

DELEUZE, RUYER AND BECOMING-BRAIN: THE MUSIC OF LIFE'S TEMPORALITY

Elizabeth Grosz

The isolation of individuals ought not to deceive us:
something flows on *underneath* individuals—
Nietzsche¹

There is a genealogy that runs from Henri Bergson's account of the relation between matter and the indeterminacy of life that is sharpened, elaborated, and transformed in the work of Jakob von Uexküll (1864–1944), Gilbert Simondon (1924–1989) and Raymond Ruyer (1902–1987). This genealogy elaborates man, not as a special kind of being—conscious, rational, self-reflective, world-building—but as a striving animal whose becoming coincides with and develops the openness of matter, capitalizing on and opening out the form-taking qualities of the material universe to direct life internally. It is a line of thought that insists on the temporality and spatiality that produces subjects and objects, a genealogy of the temporality of becoming. This tradition culminates and finds its latest inflection in the work of Gilles Deleuze and Félix Guattari. Here I want here to look at the time of the genesis of life, the ways in which living beings of all kinds produce themselves. There is something very peculiar about the processes that create new forms of life from existing forms of life and from the ongoing encounters a milieu or environment provokes, something that eludes many scientific and especially biological representations of growth, something that philosophy may help to elucidate in understanding the time of life, even if it moves beyond (while also including) the time of *our* (all-too-human) lives.

Life is not self-subsistent; yet it is self-producing. These are its two limits: life requires both other life and forms of the non-living. It requires a series of techniques that transform what its milieu provides into the forms of *internal* resonance and cohesion that enable it to form itself, to act and to become from within. What are the self-forming capacities of life; and how do these capacities rely on, harness and transform the qualities

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of a milieu made up of events as much as of objects, into the conditions of life and its transformations? What emergent and self-forming properties of materiality enable and intensify the emergent and self-forming properties of living beings?

Uexküll, Simondon and Ruyer offer a new understanding of biology as a process of bodily form-taking that relies on the form-taking qualities of inorganic existence. Life protracts, extends and transforms some of the qualities of inorganic matter into its own organic conditions; and in turn, life adds to materiality the conditions of virtuality or becoming—otherwise that the material universe already contains but cannot directly express. It will be my claim here that materiality, bare matter, matter not in its simplified form but before being animated by life, is nevertheless always involved in and invested by *incorporeal forces*, forces of potential sense, forces of virtual significance that living bodies, in elaborating their own ends or finality, affirm and develop.

Matter, through their work, can be understood as *more than* material for it always already contains within its chemical and physical bonds, within its very atomic and sub-atomic structure, the conditions for the eruption of life. Life is a form of finality, a form of goal-directedness and form-taking that is open-ended, in which the future cannot be contained in or inferred from the past. There is a continuity between the inorganic and the organic that enables the organic to emerge—evolutionarily—from the inorganic, a becoming-immaterial or -incorporeal, a becoming-idea of matter itself that foreshadows and anticipates the life that erupts from it. But we can understand this continuity only to the extent that materiality is not reduced to objects alone but also includes events, processes and relations, a materiality conceived beyond any positivism.

Uexküll, Simondon and Ruyer share, among other things, a common series of opponents, those committed to mechanism, reductionism, cognitivism, whether at a genetic, biological or neurological level. Each, in different ways, orients his work through a concept of finalism, a goal-directedness, a design, whether that of the material world or of living things. Each elaborates a paradoxical—at least in terms of dualism—excess of materiality, an excess that enables ideality, meaning, sense, direction, purpose, not to be imposed on matter (by mind) but to be extracted from it. Each addresses a trace, a small film of the ideal as it inheres in the material—Deleuze refers to the incorporeal as a ‘shadow’ or ‘mist’, sense adhering to the surface of events². Life is the open-ended but ordered capitalization of this inherence of the ideal in the material, an inherence severed by Plato and rendered dual by Descartes, where the two terms are now established in two different realms. It is the peculiar bonding or subsistence of the incorporeal in the material that gives it the possibility of extending in indefinitely as many directions as there are events and the forms of life supported by them. The tiniest indeterminacy or excess enables the elaboration of endless possibilities of meaning-something and of meaning-otherwise.

The smallest element of indetermination within matter itself, perhaps its sub-atomic components, or more likely, the string-like oscillations that link the sub-atomic to the molecular world, are the very movements that produce the chemicals that produce objects and, in the long run, living subjects and their modes of collective organization. Uexküll, Simondon and Ruyer are interested, each in his own way, in the open movements of forces, before they have formed into objects and relations, systems or forms of order; each is interested in what their potentials are, in what they make possible, that is, the virtual. In a sense, this is a kind of Umwelt or environment not only for living beings, as Uexküll has convincingly argued, but also for subatomic particles.³ It is from the instability of the relation between cosmos and particle, of Umwelt and living being, of the world and its excesses, that creates the conditions that enable beings to emerge from a pure becoming. Simondon claims that material arrangements and the alignment of various forces in relations of tension provoke invention, generating problems for which certain kinds of order and organization are working solutions.

This is the real, the universe in its unordered givenness, what Simondon calls ‘the preindividual’.⁴ What is given are singularities, specificities, tendencies, forces but not yet modes of ordering and organizing them into systems, levels, dimensions or orders. Chaos. A plethora of events without outline, distinction, discernability. Such matter is precisely not formless, pure unformed matter waiting for the Idea to take on form. Rather matter is multi-formed, overdetermined, indeterminate, for it has the potential or virtuality, the capacity, to take on a

number of forms, not an unlimited capacity, but a capacity by virtue of and limited to its singularities.

The smallest element of indetermination within matter itself, perhaps its sub-atomic components or the string-like oscillations that link the sub-atomic to the molecular world, are the very movements that produce the chemicals that produce objects and, in the long run, living subjects and their modes of organization. These theorists are interested in precisely the openness of forces before they have formed into objects and relations, what their potentials are, and what they make possible, that is, the virtual. It is the instability of the relation between cosmos and particle—and Umwelt and living being—that creates the conditions for the emergence of beings from pure becoming. Events provoke invention, generating problems for which certain kinds of order and organization are working solutions. Life cleaves to matter, elaborating and contracting matter, bringing to life the virtualities within the material in unknown directions. Life emerges as a becoming-concept, a becoming-thought or—as a consciousness, a becoming-brain.⁵

Raymond Ruyer, described by Deleuze as “the latest of Leibniz’s great disciples”⁶, the latest theorist of the monad, is among the lesser-known figures Deleuze uses throughout his writings. It is largely through Deleuze’s use of Ruyer’s work, especially in *What is Philosophy?*, that Ruyer is experiencing something of a new audience interested in his contributions to reconfiguring matter so that it can more adequately understand the self-forming properties of life. This crucial transition and ongoing relation between matter and life remains one of the central questions he addresses and one of the reasons his work may be worth a more detailed exploration.

These self-forming properties are, for Ruyer, perhaps most clearly exhibited in the equipotentiality of the embryo which, without a brain or central nervous system, without limbs or organs, without ‘knowledge’ as such, can create a brain and/ or central nervous, limbs and/ or organs for itself. Perhaps one of Ruyer’s most startling claims is that this equipotentiality also marks the brain, or those functions that operate as a brain, reflexes and instincts, modes of addressing the Umwelt of a living being from within life, all processes of becoming-brain.

As Deleuze claims, taking up Ruyer’s understanding: “the brain’s the hidden side of all circuits, and these can allow the most basic conditioned reflexes to prevail, as well as leaving room for more creative tracings, less ‘probable’ links”⁷. The brain is a site for the transition between the inside and the outside of an organism, a way in which a living being receives information from its Umwelt, but also above all the way in which it acts on an outside: “...the brain’s precisely this boundary of a continuous two-way movement between an Inside and Outside, this membrane between them... I think subjectification, events and brains are more or less the same thing”⁸. There is a becoming-brain in all life to the extent that life is a trajectory in which its outside is more and more closely approximated through the formation of an inside, a resonance, disparation or becoming that orients life more and more to the forces, even the immaterial or incorporeal forces that inhere in matter.

For Deleuze, Ruyer’s work provides us with a new way of understanding life, and the brain itself, as immediate self-proximity,⁹ a direct contact or self-survey (an auto-overflight), a form of self-awareness without distance or a supplementary viewing dimension, which enables us to develop a new understanding of the brain, not as the seat of consciousness, the locus of the mind, or the home of reason, but rather, as a mode of connection, one that is meandering rather than direct, mediated by circuits, capable of generation surprise.¹⁰ Self-survey enables both immediate contact with itself and its ‘components’ without distance, but also the capacity for contact with an outside that opens it up and challenges the being that has such an ‘awareness’.

The brain connects inside and outside, not directly but rhizomatically, unpredictably, creatively, through a disjunction or syncopation. Thinking involves creating new synaptic connections, new circuits, new modes of connection between different forms of action. The brain is not restricted, in the works of Ruyer or Deleuze, to higher orders of life but extends to every form. There is a mode of connection, working through various circuits that indirectly join the inside to the outside in every living thing, a brain-becoming that marks all of life. There are many different brain-becomings, and not all of them require a brain. The more attuned the inside

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and outside, the more melodic or resonant connections and lines flow between them, the less probable behavior becomes, and the more creatively life elaborates itself.

This fundamentally creative capacity of the brain, a capacity to disconnect determinisms and to establish unpredictabilities (basically this is Bergson's understanding of the brain) is no less creative than the organism that creates the brain, the embryo. It is this creative and above all self-creative ability, an ability that is linked to material and biological orders, that marks the embryos of every species.¹¹ The embryo is itself a becoming-brain, a fundamentally inventive capacity for new connections between inside and outside, a pure form of connectedness even if the embryo itself is entirely focused within, on the task of self-production. (This focus on the embryo could easily open up Ruyer's work to a new kind of feminism, one focused on the maternal conditions for the embryo, that is, the embryo's preindividual. The maternal function is itself the provision of space, time, housing and nutrition, taken from and within the maternal body, that enables an embryo to create itself¹².)

Ruyer suggests that the embryo's capacity to form itself and the brain's capacity to think itself are possible only because there is an opening, a sense or direction, within materiality that life capitalizes on and converts to its own interests. For him (and following him, Deleuze), there are many things which have a brain and which are self-forming—not only embryos, but also ideas, bodies, organs, cells, art works, scientific theories, atoms and even photons—all primary beings. Because the living being is defined in relation to its *Umwelt*, its behaviour can be said to have an end or finality, a tune to be performed. This is certainly not an essence or a *telos*, but rather a functionality. Such a functionality could never be possible unless the living being finds in the non-living world, the conditions and forces which enable its self-differentiation from the world.

Taken out of its environment, an animal will do whatever it can to restore its *Umwelt*, to restore the theme its organs perform. Ruyer mentions the anteater, which can only access its prey through its funnel-trap: the food must slide down the length of the funnel for it to be consumable. Its food-tone must be indirect, mediated by the funnel. Its body performs the melody of the ants it consumes, a melody of which it has no consciousness, but which its body acts, a melody in part connected to the poisonous sting of the ants, which the anteater avoids through the use of its funnel.¹³ Each living being is a consummate performer of a melodic line that comes from the world in which it lives. For Ruyer, the knowledge of how to build a nest or migrate across vast continents, instinct, is not mechanical or determined but involves a nuanced interpretation of signs, as Uexküll claimed, as well as the capacity to act in inventive ways with these interpretations and to restore these (bodily) interpretive capacities when there is a disruption. For Ruyer, an animal has a world, an *Umwelt* within which it acts, and which gives its acts value, and enables their performance to serve certain ends.¹⁴ All forms of life share with the smallest components of matter the capacity for a consciousness, for immediate self-awareness and self-constitution. Indeed it is because there are already forms of consciousness at the very level of the atom itself that life is made possible.

For Ruyer, an atom is “not a structure” but “a *structuring activity*”, and when atoms combine to form a molecule, “the connecting and interacting electrons are not localizable”¹⁵. In a sense, the atom and its particles are a consciousness, a being that makes for itself a space and time, unlike molecules, which are structures, made from particular alignments of atoms, the external connections between atoms. A molecule is a secondary being, where the atom, and even its ingredients, are primary beings. The atom is an embryo, a brain, elaborating itself, in immediate self-proximity, literally a kind of elementary consciousness.¹⁶

It is the embryonic nature of the atom, which for Ruyer is primary or true form, form that does not refer to any external viewpoint, and thus is a person, consciousness or subject long before there are human persons, and that conditions the eruption of life, which carries within it in its variety not only the open-ended atom and some of its possible material configurations, but also the plan, score or finality, mode of connection with this material universe that life must accomplish and which is its generic becoming-membrane, becoming-brain. Ruyer affirms that his concept of life comes “directly from microphysics”.¹⁷

In Ruyer's understanding, sub-atomic particles have a primary consciousness, an immediate self-perception or self-survey, an overflight without distance, immediately in touch with itself and its Umwelt, which in the case of the particle, includes not only the other particles comprising the atom but perhaps the entirety of all particles, the universe itself. Like the embryo, the brain or any living thing, sub-atomic particles act their being, perceive themselves, form and maintain themselves. They have true form, that is, self-proximity without an outside position. They do not require an external perception—we know that any external perception, the mere existence of an external viewer transforms the particle's position or speed. Yet they must perceive themselves from within, without perspective. They are the lowest level of the Uexküllian 'person' or Simondonian 'individual' or agent, not because they act but because they also produce the conditions under which their action is possible, and their action is induced from the capacities generated in their self-formation. Life, a sort of life, the smallest opening of indeterminacy, operates all through the universe in its very constituents. The smallest atom and the most simple cell, participate in life, creating a consciousness without identity.¹⁸

The atom is a mode of becoming-brain, the creation of an interior, a becoming-alive, a kind of consciousness.¹⁹ It is primary being, true form, immediate self-survey, an absolute domain, from which secondary beings—that is, aggregates and populations of primary beings—are formed. Aggregates, crowds, populations, are thus *structures* rather than primary forms, and they are the continuing object of mechanistic sciences. All primary beings, from sub-atomic particles to living beings, are the centers of finalist activity, which is to say that they are beings in absolute self-survey; and they are directed to internal ends or goals. Secondary beings, collections or accumulations of primary being, on the contrary, obey statistical laws and function according to mechanical causality. Primary beings can be understood as conscious of themselves; while secondary beings can only be understood from outside, through numerical calculations. Primary being is thus a center of finalist activity, a unity that cannot be identified with substance or pure materiality, one which requires a metaphysical or transversal cutting, an adherence of sense, a form-making that is an ideal director, organizing life or its atomic pre-conditions according to a theme. This means that a subject, whether a personal subject or an impersonal force, is not only in direct contact with an Umwelt, but also with a kind of metabiological thematic realm, the order of mnemonic themes that is trans-spatial, but not Platonic or unchanged, fixed in advance. This metabiological theme is the pattern that the organism transforms through its modes of acting, the transgenerational movement that connects the forms and activities of those within species: "The organism forms itself with risks and perils; it is not formed. . . . The living being forms itself directly according to the theme, without the theme having first to become idea-image and represented model"²⁰.

The mnemonic order, of which individuals are only a temporary eruption, is a species-memory that guides embryos in their ongoing formation and that precedes and makes species possible. This memory cannot be reduced to the genome, which, like the strings of a piano, are the mechanisms by which a musical theme is played rather than the theme itself. The mnemonic theme is trans-spatial, species have forms and activities to actualize, to cohere, to organize, a finality that cannot be regarded as an essence but rather as a theme, a coordination to bind together form and force. The tune each individual plays is not only that organized by its Umwelt, but also that which its organic history, the memory of its species have developed. Each living being not only creates a memory, as Bergson suggests. It is also the *result* of memory, of a mnemonic theme, an extra-material organization of matter: "Memory is not the property of bodies. Bodies, or what appear as "bodies," are the property of memory."²¹

The mnemonic themes that make up the finality of living beings sub-atomic forces, while they cannot be considered unchanging *a priori* themes, are nevertheless trans-spatial and non-temporal. They are not unchanging—on the contrary, they are open to almost infinite modifications and variations or improvisations—but they are not historical or able to be located in a definite space and time. The anteater may have many forms—no two are alike!—but these are all forms of a discernable species pattern whose limits are unknowable. These themes represent an invisible world, a pattern beyond perception, one that indeed makes perception possible, discernable only with higher orders of emergence.

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This is why perception is so significantly different from self-survey. Perception requires an external perspective, and in many cases, it requires actual physical distance, as in the case of seeing and hearing; it addresses objects that can be positioned side-by-side; and it requires a delimitable field within which these objects are positioned. Perception maps the structures of a geometrical space, a space that is infinitely divisible, a space that can only be perspectively addressed. What Ruyer is concerned with is a metaphysical or embryological space that makes up the interior, which requires and can provide no external distance, which is not divisible into parts, and has no edges and is thus not determined in relation to a field.²² Memory, biological or atomic memory, is the invisible, non-localizable melody, a memory that is topological rather than locatable, whose themes enable primary forms to form themselves in space and time according to certain configurations and limits.²³

This unlivable memory of the species, the inaudible themes that make and regulate living bodies, are the directions or orders, the temporality, of formation and functioning that enable the individual members of species to form themselves and once formed, to act, and to do so in the distinctive ways that represent the actions, potentially all of them, of their species. Species act from instincts, memories and indeed values that are real but that precedes any of the individuals who express them. They are not real entities but themes, traces, hauntings from past species that must be improvised on by the actions of living beings. This makes these themes adverbial rather than substantive, something to be acted rather than discovered.²⁴

Ruyer connects the operation of single-celled organisms with that of the embryo or brain: these organisms have no separate organs, no neither hands nor eyes. Yet they are nevertheless able to form 'extremities' or pseudopods, a mouth, stomach and rectum for themselves. Such organisms are able to make themselves the organs they require. Like the embryo, the brain exists as a "dark vision"²⁵, or a "dark consciousness"²⁶. It is a primary consciousness, not of objects, as phenomenology suggests, but of itself in its immediacy. The protozoon is the primary consciousness of organic form, but it is not a consciousness of itself as an object or subject of a certain kind: it exists in a mode of 'self-enjoyment,' incapable of perception and thus a direction to its outside, it is largely directed to its own internal operations. Its consciousness is without a "subject-individual who would be the proprietor of the consciousness"²⁷, a consciousness without proprietor.²⁸ The earliest stage of the embryo or the egg can be understood as a unicellular organism: both the brain of the embryo and the embryo itself act, as they begin, as unicellular organisms that creates their own organs with great focus and with little awareness of their surroundings, totally oriented to their task.²⁹

Beginning as a single-celled organism, the embryo has the peculiar ability, one that no machine has, of producing the differentiations that will create organs and the functions of respiration, nutrition, excretion and reproduction. An embryo 'knows', without a brain, how it must make itself, what form it must follow, what organs it must create. It is a consciousness, but only of how it must act. This embryogenesis is a field of 'absolute self-survey', a field with no edges or borders, requiring no external perspective, no outside eye, a field which precedes the existence of the individual but is the process of making an individual. While the embryo 'has individuality', it is not an individual, a distinct being. It knows only its own emerging absolute surfaces and nothing yet of an external world. It is entirely self-referential, even as its 'self' is not yet distinctly formed. It is a subject, an agent, an increasingly complex collective organization of the body, in the process of creating tiny apprentices that will carry on the labor of bodily production, each organ forming a world within an organism, a self or consciousness within the body: "Each organ is a small organism within an organism, And this is true at all levels—molecular, cellular, tissue, organic, in a literal sense"³⁰.

The embryo is a potential being, whose potentiality is stored not only in the mnemonic themes it re-enacts, it is also the potential for the infinite variation of these themes. As equipotential, the embryo, like the forming brain, is capable for forming itself even if drastic lesions and external interferences interrupt the melody. Equipotentiality implies that the part can stand in for the whole. It is a quality not only of the embryo (and we now understand, of stem cells) but also of the brain: one part can deputize for another. Following Uexküll, Ruyer cites the experiments of Hans Driesch, who cut in half the embryos of sea urchins, producing a full urchin, though of a

smaller size.³¹ These experiments demonstrate that the embryo is not a physical or geometric surface, capable of being divided into separable parts, but a metaphysical surface, an absolute surface that is fully aware of itself and reconstitutes itself, its theme, as much as possible in the event of drastic external interventions or internal disruptions. Ruyer uses Driesch to show the embryo's organic tune even as its development is interrupted. The tune precedes its performance, and the beings-to-become who perform it. The embryo, intent on its own formation, continues this process even in the midst of dramatic interruptions. Even if damaged or wounded, it continues to make itself. Ruyer considers the embryo as an organ that makes organs. Its organs are evoked only through the collective or organic memory that is the theme the embryo plays.³²

All consciousness, from the atom to the unicellular organism to the embryo and the brain, has, for Ruyer, thus two conditions or factors at play: the absolute surface with which it is in direct touch without the need for organs or distance; and the mnemonic theme to be played by the organism as it forms itself. The inventiveness of the organism is its capacity to play out these mnemonic themes within the absolute surface on which it makes itself, utilizing or inducing the movement of self-formation in the direction of these themes, with them as final goal.³³

The difference between the delocalized, equipotential embryo which forms a brain, and the brain that is being formed, is the kind of relation between the inside and the outside that the brain creates. While the embryo occupies an Umwelt, whether this is the womb, a larval home or an egg, it is unaware of this milieu, focusing entirely on its processes of self-formation. As far as it is concerned, like the protozoon, it has no awareness of an exterior. By contrast, the brain operates through an absolute overview, in a perspectiveless immediacy, not only on its own form, but is directed to external forms, forms that have been illuminated and made relevant by sensory or perceptual impingements: "...in our organism there is a special region, the brain, or more precisely the cerebral cortex, where the absolute organic overview is applied not to its own form but to external forms projected onto it by sensory equipment."³⁴

The brain is an embryo that is never complete, never fully grown, an embryo with no individual as its goal, not only in touch with its current forms and its future potential, but also with the external forces that enable it to invent new circuits and pathways between the inside and the outside. The brain, like the embryo, must be in touch with not only its thematic potential but also with the resources to make this potential capable of actualization. The brain is an unfinished embryo: "the brain, in the adult organism, is an area that has remained embryonic". Hence, "the brain is an embryo that has not completed its growth. The embryo is a brain, which begins to organize itself before organizing the external world".³⁵

The brain enables the connections to open up between the organic, internal circuits and external circuits that mark both its behavior as a living being and the milieu or Umwelt in which it resides. It remains in touch with the metabiological themes of the organism, the tunes its body performs, but also with the spatiotemporal activities that it undertakes.³⁶ The brain is thus the conjunction of the embodied being, who lives in a specific place and time, and the thoroughly open directedness of mnemonic or incorporeal themes, the ways in which one cuts through and intervenes into the other. It exists as it were mid-way between material objects and incorporeal themes, inventing ways to connect them, a truly rhizomatic organism within the organism.³⁷

For Deleuze, as for Ruyer, life and matter are not two orders, two forms or organisations of materiality, but rather, two orders of consciousness, two forms of becoming-brain, two modes of connectivity or types of relation. Life is the dilation of the smallest and most contracted forms of material indeterminacy, a mode of form-making and organ-making that insinuates itself into materiality and converts itself into a determinate body, and with this body, into determinate action.

These questions have fascinated Deleuze from his earliest writings, but become the object of direct speculation above all, in *What Is Philosophy?*, and especially in its enigmatic conclusion, "From Chaos to the Brain". In *The Logic of Sense*, Deleuze is preoccupied with the paradoxical concept of the incorporeal, with a logic of sense that must be distinguished from the logic of things, not to be identified with an inaccessible world of

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forms far away from and transcending material objects and their arrangements, but an *incorporeal surface* that coats things and events, that provides them with sense, and opens up the world of the counterfactual, the virtual, to material relations. Sense exists in language, in propositions, but language and propositions are only possible to the extent that sense inheres or subsists in things and their relations, hovering on their edge. The materiality of objects, events and relations does not produce an emergent order of sense, for sense always already inheres in, floats over and covers, things and relations.³⁸ This is why things and their relations, events and their transformations, are expressible, capable of generating ideas, concepts, sensations and representations. It is because things are always more than themselves, having a surfeit of sense, an added dimension of meaningfulness, that life is possible, and orients itself to the interpretation of sense, to the transformation of objects into signals and signs. Sense is what links things and language, what floats between them, making propositions possible, but also enabling meaningful, directed or purposive behavior. There can be no event without the inherence of a sense. Sense is extra-being, a phantasm, a dimension of being-otherwise, the conversion of an alignment of objects into events.³⁹ The incorporeal is the lining of things in their connection with other things that enables them to change, to reorient and reorder themselves with new singularities, new directions. It is the virtual counter-weight to the force of the present.

This inherence of the incorporeal within corporeal alignments, of sense mediating the proposition and the event, occupying the outside of the states of affairs and the inside of the propositions which express them, the thin layer that comes between events and their expression attests to something that is neither thing nor language, which is the condition of their divergence and their connections. Sense or the incorporeal, is the charge of openness or indeterminacy that inheres in events and refuses to allow events to be reduced to the objects and spatio-temporal relations which comprise them. Sense is what enables the animal to see in its *Umwelt* what it requires for its existence, not just objects, but objects which are more than themselves, objects that become meaningful for it.

Deleuze insists on the extra-being of sense, sense not in opposition to matter, but as its very excess. Matter is more than material, for it is always already immersed in sense, the condition of its becoming-other, the condition of its brain-becoming. The material universe coincides with the universe of sense, even if no single sense can adhere to any particular object. The world of materiality is layered by the dimension of sense without any life-form imposing sense on it. Rather, they extract sense, seek signs, and become more and more attuned to material configurations, cleaving to the virtualities that inhere in materiality. Life erupts from matter's particular singularities; but it also converts materiality into a world of objects, entities, things. Matter and life are not dualities, but two tendencies or directions of force, inward and outward, two types of event, one the condition of the other.

In *What is Philosophy?*, Deleuze and Guattari direct themselves to rethinking the brain. If concepts, affects and percepts, the objects of philosophy, art and science respectively—and each primary beings in immediate self-proximity, as Ruyer claims—address chaos and attempt to extract an order or sense from it, then the brain, or various brain-becomings, characterize the relations between life and matter. It is the brain that mediates between the interiority that constitutes all forms life and the outside, chaos, matter plus and as sense, within which life is lived. This is not the brain as an organ, seat of consciousness or the place primarily occupied with ideas that interests Deleuze and Guattari, but rather, the idea of the brain as subject, the brain that thinks, perceives and feels (itself and its milieu). The subject is not defined as that which has a brain; rather, the brain is a subject, one of a number of subjects but nevertheless a special kind of subject that occupies each living being.

Deleuze and Guattari posit the brain as that which becomes subject, a force that connects inside and outside not only through cerebral circuits but above all through its capacity to access the incorporeal and to convert it into concepts, affects and percepts, and to use these forces, captured from chaos that contract and resonate to contain and frame chaos. They make chaos livable by producing the sense-bubbles, thought-bubbles and action-bubbles that life uses to access that fragment or sliver of the world, the *Umwelt*, in which it lives.⁴⁰

They suggest that this brain is precisely the brain as embryo that Ruyer has analyzed. With its synaptic connections and disconnections, its undulations, folds and fissures, the brain is a series of processes that, while it can be viewed as a certain material configuration, a network of neuronal connections, must nevertheless be understood as primary or true form, engagement with itself that exists without any perspective on or perception of itself, connecting the inside of the organism to its outside, the Umwelt. There is no “I” beyond the brain, supervising its activities, directing them from perception to action for the “I” is the activity of connection that is the brain.⁴¹

Like the embryo with both its capacity for equipotentiality and self-survey, the brain is form in itself rather than form perceived, requiring a perceiver behind it or framing it. It has a capacity to disperse itself and yet remain in immediate touch with itself, at absolute speed and with all of itself simultaneously. Like the sub-atomic particle! For Deleuze and Guattari, the brain is not just a property of vertebrates, an acquisition of higher beings in their evolutionary march, but a property of materiality itself that all living beings capitalize on in their different ways. Every concept, affect or percept, that is, every mode of affecting and being affected, every mode of living, is itself a microbrain, a state of self-survey without distance, a mode of matter-idea that knows itself from the inside. They insist that the concept cannot be identified as a brain (“Nor will we say that every concept is a brain”⁴²), but they claim that all concepts, affects and percepts are brain-becomings, forms of self-survey, contractions of the external world in touch with the inside of living forms, something that suffuses all forms of life insofar as they are all the benefactors of this excess of matter within materiality.

Not only are all higher vertebrates engaged in a process of brain-becoming, even plants, rocks, and crystals are part of a process of becoming-brain to the extent that they contract within their boundaries forces that are outside them, and insofar as they constitute a mode of self-survey or immediate proximity. This constitutes a world of things and events, along with living beings, becoming-brain, becoming-thought:⁴³ “Not every organism has a brain, and not all life is organic, but everywhere there are forces that constitute microbrains, or an inorganic life of things.”⁴⁴

Through the quite peculiar yet challenging work of Uexküll, Simondon and Ruyer, Deleuze and Guattari have come to a paradoxical position. They invoke a materiality that now must have an idealist dimension, just as they create a concept of life that is largely inorganic. Matter must be understood outside itself, through the sense, the ideality, that inheres in its most minute operations; and equally, life must be understood as outside itself, even though it must also be understood as that which produces an interiority for itself, for it is only possible and capable of functioning creatively through the indeterminacy and openness of the materiality which sustains and surrounds it. Matter ‘lives’ through the capacity for being-otherwise, that is, for becoming-other, a brain-becoming; and life materializes itself through the inventiveness, the surprise, that it brings back to the world in which it lives, through its extension and expression through matter. Each is a becoming-brain, the drawing together of forces that constitute boundaries, forms of connection and forms of self-transformation. Each is a form of materialism that moves beyond matter and a mode of finality, in which an ideal or a tendency, a direction or goal can be discerned. Each is a becoming-brain in the sense that the brain is the site for the entwined connections between and transformations of the inside and the outside. The brain is the way that the outside folds into an inside, but equally the way in which interiority is folded out into exteriority, the point of transition from the one to the other and thus the condition for the creative connections between them.

ELIZABETH GROSZ is the Jean Fox O’Barr Women’s Studies Professor in Trinity College of Arts and Sciences, Duke University. She worked for many years in the Department of General Philosophy at the University of Sydney before she moved into the Department of Critical and Cultural Studies at Monash University and then to the Women’s and Gender Studies Department at Rutgers University. She is the author of *Chaos, Territory, Art. Deleuze and the Framing of the Earth* (Columbia University Press, 2008) and has written widely on French Philosophy.

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NOTES

1. Friedrich Nietzsche. *The Will to Power*. Trans. Walter Kaufmann. New York: Vantage Books, 1968, 365.
2. Gilles Deleuze. *The Logic of Sense*. Trans. Mark Lester with Charles Stivale. New York: Columbia University Press, 1990, 19–22.
3. See Uexküll, *A Foray into the Worlds of Animals and Humans*. Trans. Joseph D. O’Neil. Minneapolis: University of Minnesota Press, 2010, for a further elaboration of the concept of Umwelt and its provocations for the attunement of life.
4. See Simondon, 1994; as well as the special issue of *Parrhesia* on Simondon, Vol. 7, 2009.
5. As Deleuze claims, taking up Ruyer’s understanding: “the brain’s the hidden side of all circuits, and these can allow the most basic conditioned reflexes to prevail, as well as leaving room for more creative tracings, less ‘probable’ links.” (Gilles Deleuze. *Negotiations 1972–1990*. Trans. Martin Joughin. New York: Columbia University Press, 1997)
6. Gilles Deleuze. *The Fold. Leibniz and the Baroque*. Trans. Tom Conley. Minneapolis: University of Minnesota Press, 1993, 102.
7. Deleuze, *Negotiations*, 61.
8. Deleuze, *Negotiations*, 176.
9. See Paul Bains (2001 and 2002) for an elaboration of this crucial concept.
10. “Our current inspiration doesn’t come from computers but from the microbiology of the brain: the brain’s organized like a rhizome, more like grass than a tree, an uncertain system, with probabilistic, semi-aleatory, quantum mechanisms. It’s not that our thinking starts from what we know about the brain but that any new thought traces uncharted channels directly through its matter, twisting, folding, fissuring it.” (Gilles Deleuze and Félix Guattari. *What Is Philosophy?* Trans. Hugh Tomlinson and Graham Burchill. New York: Columbia University Press, 1994, 149)
11. As E. W. F Tomlin explains, in terms that are remarkably like Deleuze’s:

The consequence of diverting the internal circuit outside the body is the formation of an external circuit. Now this external circuit is circuitous because, however extravagant its passage, it must link up eventually with the internal circuit. Indeed it must be perpetually so linking up. The juncture in question is the brain. The brain, in other words, is that part of the nervous system in which the internal circuit is transformed into an external circuit... Thought, intelligence, or consciousness does not come into being with the brain. It is already in being, if in less complex or sophisticated forms. By changing its direction, the brain serves to continue while augmenting the power of consciousness. To modify a remark of Bergson, the brain is the means whereby the body ‘lives outside itself’.

Living and Knowing. London: Faber and Faber, 1955, 134.

12. See Luce Irigaray’s writing on the placenta in *Je, Tu, Nous: Towards a Culture of Difference*. London: Routledge, (1993).
13. “If the animal is artificially removed [from] its ecological niche, it immediately makes an effort to recover its world. People have taken for reflexes or for mechanical and meaningless tropism what in reality is an animal’s instinctive behavior as it seeks to re-establish its ecological norm. This does not mean, of course, that the animal is clearly aware of this norm but only that its activity has, in fact, an over-all theme. From this point of view, tropisms and reflexes are but products of the laboratory-artificial segmentations of a behavior the meaning of which is immediately apparent if one observes the animal in or near its natural environment, its *Umwelt*, or vital domain.” Ruyer, “The Vital Domain of Animals and the Religious World of Man.” *Diogenes* 5 (June 1957, 36).
14. “Of all Bergson’s theses, none was more criticized than that of the instinct-intuition... it is perfectly clear in any case that any bird that nests or emigrates is a skilled breeder and traveler, for whom the slightest sensorial signs reveal a whole world; it is evident that any bee is a skilful reaper and an even more skilful breeder; that any animal that breeds and hatches demonstrates thus that, in one way or another, it “knows” the embryology of its species and the anatomy and physiology of its partner.
- Of course an animal is not aware of the total meaning of its acts; but such acts would not be possible if the animal’s fragmentary awareness did not go beyond crude observation and if the egg, for instance, merely represented a rounded form for the animal and not “an object to hatch” or “an object to take back to the nest.” The objects of its *Umwelt* are signals, challenging patterns. They are not the mechanical causes of its behavior. An animal does not function; it acts.” (Ruyer, “*The Vital Domain*”, 40).
15. Raymond Ruyer. *La Gènes des Formes Vivantes*. Paris: Flammarion, 1956, 58.
16. “The new physics of the twentieth century, since Max Planck, has abandoned this idea [of a deterministic, predictable world]. A machine, in general, functions, an atom or particles are not machines whose parts can be localized. Hence these do not function. They are “made” in space and time. A living creature, and similarly a group of living creatures, can function, but only inasmuch as they resemble a machine. But they, too, are “made,” first as seed and embryo, and then in their own resourceful behavior, their actions as such.” Raymond Ruyer, “The Status of the Future and the Invisible World.” Trans. R. Scott Walker. *Diogenes* 2 (1980, 37).

17. “The fundamental paradox, which is the origin of all the others, is that a domain of primary consciousness is in ‘absolute survey’—that is to say without any need of an external scanning—that it possesses a kind of *autovision without gaze*. This character has no analogy in classical physics, but it does in microphysics because the domains of consciousness come directly from microphysics, which are already in autosurvey... It is very difficult to admit that a protoplasm, a molecular edifice, an embryo, an organic tissue or a cortex, are conscious of themselves (possess their own form) before becoming, by added modulation, conscious of the form of other beings, and without being obliged to pass by this detour.” Ruyer, *Paradoxes de la conscience et limites de l’automatisme*. Paris: Albin Michel, 1966, 167.
18. “There is no reason to deny to our non-cortical cells, even if they have no nervous system, a subjectivity, primary consciousness, self-survey, the *self-enjoyment* of their own form. ‘I’ don’t participate in this *self-enjoyment* because ‘I’ am specialized in sensory consciousness.” Ruyer, *Néo-finalisme*. Paris: PUF, 1952, 104.
19. As Deleuze affirms, the atom, particles of all kinds, bear this primary form, self-enjoyment, which thus ripples from the inorganic world to mark the organic:

Every time that we have attributable individual beings that are not content with mere functioning, but that are endlessly ‘being formed’, these true forms do not only apply to living organisms, but to physical and chemical particles, to molecules, atoms and photons. Although the inner variety of forms accounts for difference between the organic and the inorganic, the question does not thus concern a matter of vitalism. No matter what, genuine or absolute forms are primary forms, essentially individual and active primary unities, that actualize a virtuality or a potential, and that are in harmony with each other without any one being determined by any other... (Gilles Deleuze, *The Fold*, 103)

20. Ruyer, *Genèse*, 261–2.
21. Ruyer Raymond, “The Status of the Future”, 37.
“The swimming movements of a fish, a reptile or a swimming mammal are not a series of local reflexes. It has been proven that they depend on a unitary theme of swimming, for this theme of swimming already appears in the embryo, even before the members that execute it are completely formed.” (Ruyer, “The Status of the Future”, 42)
22. “It is a surface seized in all its details, without a third dimension. It is an ‘absolute surface’, that is not relative to any point of view exterior to itself, which knows itself without observing itself.” (Ruyer, *Néo-Finalisme*, 98)
23. “Every authentic form is in time as well as in space. It subsists in time by translating a potential, of itself untemporal, into space. Embryogenesis is mnemonic. The potential is a memory... There is no individualizing entelechy. The life-giving breath is organic memory. If there is a breath, it is more like the action of a theater prompter, which is nothing more than the memory of the species.” (Ruyer, *Néo-Finalisme*, 32)
24. “Instinct, memory, values, are real (in the widest sense and excluding etymology) these forms of reality are knowable, they are sources of information, without being “real objects,” which may be referred to substantively, located in space, and which emit photons. Their reality is always adverbial. An animal acts instinctively, it is informed by a specific instinctive participation: it never consults something called the “instinct.” Man speaks his mother tongue mnemonically, without having to consult his memory as if it were an inner grammar or dictionary. Man acts, thinks, and creates validly, veraciously, aesthetically, without aiming at a “substantive” value (such as Beauty, Goodness, Truth) which would be very awkward and at the same very pedantic, and would risk making his efforts sterile.” Raymond Ruyer. “Dialectic Aspects of Belief.” Trans. S.J. Greenleaves. *Diogenes* 15:60 (1967, 78).
25. Ruyer, *Néo-Finalisme*, 26.
26. Ruyer, *Néo-Finalisme*, 27.
27. Ruyer, *Néo-Finalisme*, 29.
28. “In the young embryo everything is as yet undifferentiated, as in a unicellular organism: the cells are at the same time capable of reproduction and of self-guidance. In the same way a single cell is entirely its own brain, it is entirely gamete of itself. It is also its own body (in the sense of the whole of the auxiliary organs). The same is true for a young embryo. But an embryo, with the difference of the protozoan, knows how to manufacture itself by making use of itself, of its massive organs of behavior as well as of its massive organs of reproduction, utilizable by those of its own cells that are kept at its disposal for improvisations in ‘absolute surface’.” (Raymond Ruyer, “The Mystery of Reproduction and the Limits of Automatism.” *Diogenes* (December 12 1964, 62).
29. “An egg, an embryo in its initial stage, acts like a unicellular entity. It deforms itself with regard to its overall form: an absolute overview (that is, an overview without a point of external overview, which would be perpendicular to the surface or the volume), this ‘paradoxical’ overview (paradoxical for us), is the very fact that the unicellular entity or the young embryo is not a point or a series of points, but a delocalized form that is ‘seen’ (with quotation marks), but which is not seen (without quotation marks).” Ruyer, “The Status of the Future”, 25.
30. Ruyer, “The Status of the Future”, 43. Ruyer says: “This subjective “individuality” without subject normally distributes itself into sub-individualities, into a multitude of secondary and tertiary craftsmen who are responsible for forming particular

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organs. The craftsman does not distribute the work. 'He' distributes himself into a multitude of apprentices up to the terminal mosaic in which the specialization of the 'apprentices' is pushed to the point that they seem 'mechanized'. As if the painting crumbled of itself by recruiting thousands of 'tiny craftsmen' to complete the details." Ruyer, "The Status of the Future", 31. For further details, see Hans Driesch. *The Science and Philosophy of the Organism*. London: A&C Black, 1929.

32. See also Paul Bains, "Subjectless Subjectivities" in *A Shock to Thought. Expression After Deleuze and Guattari*. Ed. Brian Massumi. London: Routledge, 2002, 111–112; and Bains, *The Primacy of Semiosis. An Ontology of Relations*. Toronto: University of Toronto Press, 2006.

33. "Consciousness, all consciousness—biological, embryonic or cortical—can thus be analyzed into two elements: a 'black' board as an 'absolute surface' or a 'competent' area before an evocative induction—and a 'theme' evoked or evocable, a mnemonic theme or problem theme, arriving from a region 'perpendicular' to this blackboard." Ruyer, "The Status of the Future", 27.

34. Ruyer, "The Status of the Future", 25–6.

35. Ruyer, *Genèse*, 73.

36. As one of Ruyer's few Anglophone interpreters, Tomlin explains the notion of the brain as pure connectivity between immediate self-enjoyment and the perception of the outside:

The brain, in other words, is that part of the nervous system in which the internal circuit is transformed into an external circuit...Thought, intelligence, or consciousness does not come into being with the brain. It is already in being, if in less complex or sophisticated forms. By changing its direction, the brain serves to continue while augmenting the power of consciousness. To modify a remark of Bergson, the brain is the means whereby the body 'lives outside itself'...Not merely must we abandon the notion of the brain as the 'origin' or 'seat' of consciousness; we must allow consciousness to exist wherever there is 'life', that is to say, in the simplest organism endowed with dynamic structure. The organism exists insofar as it realizes its form.
(*Living and Knowing*, 134–135)

37. "The recognition of a trans-spatial thematics indissolubly connected to spatio-temporal dimensions, does not mean accepting the old dualism of body and soul...The organism is not a machine *plus* a soul. Organic existence only exists dynamically in an incessant flux that, to put it simply, renews all its molecules. It is constant activity, a permanence of dynamism, and not the permanence of a material reality, informed afterwards by an ideal form." (Ruyer, *Genèse*, 244). For further detail, see Bains, 2002, 101–103 and Bains 2006, 71–4.

38. "Let us consider the complex status of sense or of that which is expressed. On the one hand, it does not exist outside the proposition which expresses it; what is expressed does not exist outside its expression. This is why we cannot say that sense exists, but rather that it inheres or subsists. On the other hand, it does not merge at all with the proposition, for it has an objective which is quite distinct. What is expressed has no resemblance whatsoever to the expression. Sense is indeed attributed, but it is not at all the attribute of a proposition—it is rather the attribute of the thing or state of affairs." (Deleuze, *The Logic of Sense*, 21)

39. "[Sense] is exactly the boundary between propositions and things. It is this *aliquid* at once extra-Being and inherence, that is, this minimum of being which befits inferences. It is in this sense that it is an 'event': *on condition that the event is not confused with its spatio-temporal realization in a state of affairs*. We will not ask therefore what is the sense of the event: the event is sense itself. (Deleuze, *The Logic of Sense*, 22)

40. "It is the brain that thinks and not man—the latter being only a cerebral crystallization. We will speak of the brain as Cézanne spoke of the landscape: man absent from, but completely within the brain. Philosophy, art, and science are not the mental objects of an objectified brain [the brain of neurophysiology and chemistry] but the three aspects under which the brain becomes subject, Thought-brain. They are the three planes, the rafts on which the brain plunges into and confronts chaos." (Deleuze and Guattari. *What Is Philosophy?*, 210)

41. "What are the characteristics of this brain, which is no longer defined by connections and secondary integrations? It is not a brain behind the brain but, first of all, a state of survey without distance, at ground level, a self-survey that no chasm, fold, or hiatus escapes. It is primary, 'true form' as Ruyer defined it: neither a Gestalt nor a perceived form but a *form in itself* that does not refer to any external point of view, any more than the retina or striated area of the cortex refers to another retina or cortical area: it is an absolute consistent form that surveys itself independently of any supplementary dimension, which does not appeal therefore to any transcendence, which has only a single side whatever the number of its dimensions, which remain copresent to all its determinations without proximity or distance, traverses them at infinite speed, without limit-speed, and which makes of them so many inseparable variations of which it confers an equipotentiality without confusion. We have seen that this was the status of the concept as pure event or reality of the virtual." (Deleuze and Guattari, *What Is Philosophy?*, 210)

42. Deleuze and Guattari, *What Is Philosophy?*, 211.

43. "Of course, plants and rocks do not possess a nervous system. But if nerve connections and cerebral integrations presup-

pose a brain-force as faculty of feeling coexistent with the tissues, it is reasonable to suppose also a faculty of feeling that coexists with embryonic tissues and that appears in the Species as a collective brain; or with the vegetal tissues in the 'small species'.' (Deleuze and Guattari, *What Is Philosophy?*, 212)

44. Deleuze and Guattari, *What Is Philosophy?*, 213.