-metabolism recursive process. But what of the notion of creativity in life on which Deleuze focuses? Does the autopoietic organism help us think life's creativity? For Deleuze and Guattari, the answer is no; the organism is actually only the resting point between bursts of creativity: "the organism is that which life turns against itself to limit itself" (Deleuze and Guattari 1987: 503). So "life" for them is most fully displayed in evolutionary creativity, even if in their more sober moments Deleuze and Guattari admit, perhaps even grudgingly, that the organism or autopoietic conservation is the condition for another round of biological creativity: "Dismantling the organism has never meant killing yourself. . . . Staying stratified . . . is not the worst that can happen" (Deleuze and Guattari 1987: 160-161). After all, dead men tell no tales and dead organisms produce no creative variations.

What are we to make of all this talk of creativity? Is this just another barbarous or mystical hypothesis? Far from being a vitalist fantasy, Deleuze's emphasis on ontogenetic and evolutionary creativity echoes the notion of "developmental plasticity" developed by Mary Jane West-Eberhard (2003; see also Pigliucci 2010). Although I can't show it in detail here, I would claim Deleuze is a multi-time scale thinker, an eco-evo-devo thinker: along with "involution" (what Lynn Margulis calls "symploysis"),¹² he would agree with West-Eberhard that creativity in developmental plasticity provides source of the variation with which evolution by natural selection works other than the canonical source, random mutation.¹³ But autopoiesis and adaptivity seem limited to the behavioral time scale. Even granted that autopoiesis is a (self-focused) process term, we might say that the notion of autonomous system overemphasizes stability, while a Deleuzian-Simondonian transductive individuation, even if it doesn't emphasize creativity per se, at least provides the conditions for it. From this perspective, the embryo as paradigmatic "larval subject" is merely a more intense site of individuation than the adult; however sclerotic and habitual, the adult is only the limit of the process of individuation. There's always the chance for change, for development of new patterns. Of course they have to fit within limits of viability, as autopoiesis insists, but it's a matter of emphasis: autopoiesis with its emphasis on conservation, and adaptivity with its emphasis on homeostasis versus Deleuze's

emphasis on creativity, for which Simondon's notion of transductive maintenance of metastability serves as its condition. In terms of autopoietic synchronic emergence, then, we might say that enaction relegates the metastable field to coupled environment and limits transduction to metabolism, while in terms of adaptivity's diachronic emergence, it neglects ontogenesis in favor of adult function and restricts transduction to homeostatic regulation.

DELEUZE AND "SPATIO-TEMPORAL DYNAMISMS"

To this point we have discussed the new, biological Transcendental Aesthetic. But Simondon's notion of individuation extends below the organic level; transductive individuation is prebiotic as well as biotic. There are important dynamic topological differences between crystallization and organic individuation, but "there might be an intermediary order of phenomena, between parcellary microphysics and the macrophysical unity of the organism; this order would be that of genetic processes, chronological and topological, that is to say, the processes of individuation, common to all orders of reality in which an ontogenesis operates" (Simondon 1995: 227).

Let's spend a minute on the fascinating difference between crystals and organisms as Simondon articulates it:

vital individuation does not come *after* physico-chemical individuation, but during this individuation, before its completion, by suspending it at the moment when it has not attained its stable equilibrium.... The living individual would be in some manner, at its most primitive levels, a crystal in the state of being born [*à l'état naissant*], amplifying itself without stabilizing itself. (Simondon 1995: 150; italics in original)

Simondon appeals to neoteny (slowing down) to explain this idea. So within the organic realm we also see individuation as the suspension of metastable processes. In a startling image, the animal is the "inchoate plant":

developing and organizing itself by conserving the motile, receptive, and reactive possibilities which appear in the reproduction of vegetative life [*la reproduction des végétaux*]. ... animal individuation feeds on [*s'alimente*] the most primitive phase of vegetative individuation, retaining in itself something anterior to the development of the adult plant [*végétal adulte*], and in particular maintaining, during a longer time, the capacity of receiving information. (Simondon 1995: 150)

These prebiotic "genetic processes," operating by means of a deferral of stability or maintenance of metastability, are what Deleuze calls "spatio-temporal dynamisms." In his terms, they are intensive processes rather than virtual structures or actual products.

Let's turn to Deleuze's essay "The Method of Dramatization" (Deleuze 2004) which has a somewhat more clear presentation than *Difference and Repetition*. Spatio-temporal dynamisms "create particular spaces and times," in a non- or pre-biotic Transcendental Aesthetic.

Beneath organization and specification [the actual], we discover nothing more than spatio-temporal dynamisms: that is to say, agitations of space, holes of time, pure syntheses of space, direction, and rhythms. (Deleuze 2004: 96)

Spatio-temporal dynamisms, as intensive process of impersonal individuation with their own space-time, entail a second new Transcendental Aesthetic, this time non- or pre-biotic. Although individuation is a general case, covering the prebiotic, Deleuze finds biology a better model than Simondon's crystallization. But biology is only a model for Deleuze's notion of intensive processes which actualize a virtual Idea (Deleuze 1994: 220-1). So, when he unleashes one of his most infamous gnomonic utterances, "the whole world is an egg" (Deleuze 2004: 96; see also

Deleuze 1994: 251), we cannot restrict the extension of spatio-temporal dynamisms to the biological realm. In other words, it's not the "egg" we should concentrate on, but "the whole world." For transductive individuation in all registers, organic, physical, and social, you need a pre-individual field with virtual potentials that are not individuated, that do not "resemble" the products produced by intensive individuation processes structured by those potentials (Toscano 2006).

Making the connection to the new Transcendental Aesthetic pursued by our thinkers, we see that Deleuze will claim that "What I am calling a drama [another term for "spatio-temporal dynamism"] particularly resembles the Kantian schema" (Deleuze 2004: 99; see also Deleuze 1994: 216-7). Seeing spatio-temporal dynamisms as the analogue to schematisms is linked to the post-Kantian demand for genesis of the Transcendental Aesthetic, that is, space and time as generated rather than posited as conditions: "We would have to distinguish what belongs to space and what to time in these dynamisms, and in each case, the particular space-time combination. Whenever an Idea is actualized, there is a space and a time of actualization" (Deleuze 2004: 111). To locate the space and time of actualization we must first distinguish three registers, virtual, intensive, actual (DeLanda 2002; Bonta and Protevi 2004). The intensive is the space-time of individuation processes, that is, actualization of the virtual (see note 2 above for a brief sketch). In the virtual register, we have virtual space: the meshed continuum of Ideas with zones of indiscernibility between them. And we have virtual time as progressive determination of Ideas, the "movement" from determinable but undetermined differential elements, their reciprocal determination in differential relations, and the ideal of complete determination in the singularities these relations generate.¹⁴ Deleuze calls virtual space "depth" or *spatium* and virtual time "Aion."

In the intensive register, we find intensive spatial processes: foldings, cascades, convection currents, etc. With intensive time, we see the time of thresholds and critical points, the time of *kairos*. Finally, extensive or actual space has universal measurements: millimeters, meters, etc., while extensive / actual time is similarly universally measurable with same units: the time of *Chronos* or clock / calendar time. The difference of intensive space-time and extensive space-time is the existence of "critical" points and moments in the former: the moment of process reaching a threshold that produces a qualitatively new pattern is not just any old moment or "time T1" just as the point at which currents bend is not just any old spatial point at specific values of co-ordinates *x, y*. Rather, critical times and spaces are immanently determined *as* critical in the intensive process that unfolds with its own concrete space and time; it cannot be compared in a universal framework to some other moment or point.

Deleuze's "spatio-temporal dynamisms" are found in multiple registers: 1) in the physical register, the spatial density gradients and temporal critical points are reciprocally determining in crystallization; 2) in the ontogenetic organic register, cellular displacement and temporality of gene expression networks are linked in embryonic development; 3) and in the evolutionary organic register, the distribution of plastic developmental systems (multiplicity of concrete space and time of ontogenesis in a population) provides the variation for the temporality of genetic accommodation in Mary Jane West-Eberhard's work. The contrast then of concrete intensive space-time dynamisms and abstract universal extensive time is the contrast between the new Transcendental Aesthetic of Deleuze and Simondon and that of Kant in which universal space and time are the *a priori* forms of intuition.

THE QUESTION OF PANPSYCHISM

When we realize that each spatio-temporal dynamism for Deleuze has a larval subject, we're forced to tackle the question of panpsychism. Although he uses many biological examples in *Difference and Repetition*, they are only examples of spatio-temporal dynamisms and larval subjects. As we will see, rocks and islands are spatio-temporal dynamisms too, so they too will have a "larval subject"! Deleuze writes:

Dynamisms are not absolutely subjectless, though the subjects they sustain are still only rough drafts, not yet qualified or composed, rather patients than agents, only able to endure the pressure of an internal resonance or the amplitude of an inevitable movement. A composed, qualified adult would perish in such an environment. The truth of embryology is that there are movements which the embryo alone can endure: in this instance, the only subject is larval. (Deleuze 2004: 97)

One of the great advantages of the Mind in Life position is that it enables us to escape from the badly-posed Cartesian problem of the relation of the mental and the physical. But then we have a problem with emergence of life and mind: the move from the abiotic to the biotic, from the non-cognitive to the cognitive. And with this move, we come upon the question of panpsychism.

Recent work has gone back to the problem of panpsychism (Skrbina 2004, 2009). We will very briefly touch on two of the contemporary approaches to panpsychism Skrbina identifies, information theory of the "cybernetic mind" type and process philosophy (Skrbina 2004: 246). We'll begin with process philosophy. To Cartesian mechanists, panpsychism laughable if not maddening, the abject of thought. Panpsychism is inconceivable: extended substance is dead, inert, unconscious, non-sentient, bereft of experience. But Thompson rejects the Cartesian extended substance picture of nature in favor of a radical processualism:

In the context of contemporary science ... "nature" does not consist of basic particulars, but fields and processes ... there is no bottom level of basic particulars with intrinsic properties that upwardly determines everything else. Everything is process all the way "down" and all the way "up," and processes are irreducibly relational—they exist only in patterns, networks, organizations, configurations, or webs.... There is no base level of elementary entities to serve as the ultimate "emergence base" on which to ground everything. (Thompson 2007: 440-1)

Insofar as the major process philosopher of the twentieth century, Whitehead, was a panpsychist, we have at least a *prima facie* invitation to pursue the connection of Thompson's radical processualism and panpsychism (for a recent piece on Whitehead and panpsychism, see Basile 2009). With the co-extension of mind and life we come to the question by the panpsychists: is Mind in Life too restrictive with its definition of mind? If there's no mind prior to life, then mind must radically emerge with life. But with the process view there's no *radical* emergence from a baseline of elementary particles. There's emergence in the sense of new structures generating new capacities, but the panpsychist would say these new capacities are the development of potentials in the "lower level." When cognitive capacities are at stake, a panpsychist would say that mind gets more complex as we find life, but it doesn't radically emerge with life. A Cartesian radical emergentist would say there's dead unmindful matter that when properly arranged becomes living and minded. But is that really less strange than the panpsychist position? In fact, Strawson (2009) will say radical emergence is no better than "magic," so it's actually a more rigorous position to be a panpsychist.

Let us concentrate on Thompson. In *Mind in Life* Thompson examines several cases at the borderline of autopoietic cognition, starting with Stuart Kauffman's auto-catalytic loops (Thompson 2007: 104-5). Recall the Mind in Life position that strongly links autopoiesis and cognition: "cognition is behavior or conduct in relation to meaning and norms that the system itself enacts or brings forth on the basis of its autonomy" (Thompson 2007: 126). On this reading, you need the physical instantiation of metabolism-membrane-metabolism recursivity to have an autonomous subjectivity such that life and organismic sense-making are linked. Thus Thompson will rule out Kauffman's autocatalytic loops as the basis or minimal example of life: they don't have a recursive membrane-metabolism structure, so they don't have autonomy and don't enact a subjective position (Thompson 2007: 105). Later he examines other borderline cases, the tessellation automaton of Bourguine and Stewart, and the auto-catalytic miscelles and viscelles of Bitbol and Luisi (Thompson 2007: 125). While Thompson leaves undecided whether these systems are minimal cases of autopoiesis or only proto-autopoietic systems, on the strong autopoietic definition of cognition given above, they too fail to qualify as autonomous autopoietic systems because they do not produce a physically realized membrane-metabolism recursivity and hence an autonomous subject position (Thompson 2007: 125-7).

But what about a simpler definition of cognition? There is information transfer and self-organization in autocatalytic loops, and this fits the cybernetic definition of mind offered by Gregory Bateson when he identifies "mind as synonymous with cybernetic system—the relevant total information-processing, trial-and-error completing unit" (Bateson 1972: 460).¹⁵ Deleuze will have such a cybernetic outlook: in self-organizing systems or "spatio-temporal dynamisms" there's a "dark precursor," then "internal resonance" and then "forced movement" (Deleuze 1994: 126; 277-8). The first term, "dark precursor," indicates information transfer between heterogeneous series (DeLanda 2002: 80).

since intensity is difference, differences in intensity must enter into communication. Something like a "difference operator" is required, to relate difference to difference. This role is filled by what is called an obscure precursor [*précurseur sombre*; Patton translates as "dark precursor" in Deleuze 1994]. A lightning bolt flashes between different intensities, but it is preceded by an *obscure precursor*, invisible, imperceptible, which determines in advance the inverted path as in negative relief, because this path is first the agent of communication between series of differences. (Deleuze 2004: 97)

Just like with "the whole world is an egg," Deleuze seems to be unnecessarily gnomonic with his term "dark precursor." But in fact it is plain old meteorology. Actually, there are a number of steps here in lightning genesis: 1) the formation of ionized air called "plasma" which is much more highly conductive than normal air; 2) formation of "step leaders" or channels of ionized air which propagate from cloud to ground in stages; 3) "positive streamers" which reach from objects on the ground to cloud; 4) the meeting of positive streamer and step leader, which allows the current to pass. So "dark precursor" could be either step 2 or step 3. In fact, the term *précurseur* is used straightforwardly in any number of French-language websites on lightning.

If we push it, we can see a total panpsychism in *Difference and Repetition* that surpasses the biological to the level of "spatio-temporal dynamisms" or the self-organizing cybernetic mind level. Deleuze notes that the mathematical and biological notions of differentiation and differentiation employed in *Difference and Repetition* are only a "technical model" (Deleuze 1994: 220). Now if "the entire world is an egg" (Deleuze 1994: 216), then every individuation is "embryonic" we might say, even rocks: "On the scale of millions of years which constitutes the time of their actualization, the hardest rocks in turn are fluid matters which flow under the weak

constraints exercised on their singularities” (Deleuze 1994: 219). Now if rocks and islands as individuation processes are embryonic, then they too have a psyche: “every spatio-temporal dynamism is accompanied by the emergence of an elementary consciousness” (Deleuze 1994: 220). By the time of *Anti-Oedipus* and *A Thousand Plateaus* Deleuze and Guattari explicitly thematize that the syntheses they investigate are fully material syntheses, syntheses of nature in geological as well as biological, social, and psychological registers (Welchman 2009). Not just organic syntheses, but inorganic ones as well, are “spatio-temporal dynamisms.” With this full naturalization of syntheses, the question of panpsychism is brought into full relief, since material syntheses are as much syntheses of experience as they are syntheses of things, as we see in the title of Chapter 3 of *A Thousand Plateaus*: “The Geology of Morals: Who does the earth think it is?” (“La géologie de la morale: pour qui elle se prend, la terre?”)

We thus have a second new Transcendental Aesthetic here with Deleuzian “spatio-temporal dynamisms.” It’s the Transcendental Aesthetic of larval subjects, of mind in physical self-organizing processes, echoing Bateson’s cybernetic mind. So the question is: how do we relate this to *Mind in Life*? Can we have a coherent defensible notion of mind that’s broader than that of sense-making of an autopoietic organism, one based on information transfer and self-organization in physical processes (crystallization, convection currents, lightning, hurricanes....)? Then the question of emergence of mind is pushed down below emergence of life. How far down? Is there a point of emergence we can locate? That’s what the panpsychists deny. It’s mind all the way down. Thompson will say it’s process all the way down, but doesn’t say whether there’s a non-autopoietic notion of mind that accompanies process. Is there a “Mind in Process” position we need to think about? Thompson’s subtitle is “Biology, Phenomenology, and the Sciences of Mind.” Is there a “Physics, Phenomenology, and the Sciences of Mind” book to be written?

To move toward a conclusion, let us note that a classic objection to panpsychism is based on a worry about the overuse of the principle of parsimony: we can’t push parsimony too far, because the fewer principle we have, the more we risk stretching them beyond their useful extension. So we have to worry that a definition of mind as mere information transfer involved in self-organization is so broad as to be meaningless: if convection currents in a pot of boiling water are mind, what good is such a broad definition? But on the other hand, what’s exciting about dynamic systems modeling is that it shows self-organizing processes in an extremely wide range of registers, from convection currents through neurodynamics. So if self-organization is a univocal concept, that is, if there is a non-trivial shared structure between convection currents and neurodynamics, then we have identified a fundamental principle that links the inorganic and organic registers. So we’re back to the cybernetic challenge: is information transfer and self-organization capable of being called “mind” in a defensible fashion? It wouldn’t be autopoietic cognition, because it’s doesn’t involve a membrane-metabolism recursive process and hence an autonomous subject position. But wouldn’t it be “Mind in Process,” even if it’s not “Mind in Life”?

To conclude somewhat abruptly: if there is Mind in Process, that is, mind all the way down just as there is process all the way down, that means we really have our work cut out for us in discussing this second new Transcendental Aesthetic, the non- or pre-biotic one. It’s not that we don’t have enough to talk about with a biological Transcendental Aesthetic, but if we want to follow Deleuze all the way, we’ll have to go not only “beyond the turn” in (human) experience as Bergson puts it (1988: 185), but “beyond the turn” of (living) experience out into the “plane of consistency” we find posited in *A Thousand Plateaus*.

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NOTES

¹ This is a contested reading, but against Wheeler (this volume), I read Thompson 2007 as upholding a co-extensivity thesis regarding the relation of mind and life, rather than Wheeler's enrichment thesis, which would move from life to mind. I can't fully engage with Wheeler's rich reading, but a key quote for me in defending the co-extensivity thesis is the following: "any living system is both an autopoietic and a cognitive system ... this thesis is sufficient to establish a deep continuity of life and mind" (Thompson 2007: 127). In other terms, autopoietic (cellular or multi-cellular) life is sufficient for cognition; where there is such life there is cognition. Leaving aside the ALife question and the ancient hylozoism question, which ask about non-cellular life, the panpsychism question will ask about non-living mind. Panpsychism asks whether autopoietic (cellular or multi-cellular) life is necessary for cognition (mind), or whether there is a defensible notion of mind not just in life, but in process. Is mind a genus of which enactive cognition or Mind in Life is a species?

² Deleuze's terminology is idiosyncratic, but I believe the rewards of engaging his system are worth the effort. The following can serve as an all-too-brief sketch. In *Difference and Repetition* we find a tripartite ontological scheme, positing three interdependent registers: the virtual, the intensive, and the actual. Deleuze's basic notion is thus a tri-partite "ontological difference": in all realms of being (1) intensive morphogenetic processes follow the structures inherent in (2) differential virtual multiplicities to produce (3) localized and individuated actual substances with extensive properties and differentiated qualities. Simply put, the actualization of the virtual, that is, the production of the actual things of the world, proceeds by way of intensive processes. In a fuller picture of Deleuze's ontology, we see that the virtual field is composed of "Ideas" or "multiplicities," which are constituted by the progressive determination of differential elements, differential relations, and singularities; what are related are precisely intensive processes, thought as linked rates of change (Deleuze 1994, 182-191). Beneath the actual (any one state of a system), we find "impersonal individuations" or intensive morphogenetic processes that produce system states and beneath these we find "pre-individual singularities" (that is, the key elements in virtual fields, marking system thresholds that structure the intensive morphogenetic processes). We thus have to distinguish the intense "impersonal" field of individuation and its processes from the virtual "pre-individual" field of differential relations and singularities that make up an Idea or multiplicity. For a more full discussion, see Bonta and Protevi 2004; Smith and Protevi 2008; Protevi 2010.

³ We should note that organic time, the synthesis of habit producing the living present, is only the "foundation" of time. Deleuze's full treatment of time in *Difference and Repetition* posits a second synthesis of memory producing the pure past as the "ground" of time, while the third synthesis, producing the future as eternal return of difference, we might say unfounds and ungrounds time.

⁴ Many of the major commenters on *Difference and Repetition* – Hughes 2009; Bryant 2008; Beistegui 2004; Williams 2003 – do not isolate the level of organic synthesis. The exceptions are Ansell-Pearson 1999 and DeLanda 2002.

⁵ Deleuze cannot go directly to his key notion of organic synthesis because he must first free a notion of habit from the illusions of psychology, which fetishizes activity. For Deleuze, psychology, by fear of introspection, misses the element of passive "contemplation." Indeed,

current work in philosophical psychology says the self cannot contemplate itself due to fear of an infinite regress of active constituting selves (Zahavi 2005).

⁶ In *Difference and Repetition*, Deleuze claims that organic syntheses operate in series, and each series has a rhythm; organisms are polyrhythmic: “the duration of an organism’s present, or of its various presents, will vary according to the natural contractile range of its contemplative souls” (Deleuze 1994: 77). There are thousands of rhythmic periods that compose the organic being of humans: from the long periods of childhood, puberty, adulthood and menopause to monthly hormonal cycles to daily cycles (circadian rhythms) to heart beats, breathing cycles, all the way down to neural firing patterns. Everything has a period of repetition, everything is a habit, and each one of these repetitions forms a living present that synthesizes the retention of the past and the anticipation of the future as need. Now “need” can be “lack” relative to active syntheses, but “satiety” relative to organic passive syntheses. Deleuze writes: “need marks the limits of the variable present. The present extends between two eruptions of need, and coincides with the duration of a contemplation” (Deleuze 1994: 77).

⁷ I will provide my own translation of the Simondon passages.

⁸ Metastability is well-known in dynamic systems theory, serving as a key term in Kelso 1995, for instance.

⁹ Deleuze will call the pre-individual the realm of the virtual, and the individuation process the realm of the intensive. Using another of Deleuze’s idiosyncratic terms, staying in touch with the metastable fields surrounding your ongoing individuation (which can be psychic and social as much as organic) is keeping your “Body without Organs” close by. Attaining your “BwO” is not regression to a prior pre-individuation, but attaining your potential for transformation.

¹⁰ “The simplest organism, which we can call “elementary,” is that which does not possess a medial interior milieu, but only an absolute interior and exterior” (Simondon 1995: 225).

¹¹ From the excellent resource on Simondon’s vocabulary [<http://fractalontology.wordpress.com/2007/11/28/a-short-list-of-gilbert-simondons-vocabulary/>], we find this definition: “**Allagmatic** - The Greek word *allagma* can mean change or vicissitude, but it can also mean that which can be given or taken in exchange, which more genuinely captures the idea of energy exchange in Simondon’s usage.”

¹² Margulis’s notion of symbiogenesis (Margulis and Sagan 1995), is echoed at Deleuze and Guattari 1987: 238. See Ansell Pearson 1999: 165-6 for a brief discussion.

¹³ West-Eberhard (2003) does not deny natural selection, but claims it will favor the spread of a particular environmentally-induced phenotypic variant when it has positive effects on individual fitness, that is, when it is adaptive. West-Eberhard denies this is Lamarckism, because there is no direct influence of environment on genotype. In other words, Lamarck thought that adaptive phenotypic changes were the source of variants that could be inherited (in contemporary terms, adaptive phenotypic changes produce genetic variation). But that’s not West-Eberhard’s scheme. What she says is that some adaptive phenotypic change is the result of developmental plasticity calling upon previously hidden, i.e., unexpressed, genetic variation. In other words, neither the phenotype nor the environment produces genetic variation. The above sketch needs to be made

more precise through an analysis of West-Eberhard's notion of "genetic accommodation," but this is not the right venue for such a reading.

¹⁴ We can compare this to Donn Welton's notion of "transcendental space" of constitutive phenomenology, and "transcendental time" of genetic phenomenology "This gives us yet another interesting way of understanding the difference between constitutive and genetic analysis. We can say that constitutive phenomenology schematizes the structural transformations making phenomenal fields possible according to transcendental *space*. They are framed as layers or strata beneath each field, providing it with its supporting ground. Genetic phenomenology schematizes those transformations in terms of transcendental *time*, and thus as a process of development in which the earlier gives rise to the later, and in which the later draws and gives direction to the now" (Welton 2003: 254; italics in original).

¹⁵ As Skrbina notes, Bateson later backs away from this cybernetic mind position (Skrbina 2005: 196-8).