



The ontogenetic alternative:

“Platonism”, khôric mater(ial)ism, and open-ended evolution

Dr Timothy N. W. Jackson

timothy.jackson@unimelb.edu.au

TL/DL

- This talk is a high-level overview of “ontogenetics”
 - No detailed discussions of physics and biology
 - i.e., riddled with “promissory notes” and sub-tweets
- Developing the ontogenetic method as part of the Process Science Project (Centre for Process Studies)
 - Reframing the history of modern science and evolutionary thought
 - “Auditing” contemporary research programmes
- Individuation, substantialism and hylomorphism
- “Mathematical Platonism” and the *khôra*
- Physicalism and effective theory
- Information, ontogenesis, and alterity
- Mechanical, physical, and vital
- Images, encounters, elicitation, “-ecceity”
- Absent: serious discussion of ancestral relations, inheritance, convergence etc (a core focus of my work in biology)



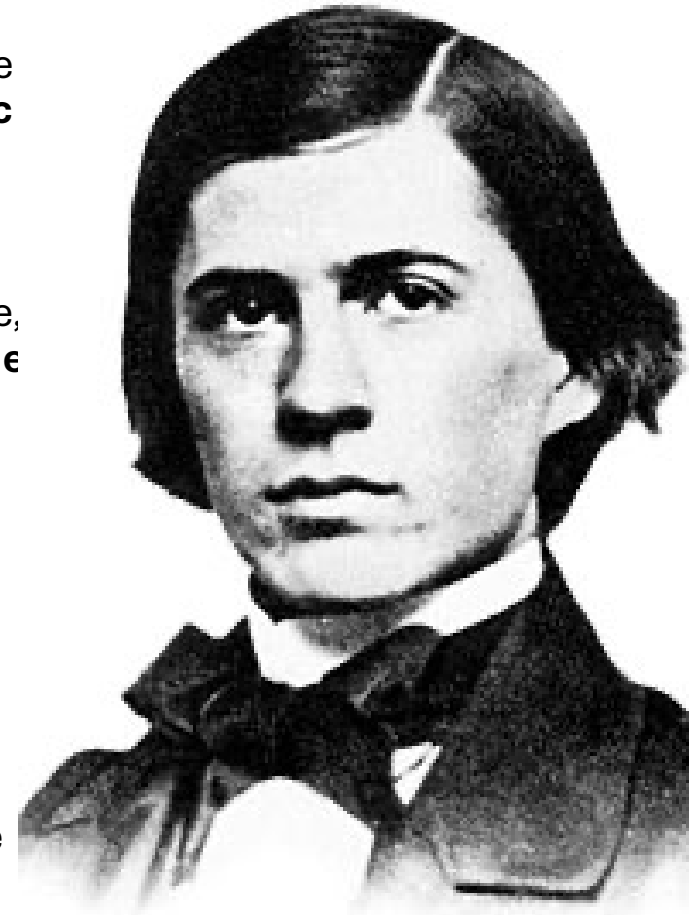
Fellow travellers – Anaximander (via Nietzsche)

- "**Never....**can a being which **possesses definite qualities** or consists of such be the origin or the first principle of things."
- "In order that coming-to-be **shall not cease**, primal being must be **indefinite**."
 - *Apeiron*, the boundary-less
- "Now anyone who can quarrel as to what sort of **primal stuff** this could have been, whether an intermediate substance between air and water or perhaps between air and fire, has certainly not understood our philosopher at all." Nietzsche on Anaximander, *Philosophy in the Tragic Age of The Greeks*, p47



Fellow travellers – Charles Sanders Peirce

- “The evolutionary process is, therefore, not a mere evolution of the existing universe, but rather **a process by which the very Platonic forms themselves have become or are becoming developed.**” CP 6.194
- “In short, if we are going to regard the universe as a result of evolution at all, we must think that not merely the existing universe, that locus in the cosmos to which our reactions are limited, but **the whole Platonic world, which in itself is equally real, is evolutionary in its origin**, too. And among the things so resulting are time and logic. The very **first and most fundamental** element that we have to assume is a Freedom, or Chance, or **Spontaneity...**” CP 6.200
- “When I have asked thinking men what reason they had to believe that every fact in the universe is precisely determined by law; the first answer has usually been that the proposition is a "presupposition" or postulate of scientific reasoning.....(but) what is a postulate? It is the formulation of a material fact which **we are not entitled to assume as a premiss, but the truth of which is requisite to the validity of an inference.**” CP6.39-6.41



Fellow travellers – Whitehead; Deleuze & Guattari

- “The explanatory purpose of philosophy is often misunderstood. Its business is to explain the emergence of the more abstract things from the more concrete things. It is a **complete mistake** to ask how a concrete particular fact can be built up out of universals. The answer is, ‘In no way.’” Alfred North Whitehead, *Process & Reality*, p20
- “The first principle is that **Universals explain nothing and must themselves be explained.**” Gilles Deleuze and Félix Guattari, *What is Philosophy?* p7
 - Cf. (e.g.,) Feigenbaum’s constants (not Universals, definitional and descriptive rather than explanatory)
 - More like *synapomorphies* than Universals
 - A felicitous tautology – FCs define a *restricted* class of phenomena that exhibit FCs
 - A one-parameter family of one-dimensional, smooth, unimodal, bounded, non-invertible maps with a quadratic maximum, undergoing a cascade of period-doubling bifurcations as the parameter varies.

Process and Reality

CORRECTED EDITION



Alfred North Whitehead

Edited by David Ray Griffin
and Donald W. Sherburne

Mighty ancestor/psychopomp – Gilbert Simondon

- “Two paths” which approach the reality of being as individuated:
- Substantialism (e.g., atomism; some versions of materialism/idealism):
 - “...the being as consisting in its unity, given to itself, founded on itself, not engendered and as resistant to what is not itself...” *Individuation in Light of Notions of Form and Information*, p1
- Hylomorphism:
 - “...considers the individual as generated by the encounter of a form and a matter...” *ibid.*, p1.
- “...both suppose that there is a principle of individuation prior to individuation itself that is capable of explaining, producing, and guiding it.” *ibid.* 1
 - Both contain partial truths, and are more related to one another than a superficial study might suggest
 - Both “suppose the existence of a first term, the principle....” *ibid.* 2
- But, “....we would precisely have to show that ontogenesis can have a first term as an initial condition: **a term is already an individual....**” *ibid.* 2
 - This is question-begging, attempting to understand individuation in terms of the (pre-constituted) individual, rather than *vice versa*
- “To seek the principle of individuation in **a reality that precedes individuation** itself is to consider individuation strictly as **ontogenesis**.” *ibid.* 2
- “Both atomistic substantialism and the hylomorphic doctrine de facto **avoid the direct description of ontogenesis** itself....” *ibid.* 2.

GILBERT SIMONDON
TRANSLATED BY TAYLOR ADKINS

individuation
in light
of notions
of form and
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Psychopomp – Gilbert Simondon

- “Instead of conceiving individuation as a **synthesis of form and matter** or of body and mind, we shall represent it as a **splitting**, a resolution, a non-symmetrical distribution occurring in a totality starting from a singularity.” *ILFI*, p51
- “...if the individual is grasped after individuation, then we wind up with the **hylomorphic schema**, because nothing would remain in the individuated individual except these two visible aspects of form and matter; yet the individuated individual is not a complete reality, and **individuation is not explainable by means of the mere elements that the analysis of the individual after individuation can discover.**” *ILFI* 52
- “...individuation will not be considered solely from the perspective of the explanation of the individuated individual; it will be grasped, or at the very least we will say that it should be grasped, before and during the genesis of the separate individual; **individuation is an event and an operation within a reality that is richer than the individual that results from it.**” *ILFI* 53

Detail from *The Souls of Acheron*, Adolf Hirémy-Hirschl





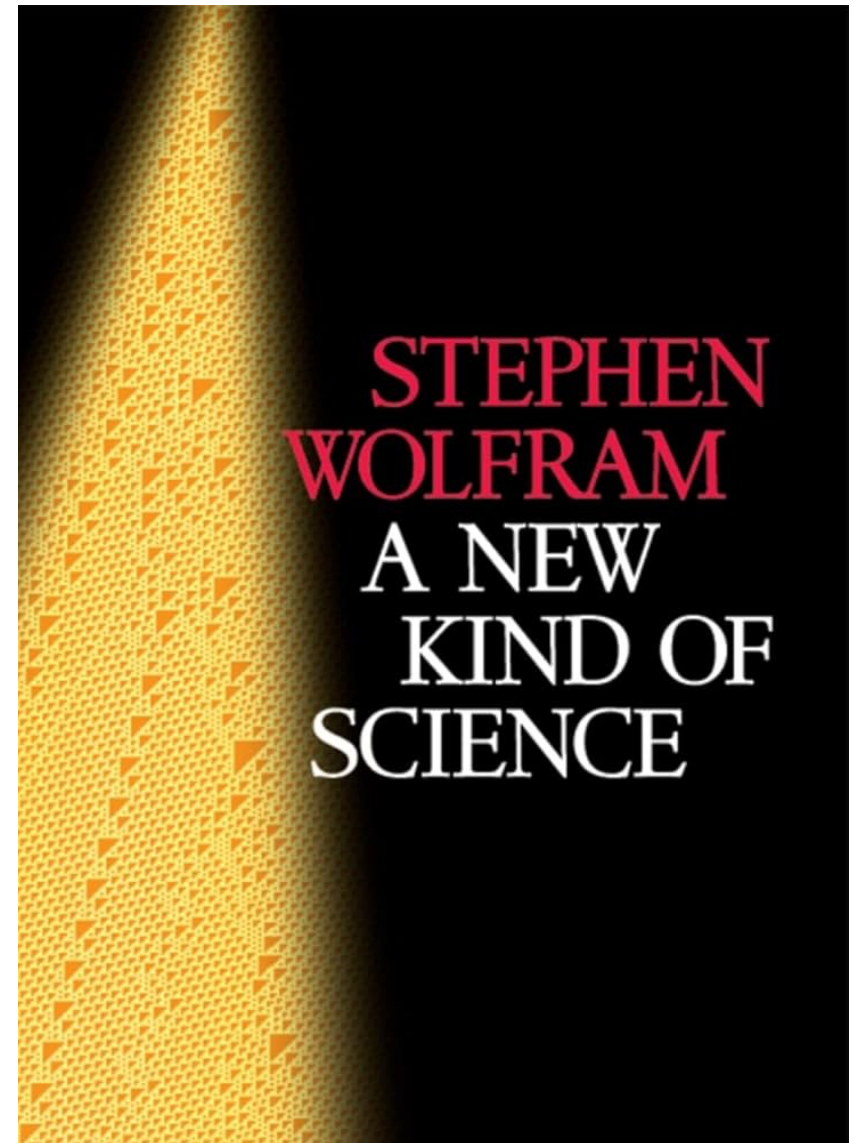
Quo vadis, “Platonism”?

- It may yet be important to linger with Plato’s problematics
- “Platonism” in philosophy of maths?
 - Cf. constructivism; intuitionism.....
 - ...formalism, logicism, etc...
- “Ending up” in the maths department to solve (for) morphogenesis?
 - Despite my passion for mathematics.....
 -I sincerely hope not.
 - Physics, biology, philosophy, aesthetics.....
 - Finding, observing....
 - This is a **transdisciplinary** problematic.....
 -but perhaps we do need new(ish) maths, or “new” ways to think about maths?



Fellow travellers – Stephen Wolfram?

- Faced with complexity, “....mathematicians in my experience have two common responses: either to single out specific patterns that have a simple repetitive or perhaps nested form, or to **generalize and look not at individual patterns, but rather at aggregate properties** obtained say by evolving from all possible initial conditions.....about questions that concern...the structure of a pattern that looks to us complex, the almost universal reaction is that such questions can somehow not be of any real mathematical interest.” *A New Kind of Science*, p794
- “....my results suggest that if one is ever going to study many important phenomena that occur in nature, one will also inevitably run into (such problems). But **to traditional mathematics, they seem uninteresting and quite alien.**” *NKS*, 795
- “...in both the systems it studies and the questions it asks **mathematics is much more a product of its history** than is usually realized.” *NKS*, 792

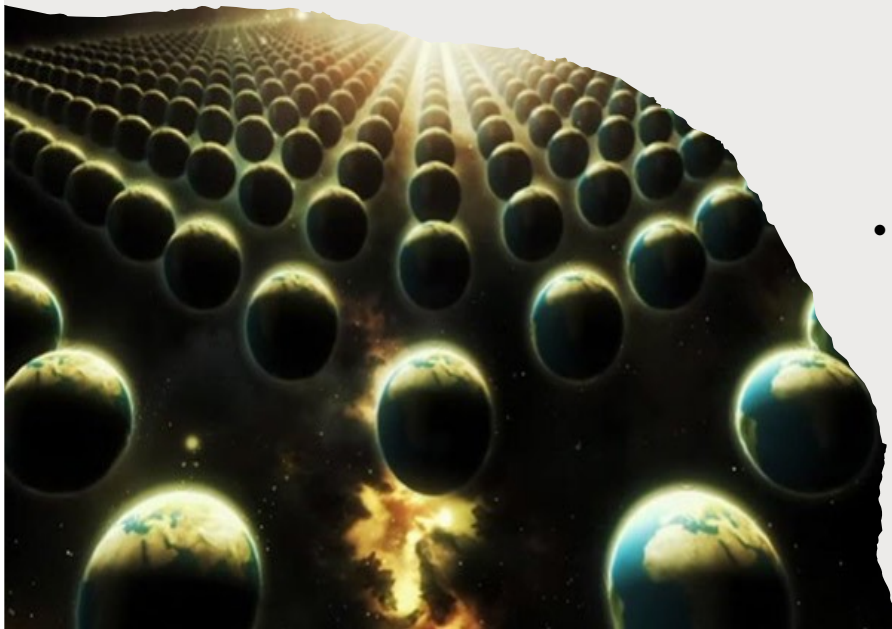


Mathematics – “fundamental” or diagrammatic?

- Cf. Peirce, Poincaré, etc
 - **"Mathematicians do not study objects, but relations among objects;** they are indifferent to the replacement of objects by others as long as relations do not change. **Matter is not important, only form interests them**". Henri Poincaré, Cf. “On the Foundations of Geometry”
- Do “the equations themselves” have x interesting properties? Or...
- ...did we derive – from a study of empirical system y – **a diagram of abstract relations**, which we represented using PDEs, and then **materially instantiate this set of abstract relations in an alternate material substrate** (e.g., a computer) and found that the resultant process retained the interesting properties of system y ?
- David Deutsch: “Computers are ways of instantiating abstract objects and their relations in physical objects and their motion.”
 - This is hylomorphic (about which.....)



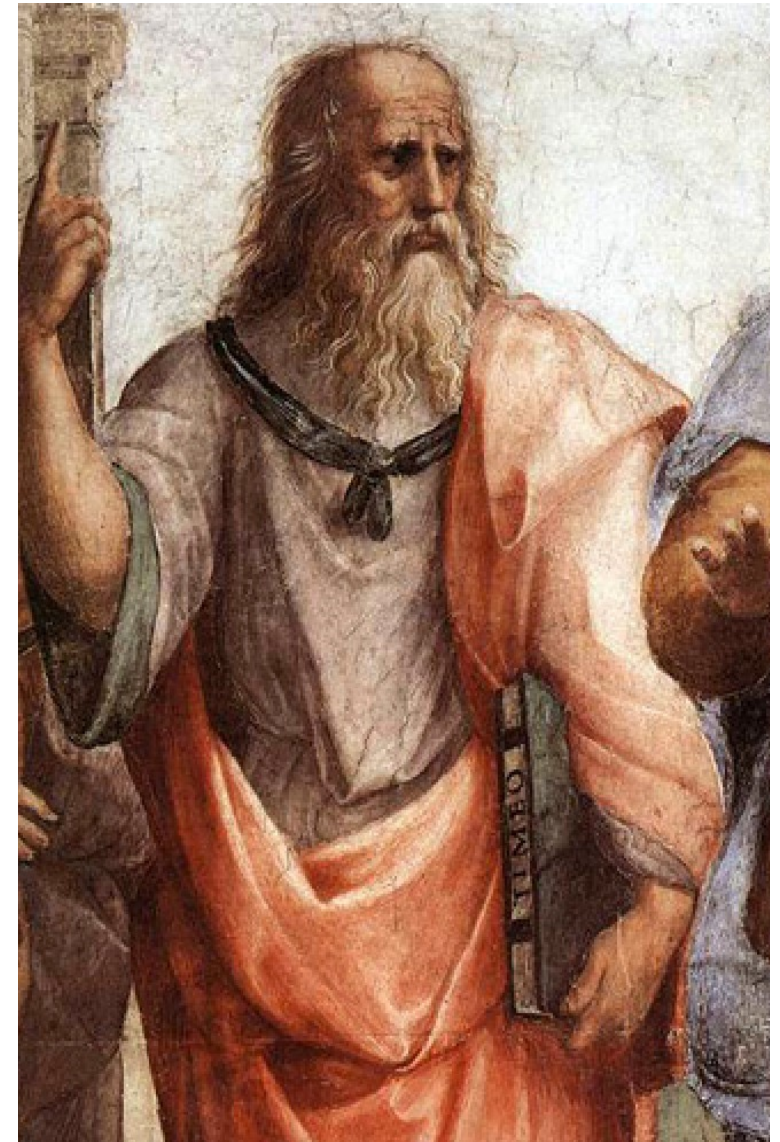
In praise of alternatives



- It's reasonable to suppose a *quasi-space* of *quasi-determinate* “real possibilities”
- But, given this is an ancient idea, there may be a few ways to think about it
 - Some may yet be much more “radical” and underexplored than others
 -some may in fact be the hidden assumptions of western rationalism *in toto* (!)
- Are these alternate *speculative* (metaphysical) theses empirically distinguishable?
 - ...a non-trivial question, cf. discreteness vs continuity, indeterminism vs determinism
 - Alternate formalisms may be equivalently empirically adequate (in specific domains)
- And yet....
 - We *ought* to explore alternatives as rigorously as possible, because their *consequences* may not be immediately apparent....
 - ...and may show up in domains far from the initial arena of investigation
 - E.g., the limits of (dominant forms of) physical theorization may be apparent in biology, ethics, aesthetics, etc....
 - **Generality conceals specificity**

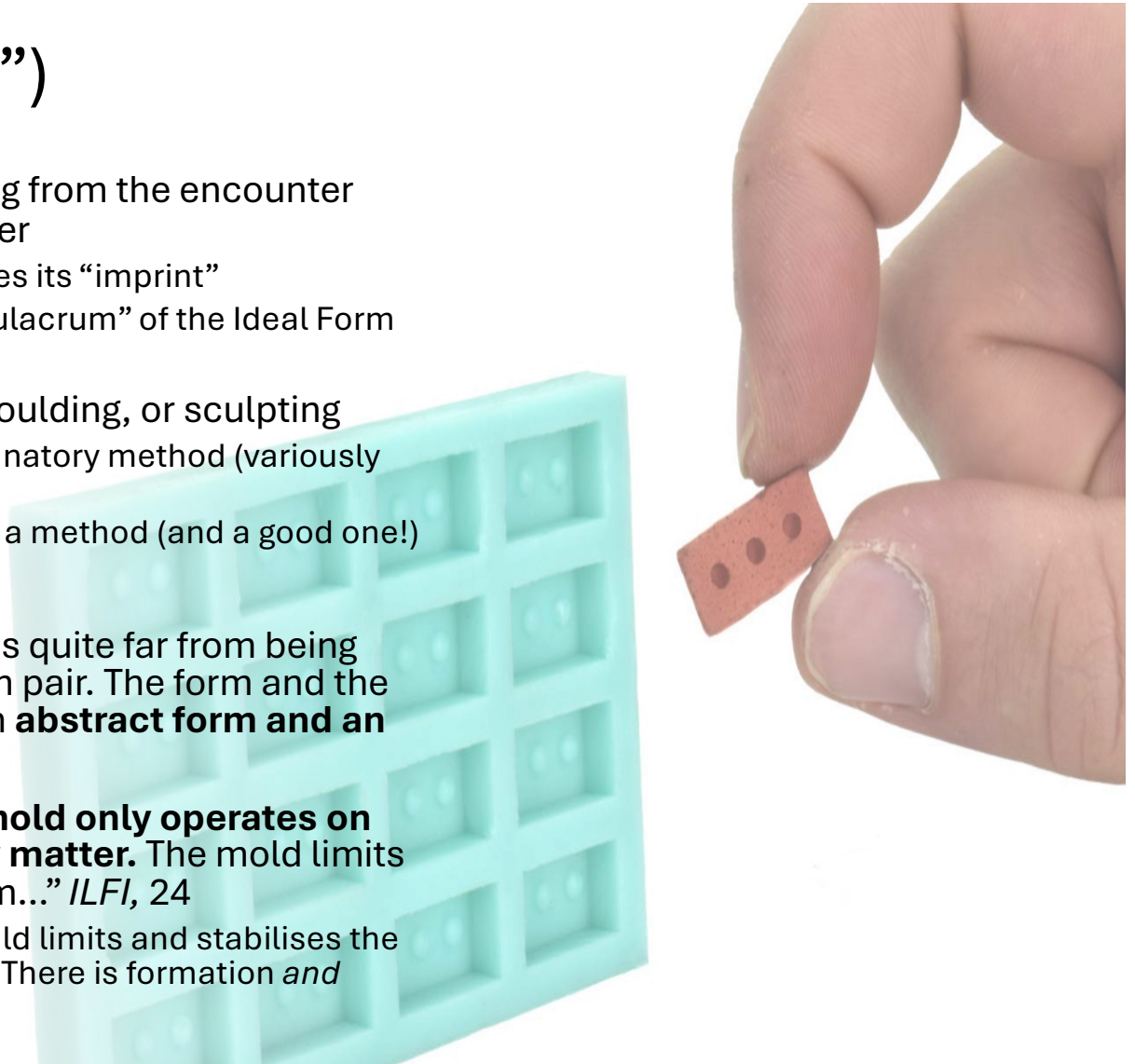
Reclaiming mum: *khôric* mater(ial)ism

- Plato's receptacle – *khôra* – a “mass of plastic material”
 - Precursor of Aristotelian “matter” – “anything that is to receive in itself every kind of character must be devoid of character”
 - “...by nature a matrix for everything...”
 - *Apeiron* is *khôra*'s antecedent, *hylē* its descendant
- However – *khôric necessity*
 - “...there is in us a large element of the contingent and random....”
 - “...this world came into being from a mixture and combination of necessity and intelligence....”
 - “....(it was by) submission of necessity to reasonable persuasion that this universe here was originally constituted....”
- “...to give a true account of how it came to be one must mix in the kind of the **wandering cause** and how it is its nature to cause motion....”
- In the primitive chaos (cf. Hesiod) of the *khôra*, “there was no homogeneity or balance in the forces that filled it, **no part of it was in equilibrium**, but it swayed unevenly in all the directions as it was shaken by the forces, and **in being moved it in turn shook them**. And the things that were moved were constantly being separated and carried in different directions, **rather like the contents of a winnowing basket....**”
 - This process of *endogenous and constructive coarse-graining* leads to the formation of incipient elements....the demiurge comes in to finish off the job, to “shape them completely according to forms and numbers”.



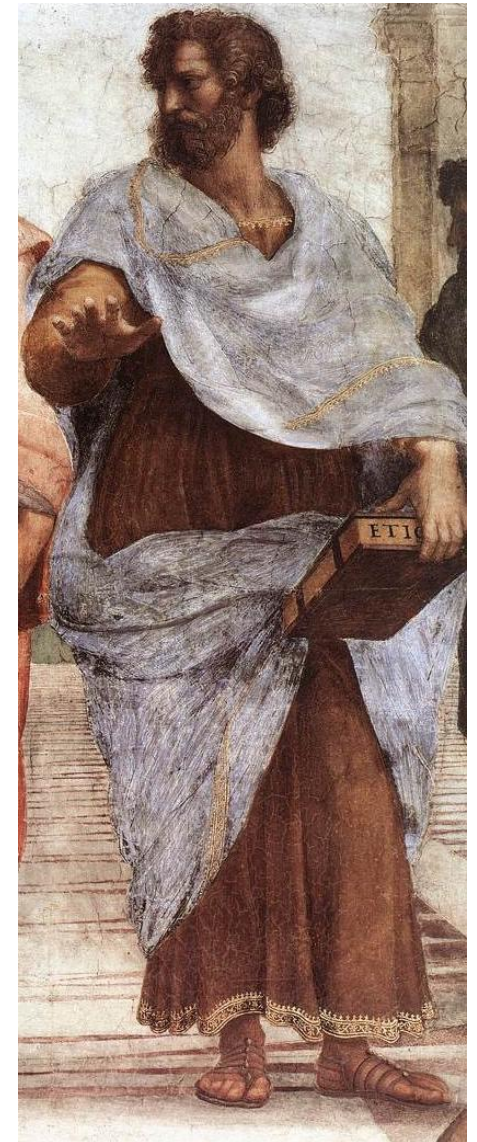
Hylomorphism (“Aristotle”)

- The “individual” is understood as resulting from the encounter between (active) form and (passive) matter
 - Form is *imposed* on matter, which receives its “imprint”
 - The formed, material body is thus a “simulacrum” of the Ideal Form itself
- The quintessential examples are brick-moulding, or sculpting
 - Cf. the “four causes” as an analytic/explanatory method (variously collapsed)
 - Indeed, the hylomorphic schema is such a method (and a good one!)
- But.....:
- “...the **real dynamism of the operation** is quite far from being able to be represented by the matter-form pair. The form and the matter of the hylomorphic schema are an **abstract form and an abstract matter.**” Simondon, *ILFI*, 22
- “...it could be said that the **form of the mold only operates on the form of the clay and not on the clay matter.** The mold limits and stabilizes rather than imposing a form...” *ILFI*, 24
 - In-formation *versus* imposition – the mould limits and stabilises the ongoing formation of the (prepared) clay. There is formation *and* matter on “both sides” of the encounter.



Hylomorphism cont'd

- “...these relations are not established between the raw matter and the pure form but **between the prepared matter and the materialized form**: the operation of form-taking doesn't just suppose raw matter and form but **also energy**; the materialized form is a form that can act as a limit, as the **topological boundary** of a system. The prepared matter is one that can transmit energetic potentials, the technical manipulation of which charges it.” *ibid.* 29
- Form and matter are the *operational* (not substantial) terms that characterise roles which are *indefinite* during individuation, and only definite *retrospectively* (and abstractly).
- “There is **a hole in hylomorphic representation that makes the true mediation disappear**, i.e. the very operation that attaches the two half--chains to each other by instituting an energetic system, a state that evolves and must effectively exist for an object to appear with its haecceity.” *ibid.* 30
- NB. the brick moulding example is the technical paradigm for hylomorphism, i.e., it is *as hylomorphic as you can get*, for Simondon, the **most extreme separation of form and matter** into these distinction operational roles.
 - And even here, its degree of abstraction is easily recognised



“Physicalism is not enough”!?

- “Effective theory” is not enough
- Physicalist *rationalism* is **dualist** because it brackets the genesis of form
 - Placing form “before” matter, before *individuation*, is doubling down on this dualistic bracketing
- It’s *not* that we need to resurrect “formal cause”
 - Formal cause is very present, indeed *hegemonic* in physicalism....
 - “...one cannot, it seems, oppose mechanism and finalism...” Georges Canguilhem, *Machine & Organism*; the mechanical ontology is **teleocratic**
 -we need to bring the (*onto*)genesis of forms (endless, most beautiful), of formal causes, back *in*, i.e., it must be immanentized
- Everyone wants to move past Darwin....
 -but few indeed have considered the significance of his basic move
 - “Neo-Darwinism” is hylomorphic!



Effective theorisation

- “Effective theories discover and label large groupings ("coarse-grainings") of fundamental or non-fundamental materials and properties that **maintain coherence through time**..... As long as variables assigned to each dimension maintain **sufficient physical or organisational integrity through time**, an effective theory has a chance of succeeding.....(ETs) describe **reduced dimensions along which coordinate aggregates of fundamental matter transform.**” (Krakauer, *The Complex World*, p100)
- ETs identify **invariants** in terms of which variation can be understood.
 - The domain-specific “correctness” of the **basis** of reduction (compression, coarse-graining) is necessary for **utility**
 - The rest is noise
 - In “substantial” terms, this is equivalent to stipulating the fundamental “stuff” (defined by its degrees of freedom); i.e., objectification/observables/causative agents
- Often thought of in terms of *predefined* phase or state spaces
 - Actual behaviour is a trajectory *within* such a space
 - The basis is "...a set of vectors in a vector space that can encode every vector in the space." *ibid.* 105
 - As a maximally general model constructed using minimal justified constraints, the *space* of the ET does not precisely define the dynamics *within* it
- Such spaces are definitionally **closed**
 - Correspond to a fixed, predetermined, **ontology** or space of possibility
- Problem?
 - Ontogenesis appears *open-ended*



God: the Laplacean effective theoriser

- Pierre-Simon Laplace is a primary architect of modern effective theorization
 - The “Demon” is the apotheosis of this trajectory – the shebang as technical object (machine/computer):
- **“We may regard** the present state of the universe as the effect of its past and the cause of its future. An intellect which at a certain moment would know all forces that set nature in motion, and all positions of all items of which nature is composed, if this intellect were also vast enough to submit these data to analysis, it would **embrace in a single formula** the movements of the greatest bodies of the universe and those of the tiniest atom; for such an intellect nothing would be uncertain and the future just like the past could be present before its eyes.” Laplace, *A Philosophical Essay on Probabilities* (1814)
 - The universe is a deterministic automaton (chance is merely ignorance), i.e., a computer
 - Deterministic evolution requires “input” of initial conditions and entailing laws
- Note the context – development of probability theory
 - The system has a vast phase space (spacetime container)
 - “Virtual” trajectories may be plentiful (hence probability), but only **one** trajectory is *possible*
 - Actual and possible are collapsed (possibility is not “real” - **actualism**)
 - We imagine the existence of possibilities because we’re finite (not God)
 - Entailing laws are **externally imposed formal** causes (sorry, Jonas), initial conditions are arbitrary (cf. “past hypothesis”)



Simondon and the amplification of information

- "Virtually **any reality that does not fully possess the determination of the course of its becoming within itself is a potential receiver**. This condition is met if the receiver is **not completely a system.....**" Simondon 1962, Amplification in Information Processes
 - Such a system contains an internal "tension" of difference, capable of being selected/elicited/determined by an informant (alterity)
- Computers are quintessential receivers of information
 - The system is only **closed** (complete, replete) *once* a deterministic computation has been initiated (via program ± instructions)
 - The computer's universality allows it to be "differentially determined", i.e. to run any computable program
 - Additional interventions/instructions (like keystrokes) come from *outside* and *change boundary conditions*, i.e. the system alternates between open and closed states
 - The state space predefined by the physical materials and architecture does not entail which program traverses it
 - The program is the *formal* cause, the **in-formation** (cf. *Bildung*)



Ontogenesis of programs/theories

-but where does the program come from.....?
 - Cosmologically speaking.....why *these* laws? Why low entropy initial conditions (the “past hypothesis”)? *Etc.*
 - Who in-forms the in-former?
- The programmer, duh!
- In effective theorisation, the theoriser stipulates the basis according to an objective and domain of application
 - Effective theorisation is a creative process
 - This *ontogenetic act* is **external** to the theory itself
 - Effective theory is hylomorphic, form-first (like a computation determined by an external programmer)
- Closed organism-world loops do not solve the issue
 - Moving the “observer” inside the system (cf. second order cybernetics) doesn’t resolve the issue
 - The necessity for **alterity** is ineliminable (ontogenetic systems cannot be closed)





(onto)genesis requires ineliminable alterity

- Any closed (i.e., determined) system that purports to model the totality of its own evolution must assume external parameters (laws and initial conditions) which it cannot generate. These parameters are formally alterities, i.e., unprestatable, untraceable, and unmodelable from within. Therefore, any such system is *not* closed, and **the universe cannot be unitary**.
 -unless it's eternal (no genesis, **no explanation – the ultimate in mysticism**)
 - Halting problem (cf. oracle machines); computational irreducibility (still Laplacean)
 - Self-reference; incompleteness theorems (demon cannot be immanent)
- There can be no effective theory of the cosmos
 - Effective theories are not “fundamental”
 - There is no **privileged basis of reduction** (enter perspectivism)
 - There's no privileged “level of description” for any stratified system
- You either bite the theological bullet (external creativity), or you acknowledge **immanent alterity**
 - A universe with “**real chance**” (indeterminism, under-determination) is not closed
 - The constitutively under-determined is “**excessive**” wrt to any reference frame
 - No unitary description of creative evolution is possible (contradiction in terms)
- Chuck to the rescue
 - **Variation** (the “zero force evolutionary law”) and **selection** are immanent alterities

What motivates Platonism?

- The inevitable need for *alterity**
 - Formal systems (like “appearances”) always point to something beyond themselves
- In 20th Century maths departments, this is connected to the inevitable incompleteness of any self-consistent, finitely specified axiom system
 - There’s always some “outside” that is indeterminate from “within” the system
 - You can always nest the system in some larger pre-determined “space”, but that too will summon the irreducible alterity (oh, the **horror!**)
- Indeed, any non-trivial axiomatic system will have unprestatable consequences
 - “...in general one will not be able to construct a finite set of axioms that can be guaranteed to lead to ultimate completeness and consistency.” Wolfram, *NKS*, 783
 - Cf. the halting problem.
- *There is some *active* reality that is not captured by this formal approach, that is not intelligible in terms of it, does not belong to this determinable domain
 - The “absolutely irrational” in Whitehead; the “generative nothing” in Peirce.....



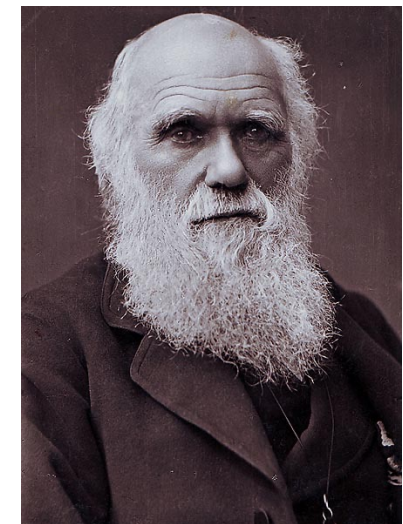
The rationalist ambition

- The rationalist ambition is always to expand the frame, to determine the indeterminate
 - Life does this, incorporating more of the preindividual, expanding its powers
- ...but it's not possible to *exhaust* the indeterminate (completeness, *closure*, are abstract, fantastical)
 - The under-determined is *generativity as such*
 - Rationalism undermines itself, cannot “self-ground”
 - Frame expansion (like evolvability) itself relies on the existence of alterity
- Only death exhausts generativity, and death is radically local....
 -just like the domain of application of any effective theory
- The *logos* is a form of *techné* – determination by “the word”
 - As we have thought the universe like a clock, a steam engine, a computer, we have thought it was like the word
 - Each (en)framing neglects its own conditions of ontogenesis
- Relativising the rationalist ambition is not “giving up”, it's removing a block in the path of inquiry
 - Giving the indefinite its ordinal priority is preserving the **possibility** of explaining *any given* structure or form
 - The dream of “complete explanation” is self-defeating



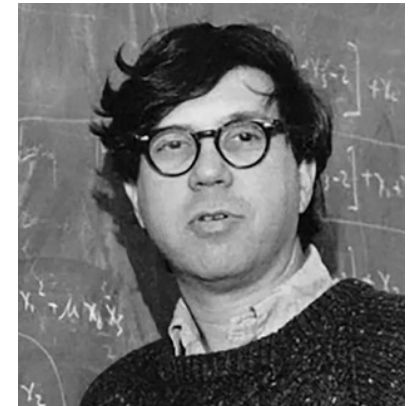
Excess and alterity – Gilbertand Chuck

- Gilbert Simondon
 - “....**biological individuation does not fully resolve tensions: it leaves the problematic latent, subsistent**; ...life is a first individuation; ...has not resolved everything; we have movement to go ever further...**we have tension and potentials for becoming-other**, for recommencing an individuation that is not destructive of the first. This force is not vital; it is pre-vital...” *ILFI* 340
 - Organisms have multiple entelechies, due to ongoing differentiation
 - "According to the doctrine we are presenting, being is never one: when it is monophasic, preindividual, **it is more than one**: it is one because it is non-decomposed....” *ibid.* 369
- Chuck D
 - Darwin’s major intervention, against the thesis of special creation (cf. hylomorphism), is to make the “**overproduction**” of variation (difference, excess) the **first principle**
 - Darwin/Peirce/Lewontin triad – variation:selection:inheritance
- The “Darwin-Hooker Principle”
 - “....a pure variability of the living, “**an inherent tendency to vary**”which remains without determined or perhaps determinable cause, (is) intrinsic in the sense that **natural selection only intervenes in it secondarily**, and thus extrinsically (even if ...it also itself tends to **conserve and amplify** this intrinsic variability of the living).” Jerome Rosanvallon, Pure variation and organic stratification



The Darwin-Peirce-Lewontin Triad

- Variation:selection:inheritance
 - Variation is constitutive or intrinsic to all levels of biological systems
 - Not just “mutation”, but stochastic gene expression, Brownian motion in and between cells, spontaneous activity in nervous systems, stochastic behaviour, &c
 - Selection occurs across levels, both internally and externally, “abstracting” and amplifying a subset of “standing variation”
- “Forms” or “species” are relatively stable “clumps” in the field of primary variation
 - Unlike in hylomorphism, where variations are “accidental” deviations from essence, variability or generativity is primary
 - “Matter” is not passive, but form and matter are the “extreme terms” which obscure the “central zone” of life itself
- “Neo-Darwinism” and genetic determinism are *not* “Darwinian” in this sense
 - They are hylomorphic – bodies constrained by forms (as their “vehicles”)
 - This is a standard “mechanistic” paradigm, whereas Darwin’s logic is *anti-mechanistic*.
 - The “effective theory of evolution” seeks a privileged base of reduction, a definitive “level of selection”, i.e. to **identify the unique causal agents**
 -let’s not be too hasty to substitute one hylomorphic scheme with another, grand ideas require great care



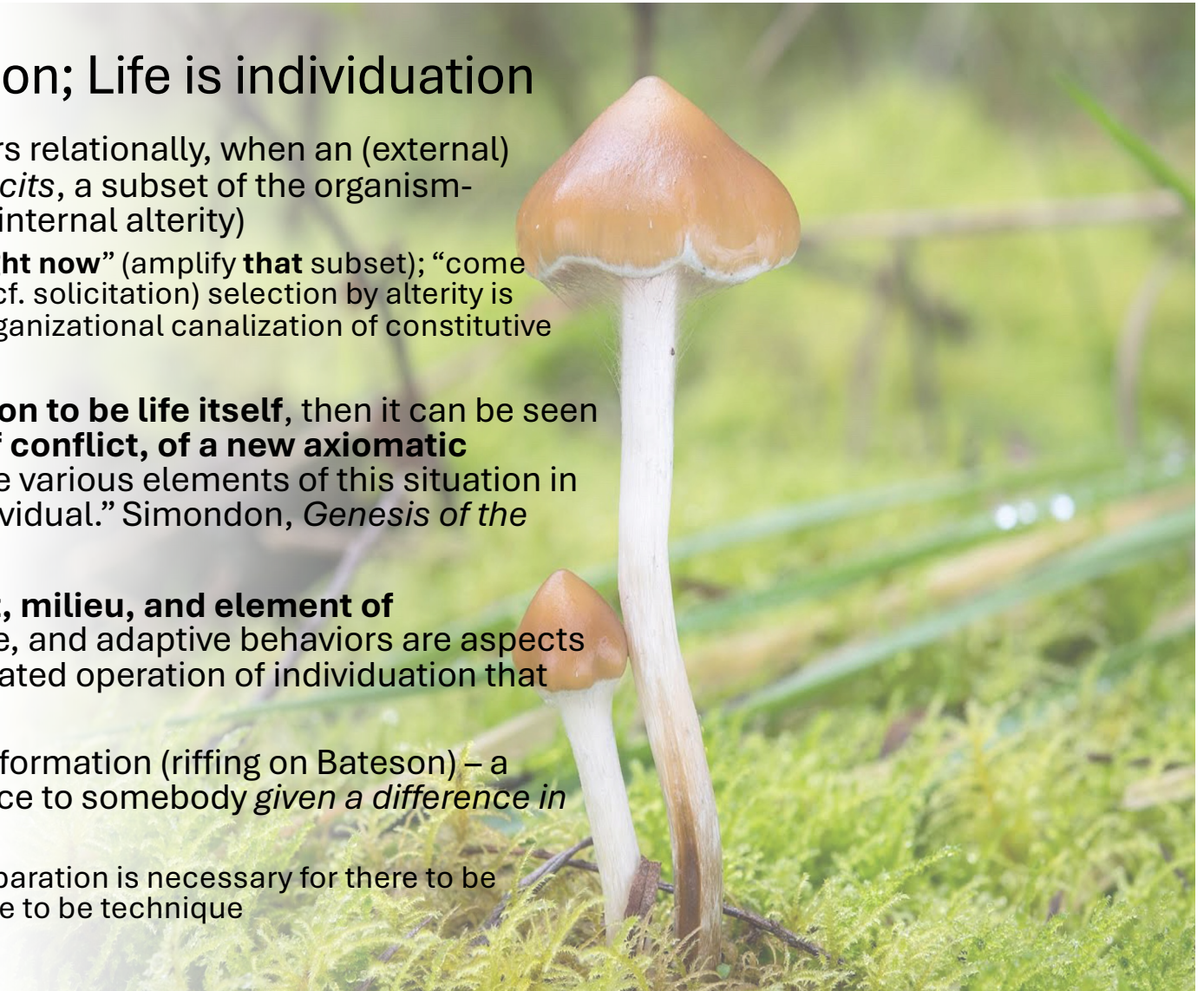


Physical *versus* vital individuation

- Physical systems “individuate all at once” - they “jump the gun”. This is **becoming-physical** (since the pre-individual is pre-physical and pre-vital).
- Living systems defer (complete) individuation indefinitely – they are “neotenic”, they maintain the charge of the pre-individual and do not exhaust it.
- The organism, or *subject*, comprises the coupling of individuated and pre-individual realities.
- It thus maintains an internal problematic, is “more-than-a-unity”, at odds with itself, *frustrated* (sequestered degrees of freedom)
 - Stochastic gene expression, spontaneous brain activity, stochastic behaviour, autokinesis, babbling (motor and linguistic) &c

Individuation is elicitation; Life is individuation

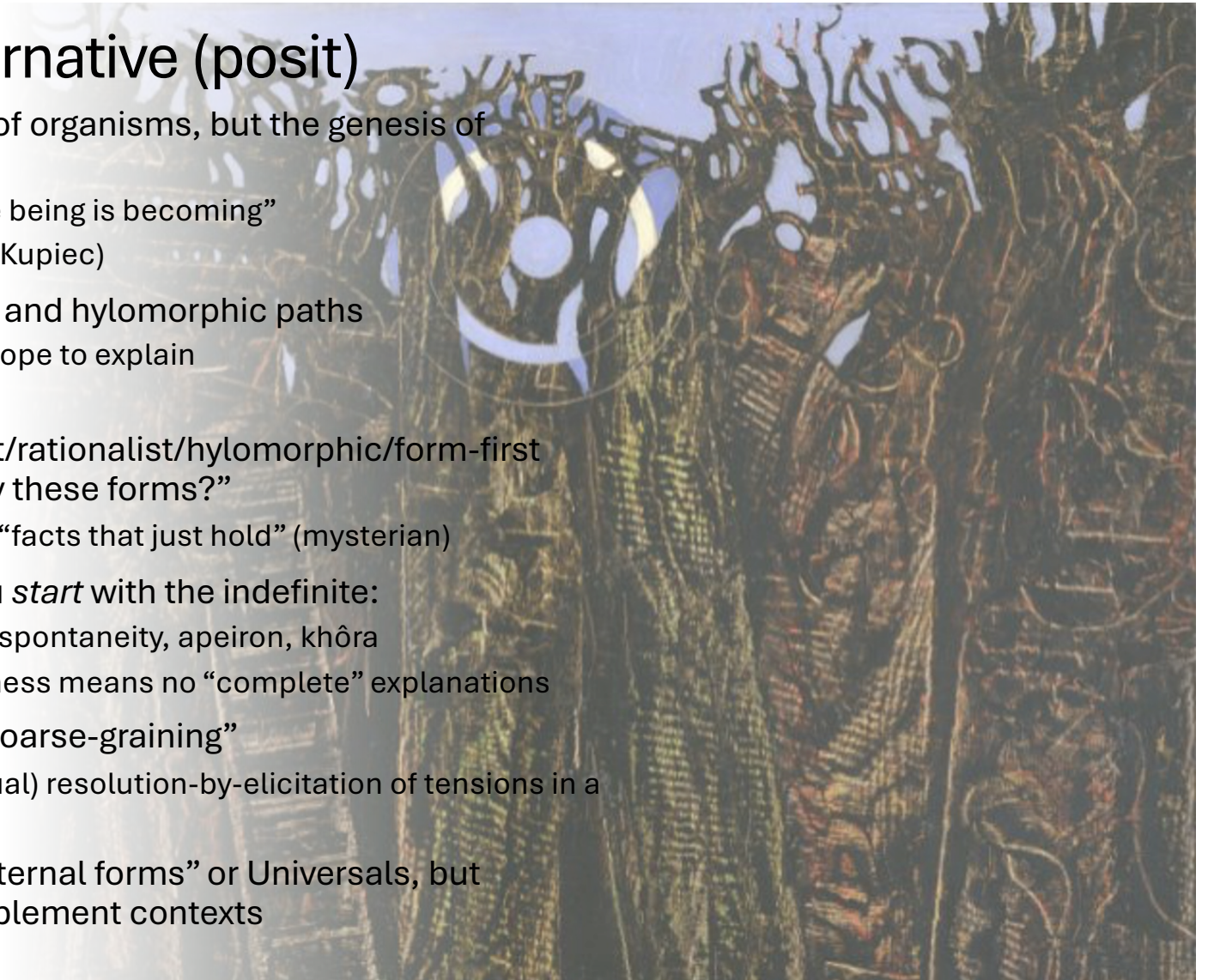
- Individuation/ontogenesis occurs relationally, when an (external) alterity selects, “refers to”, or *elicits*, a subset of the organism-subject’s constitutive variation (internal alterity)
 - “This is what you need to be **right now**” (amplify **that** subset); “come forth, reorganize” – *elicitation* (cf. solicitation) selection by alterity is *secondary* to self-selection (organizational canalization of constitutive variation)
- “When we **consider individuation to be life itself**, then it can be seen as a **discovery, in a situation of conflict, of a new axiomatic** incorporating and unifying all the various elements of this situation in a system that embraces the individual.” Simondon, *Genesis of the Individual*
- “**To live consists in being agent, milieu, and element of individuation.** Perceptive, active, and adaptive behaviors are aspects of the fundamental and perpetuated operation of individuation that constitutes life.....” ILFI 236-237
- A Simondonian conception of information (riffing on Bateson) – a difference that makes a difference to somebody *given a difference in that body*.
 - Primary difference/tension/disparition is necessary for there to be information, necessary for there to be technique



The ontogenetic alternative (posit)

- Not (merely) the development of organisms, but the genesis of *being(s)*
 - The study of “the being whose being is becoming”
 - In biology: ontophylogenesis (Kupiec)
- Goal: avoid both substantialist and hylomorphic paths
 - Do not presuppose what we hope to explain
- In the effective theory/mechanistic/physicalist/rationalist/hylomorphic/form-first paradigm, you cannot ask “why these forms?”
 - You are *stuck* with a bunch of “facts that just hold” (mysterian)
- In the ontogenetic method, you *start* with the indefinite:
 - “Variation-first”; autokinesis, spontaneity, apeiron, khôra
 - Biting the bullet on indefiniteness means no “complete” explanations
- Individuation is constructive “coarse-graining”
 - The eventual (kairotic, contextual) resolution-by-elicitation of tensions in a heterogenous “field”/flux
- Convergence never requires “eternal forms” or Universals, but indexes shared constraint-enablement contexts

Max Ernst, *Forest, Birds, and Sun*



Ontogenetic alternative, cont'd

- Form emerges as a *consequence* of individuation/actualization/ontogenesis
 - Form comes from the “actual”, which “counter-effectuates” the virtual/potential (indefinite activity), generating an *adjacent possible* of quasi-determinate possibilities
 - “Singularities” are a *praesenti*, **evental**
- The adjacent possible haloes the actual, it is penumbral
 - This “**virtual** reality” is not *substantially*, but *operationally* distinct from “the actual”
 - The basic nature of nature is to move, to vary, to *differ from what is already actualised*
- Bodies are not completely constrained (especially if they’re complex/stratified) by form, which itself arises via in-formative relations between active bodies (immanent genesis)
 - Forms are “immanent” to bodies, to the flux, arising relationally, never absolutely “finalized”
 - In-formation is “-ecceity” – this here, now.
- Natural abstraction
 - “Abstraction expresses nature's mode of interaction and is not merely mental. When it abstracts, thought is merely conforming to nature, or rather, it is exhibiting itself as an element in nature.” – Whitehead, *Symbolism: Its Meaning and Effect*, 26
- Yes, there’s physics (and biology &c) for all this (promise), but there’s a *lot* of detail to work out
 - The ontogenetic method is an alternative *posit*, not a “complete theory”
 - ...indeed, cf. “indivisible remainder”

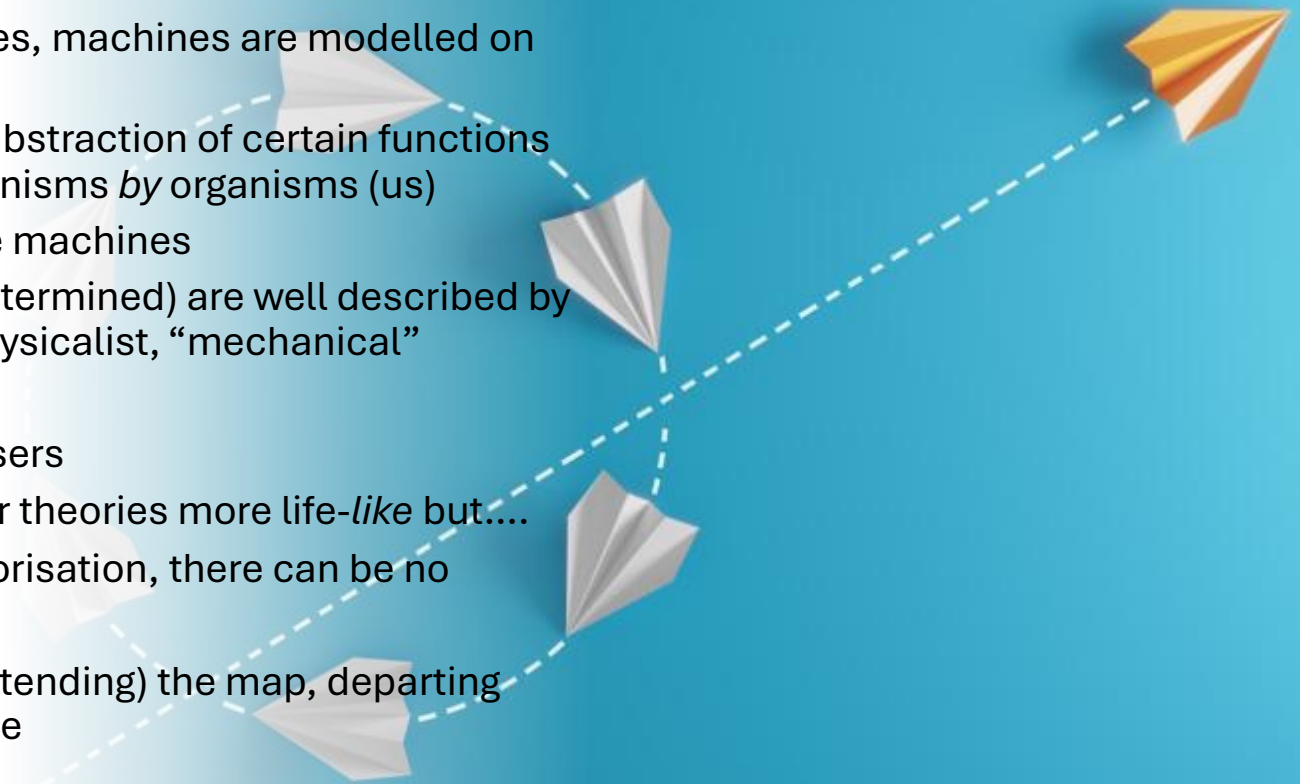
Radical?

- Sacred cows of physicalist rationalism
 - Global unitarity
 - Global PSR
 - Well-defined “grand unified theory”
 - “Complete” explanations
- Sorry.
- But why is giving such things up threatening to us?
 - It will *not* undermine science – effective theory is *effective*, physics is a *resource theory*, i.e. informational
 - Instrumental positing of the local conditions of unitarity is perfectly legit, and “loci” can be vast
 - It’s not “every thing must go” (individuals are real) but “every thing must be relativized”
- These sacred cows do not exist in the same way in South and East Asian traditions (for example)
 - It’s certainly *not* because these philosophies are “less sophisticated”
 -but they may well be less derived from technical, artisanal, paradigms



Life is effective theorisation

- Living systems are not machines, machines are modelled on living systems (Canguilhem)
 - Machines result from the abstraction of certain functions (“mechanisms”) *from* organisms *by* organisms (us)
 - It takes organisms to make machines
 - Machines (as externally determined) are well described by effective theories (= the physicalist, “mechanical” paradigm)
- Organisms are effective theorists
 - We can (it’s hard) make our theories more life-*like* but....
 - ...since life is effective theorisation, there can be no “effective theory of life”
- Life is always wandering off (extending) the map, departing from the predefined state space
 - Engaged in mapping....
 -but not (necessarily) representationally (theory of **natural abstraction** goes here!)





Evental elicitation – “ecceity”

- Kairotic **encounters** – events
- "There is a mode of individuation very different from that of a person, subject, thing, or substance. We reserve the name haecceity for it." Deleuze and Guattari, ATP 261
- "This is sometimes written "ecceity," deriving the word from ecce, "**here is**." This is an error, since Duns Scotus created the word and the concept from haec, "this thing." But it is **a fruitful error** because it suggests a mode of individuation that is distinct from that of a thing or a subject." ATP 540-541 (note 33)
- For Simondon, the “haecceity” of information is the “here is”, the *hinc et nunc* (here and now)

Kairotic encounters





Physis is apeiron

"Never....can a being which possesses definite qualities or consists of such be the origin or the first principle of things."

Nietzsche on Anaximander, *Philosophy in the Tragic Age of the Greeks*, p47