

GENERAL ANTHROPOGENY

THIRD PART – SUBSEQUENT ACCOMPLISHMENTS

Chapter 21 – THE THEORIES OF THINGS / PHILOSOPHIES AND SCIENCES

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Chapter 21 - Theories of Things: Philosophies and Sciences

All the graspings made by Homo in his environment are systemic, because of the coherence of his signs, or as a result from technical manipulations which are transversalizing, indicializing, indexing and thus hold together (estanaï, sun) what they broach. But these graspings are not necessarily systematic, i.e. the systems they create are not thematized as systems.

21A. The terms “theory” and “things”

The term “theory” then refers to the graspings of the environment which are precisely systematic and therefore thought as to their system and accompanied by a degree of sufficiency, with the rhythmical inclination inherent to all self-sufficiency. Enjoyment even becomes here pleasure in that it is insistent, in its reduplication.

Theories took a long time to form in Homo’s evolution. Depending on the various ethnic groups and periods, they were initially sought indirectly through tectures, images, dances, music, and, more fundamentally, gestures. And it took autarkic scriptures (such as Chinese <18B1>) or transcriptive writings (serving a dialect <18B2>) for them to find their appropriate vehicle. One day mathematical writing <18H> appeared as well.

For our purpose, the word theory has the disadvantage of being restrictive, since the Greek theôria, from which it derives, privileged sight (tHeôreïn, tHeastHaiï, to see, to look), and particularly the embracing, totalizing, integrating sight, from the “right distance”, offered by the Athenian theater (tHeatron), that proposed to grasp wholes (actions, actors) made up of integral parts according to the will of the Greek WORLD 2 <12B>. But, at the end, since it is with this Greek world that the systematic grasping took all its decision, it is probably why “théorie” and “theory”, have endured and are now adopted all over the world to describe a system grasped as a system.

As for the term “things”, such as it appears in our chapter title: “The Theory of Things”, it refers to any elements insofar as they are of interest to Homo and thus create an event (venire, ex), opening a field of indicialities (causa, cause, thing) <4A> calling for indexations <5A>. In the same sense, the English word thing is well defined as a matter of concern (cernere, cum), a state of affairs (facere, ad). The French “choses” and the English “things” each cover what German has divided into two terms, the feminine Sache – die Sache – and the neutral Ding – das Ding – the first thematizing whatever falls within its reach in the environment, while the second includes what is more subtly glimpsed, as a secret quality, a mood, the focus of desire that, under a particular desired object, Freud calls das Ding, or even the inaccessible ontological dimension that Kant refers to as das Ding an sich (the thing itself).

21B. Pre-philosophical theories

Having established this vocabulary, we understand that the manipulating, indicializing, indexing, neutralizing, and generalizing Homo had to develop theories of things rather quickly, in any case from about 50 or 30 thY, once he had really mastered dialect and detailed image <17G2>. Regarding the theories that preceded philosophies, an anthropogeny has probably very little to add to what it already learned from tectures, images, or even from what we guess from the first music and dances, since it is in these mediums that systems were first encountered as systems.

So let us merely recall that the pre-framing Paleolithic <14A11>, showed a first systematization in the way Homo arranges the painted figures according to the topology of the caves, demonstrating evident autarky, enjoyment and ecstasy <13D,14A11>. In the same way, the framing Neolithic suggested a first developed and developable system of things in its generative schematism <13E,14D>. Africa and Polynesia – hardly framed and unscriptural – were the source of spoken, auditory, tactile theories of things that can be described as interwoven, around the rhythm of dance, music, dialect, for which Marcel Griaule’s interviews with the Dogon Ogotemmêli, God of Water, revealed to us, despite the translation, some elements of the general movement <22B1-2>. Likewise, the theory of things that flourished in primary empires appeared on the occasion of their intensive writing <18B>. The glyphs of the early texts, under the browsing eyes and manipulating hands of the scribe, favored polarizations, indicialization and indexing up-down and down-up, right-left and left-right, along with diagonal entries. They were small-scale universes, framed and sub-framed, that invited the creation of stars as the ultimate reference frame, since the stars were the best to realize these scriptural vectorialities. This is what finally gave the solar centering of the Amarna theology. And, in China, the interpenetration of animals, materials and body parts around five cardinal points. Or still the pleroma of the 13, the 4 angles of the sky, the 4 of the earth, the 4 of the underworld + the 1 of Homo, among the Maya.

Yet, if the theories of things in this pre-philosophical moment – whether ascriptural or scriptural – are not consistent enough to require detailed explanations, they nevertheless possess two features that we must point out as they will support all subsequent anthropogeny.

21B1. The plastician spontaneity of transversalizing manual Homo

In all these cases, in fact, the theories demonstrate a propensity in the transversalizing and manipulating primate to grasp the Origin of things as the result of a physical manipulation (manus) and a mental manipulation (manus) of Formers-Constructors, where Homo's still extropic immersion in the environment is reconciled with a first desire for endotropy.

This is what the words “plastic”, “plastician”, “plasticism” cover, which aim at modelling, shaping, and this under the control of the entire body of Homo, who finds in it both image and likeness. As a craftsman, sculptor, painter. And, also as an orator. And finally, as the one who imagines, with the same resonances as the Latin *ingere*, and Descartes' French “*feindre*” (“*Puis voyant que je pouvais feindre que je n'avais aucun corps...*”), running from imagining to forging-for-oneself. The intuitive connection between the plastician and what he shapes is revealed in the middle voice of the verb, *plattestHaï*, which encompasses “to compose oneself a posture” right down to “to make illusion to oneself”.

Homo's inherent plasticism has made the force of the Paleolithic, Neolithic and primary imperial images, in which everywhere the auditory, optical and tactile figures conceive the cosmogony of things as a plastician operation, with the meanings we have browsed. So much so that art (technique) and theory were not very different. The Chinese *Yi King*, the book (king) of transformations-conversions (*yi*), begins with two elementary plastic phenomena, the continuous line $_$, yang, and the open line $- -$, yin, which is obtained by breaking wooden sticks. Still plastically, it combines them by 3, then by 2×3 . Then, its practitioner considers that by reading from bottom to top the 64 combinations thus obtained, he meets the essential situations of the Universe and of Homo, according to a viewpoint that is at the same time an ontology, an epistemology, a morality, a mantic. In this system, which results from the fundamental mathematical and scriptural element – the trait-point – the figures encountered are simultaneously very analogizing (thus working by resemblance) and very macro-digitalizing (thus designating by exclusion in a closed system) <2A2e>.

Around the year -1000, the Hebrew cosmogony will produce another anthropogenically fertile manifestation of hominian plasticity, after the fall of Ugarit. According to the Book of Genesis, indeed, Yaweh-Adonai operates separations and demarcations between heaven and earth, between earth and waters, although these cleavages never evacuate the initial *tohubohu* within which they are inscribed. This same ambiguity intervenes in the origin of Adam, who is born sculpturally from a divine modeling, but in a *gleba* over which a vague breath passes. He will remain the “*glebous*”, from whose rib his other self – Eve – will be drawn and will “stick” to him *glebously*. The Hebrew plasticity of the temple of Solomon was the result of cryptic encounters of numbers and materials.

21B2. Theoretical fecundity of the subframe and writing

The second observation that this anthropogenic moment calls for is that a theory, to flourish, needs framing. In the woven, and therefore not very framing, spoken theories from Africa and Oceania, any passage from the systemic to the systematic, as soon as it is laid down, is blocked, confined by the existing rhythm of language, mimicking and distributing “things” perceived as almost instantaneous surges of force (the fluid blood and speech of the Dogons of Africa) or life (kamo and do kamo, the living and living par excellence of Oceania). The specificity of spoken weaving, as with all weaving, is to go on, and not to go back on oneself. Hence to maintain an endless flow of activity on-site, which confirms a non-vectorial time, and which does not call for written historicity.

As a result, in all the places where it has prevailed and still prevails, the weaving theory has had less theoretical future for the anthropogeny than the framing schematism of Neolithic. And indeed, in the Old World, it was in the regions where the latter prevailed that Homo, about 5 thY ago, moved relatively quickly from framing to sub-framing and to the writing of primary empires, with their theoretical rebounds, the best known of which are the variations of Egyptian theologies moving and founding new cities along the Nile. In the New World, the history of Amerindians in no way contradicts this connection between framework, sub-framework, and theory of things.

The theory of things of the primary empires, Egypt, India, China, Pre-Columbia, proved so strong, and seems to have been so well suited to several fundamental characteristics of Homo that it has dominated certain regions for millennia until today, and that we do not see at first glance why it has not definitively closed the theoretical evolution of Hominian specimens, given that these in this ubiquitous sub-frameworking seem to have perceived themselves as fully explained and justified. The plastic and existential perfection of ancient Egypt continues to take our breath away.

21C. Philosophical theories

However, despite these intensely pleasurable accomplishments, there was a violent rupture taking place in various parts of the Planet about 2.5 thY ago. This rupture is illustrated by Lao Tzu and Confucius in China, by the Upanishads in India, by the Torah and the Prophets in Israel, by Zoroaster in Iran, and by the Greek philosophers. For the pre-Columbian civilizations, the contemporaries of Chavín de Huántar and the Olmecs might have played a similar role.

In all these cases, we observe a few specimens of Homo rising in the crowd with a certain abruptness, instead of continuing to perceive themselves as relays in a social fabric that is itself connected to the fabric of things. Admittedly, they are surrounded by disciples, but the latter are invited to exercise as much as them the solitude of possibilizing meditation, consideration, and contemplation <6A>. Whereby – they all think – things will come to them without any intermediary, according to a subjective evidence that implies an objective truth. They thus receive the shock of an Ultimate, a Principle, an Embracing so pure that it is independent, facing their own purity and independence. And they call this Ultimate, this Principle, either First or Last, with extreme names: Chaos/Order, Nothing/All, Infinite/Finite, Evil/Good, Reason, Axiom, Open, etc.

Can we then suggest factors of such great change, considering that it happened in the emerging Greek WORLD 2, but also in the scriptural WORLD 1B, around 500 BC, long before the primary empires were influenced by Greece, through Alexander's conquests? Once more, we think of a new state of technology that would have entailed a new social state. And indeed, almost everywhere at that time, Homo was becoming sufficiently proficient in its technical productions and in its movements (migrations), within and beyond the group, to escape the immediate social bond, and for the system of things to appear to him independent of this bond – or anterior to it – and accessible in its own right. This independent system of things, as a systematizer, gives him then a *de facto* autarky, which will no doubt have to wait for the 17th century rationalism to become a *de jure* autarky.

We also think of a maturation of dialects, with access to increasingly extensive and demanding syntactic links, which favored embracing, ultimate, first, last views, evoking in their producers simultaneously eristic and elevating states. This is true in the implicit syntax of the Chinese language, in the pivotal roots of Semitic languages, in the aggregations of the Mayan Quiche, in the explicit syntactic compositions of the Indo-European, Sanskrit, Iranian and Greek languages <17G2>.

Lastly, we can suspect a new state of writing, which would have become more cursive, thus allowing faster, and most importantly, more neutralizing and thus generalizing transpositions, up to the perfect abstraction of the Ultimate, First, Last. In Chinese writing, the relationship between pictogram and ideogram had to undergo an evolution in favor of the latter around 500BC. Symptomatically, Confucius built up a first corpus of Chinese texts that gave China that “Critical Antiquity” (Jaspers) that completes Lao Tzu's transcendental Taoist naturalism. Similarly, the contractual exchangeism that emerged in Phoenician, Aramaic and archaic Hebrew writings played a theorizing role. Finally, the transparent and equitable Greek script would provide the decisive instrument for an order of things perceived as autarkic by everyone, irrespective of the group.

21C1. The notion of philosophy

This new practice of Homo has become known as pHIlosopHia according to the Greek word. The term is revealing, since it describes a “sophie”, i.e. an ultimate, first, last theory of things, while at the same time it marks the fact that it can only ever be aimed at, either as object of a respectful and somewhat remote cherishing, or object of a pHilia. The philosopher, says the word, is a friend of the *sophie*, not its lord. And the Greek title of sophist, i.e., producer of sophie, will remain derogatory. The philosophical modesty that Aristotle states at the beginning of his *Metaphysics* can be found everywhere. Likewise, the Indian, Chinese and Japanese philosophers knew that they would never achieve bodhi or satori, and that they would have to be content with t’chan and Zen, that create favorable conditions for approaching them. All philosophers adhere to the opening statement of the *Tao Te King* (book of Tao), that “Tao is unspeakable”, in the same way as “Das Ding an sich” is unspeakable in Kant.

Thereby, any philosophical systematic is progressive, regressive, discursive, precisely because of the impossibility of reaching the Ultimate all at once, or even never really, as opposed to the mystique, who achieves it with every ecstasy, or to extreme art in its extreme works. This is undoubtedly why philosophy cannot make content with images, music, dances, or even lyric weaving. It needs a written language, or at least a close link with writing. When Beethoven says that “music is a higher revelation than all wisdom and philosophy”, it is because, despite the similarities of the structures, textures and growths of music it shares with those of Kant and Hegel, he does not operate philosophically. Although Socrates does not write, he moves in an environment where writing is everywhere. He utters a word so scriptural that Plato will transcribe it, or at least give the illusion of doing so, shortly afterwards.

Thus understood, there are various degrees or statuses of philosophy, of which anthropogeny must offer at least a summary panoply. (a) Taken in its strictest sense, philosophy generates an extensive and differentiated system that develops over centuries or millennia, within a clearly circumscribed area of debate shared by all the protagonists, as was the case in the West from Parmenides and Heraclitus to Sartre. (b) In a still strict albeit protean sense, it produces a system whose principles are shared, but whose differentiations take pleasure in their perpetual movement, leading correlatively to an evasive proliferation of debates. This was the case of the *Upanishads* (upa, assad, putting in relations / connecting) in India, “one of a class of Vedic treatises dealing with broad philosophic problems”, as the Merriam-Webster puts it. (c) In a sense that is still demanding yet available, it activates-passivates a system that is not very extensive and not explicitly differentiated, as in the Chinese *Tao Te King* (book of Tao). (d) In its broad sense, the Ultimate it attains does not really diffract into a systematically articulated system and is content with its fulgurances, which rebound in paradoxes: thus the “philosophy” of the Prophets of Israel, or that of Nietzsche or Kierkegaard. (e) In its ambiguous sense, which concerns the Arab philosophies of Avicenna and Averroës, and the Jewish philosophies of Maimonides and the Kabbalah, the transcendence of the Ultimate defies any decisive ontology and epistemology, and if a systematic discourse occurs it is primarily as a theory of interpretation (interprets, mediator), of the levels or angles of approach to a text, it being understood that sacred texts, but also any text, always carries revelation. Every statement then borders on paraphrasing.

The philosophical process was so dependent on the virtualities of writing that the various degrees that we have just identified were undoubtedly linked quite closely to various types of graphic design <18>. It is difficult to see its strictest sense being developed without writing that is transparent to the being and the real introduced by Greece. Its strict albeit protean meaning without the sub-articulate and intense writings of India. Its demanding but available sense without the autarkic Chinese writing. Its broad and ambiguous meaning without the non-vocalic writings of the Semitic languages, sometimes anesthetic (fostering logico-semiotic field effects) in Israel, sometimes esthetic (with powerful perceptive-motor field effects) in Islam. Furthermore, it is difficult to envisage Nietzsche's apothegms written in any other way than German Gothic.

21C2. The limited panoply of philosophies

There has been a finite number of philosophies, even when understood in a broad sense. It is undoubtedly that the upright, transversalizing, lateralizing, angularizing, possibilizing, endotropic, associative, neutralizing and generalizing (conceptual) Primate can only identify a few major essential orientations, a few major indicialities and indexations in the Universe, at least when it adheres to the resources of the dialect, whether spoken or written. Only the imaginary calculation of mathematics offers him, one might think, a true elsewhere.

Indeed, within the linguistic framework, we can only conceive of about ten native (naive) links between two phenomena in the Universe. Here is a brief panoply of these relationships, where "A" and "B" appear as "things" in "theories of things".

(a) "A" and "B" are irreducible, and they fight one another in a radical and never-ending struggle. Zoroastrianism and Catharism, insofar as we can sufficiently surmise them.

(b) "A" continually converts into "B", which in turn starts to convert back into "A", in a relentless homeostasis. - Yin and yang of the Chinese Tao.

(c) "A" and "B" form tireless sub-articulations between them, where they overlap and reflect each other in infinitely small ones, almost indistinct. - Hinduism, with its derivations of Brahmanism, Buddhism, Jainism, Vedanta, Mimansa, Tantrism.

(d) "A" and "B", in the initial and continued tohubohu, can only be partial exchangeables (merces) according to a generalized commerce (com-mercium), where the only markers somewhat fixed are pacts (alliances) and strict ritual prescriptions. - Hebraism.

(e) "A" and "B" are in nesting compressions. - Amerindian.

(f) "A" and "B" each cancel each other out and awaken one another under the lightning strike of their Principle. - Arab Islam.

(g) "A" and "B" are complementing and compossibilizing each other as integral parts of wholes, which gives them a reason for being, presupposing at their Principle an intelligence-will, or at least a real-good. - The West.

21C3. The permanence of philosophies. The coherence of strands. The case of the West

It is of great importance for the Anthropogeny to note that philosophies have not changed much, and this is because of geographical and political partitioning, but more importantly, because of Homo's ethos as he craves for reminiscence and systemic stability. If we compare a philosophy to a rope that would cross the ages, it appears to be made of strands that wind and support one another. We will content ourselves with considering the most complex case, that of the West, which will enlighten all the others. Indeed, the Western party of seeing wholes made up of integral parts everywhere (WORLD 2) means that philosophies, which also operate as integrated wholes, have contrasted to the extent that this time they appear as refutations of one another, in a dialectical succession of theses, antitheses, syntheses: empiricism/rationalism, spiritualism/materialism, determinism/indeterminism, etc. It is all the more astonishing to observe here a constancy spanning more than two millennia, the major strands of which are as follows:

(a) The postulation of the adequacy of language to the Real, whereby the Real is converted into Reality, i.e. into a Real adequately tamed by Homo. This explains Plato's idea that the philosopher should only deal with "interesting objects", those susceptible of being grasped by intelligible forms, and not others, such as garbage or absurd compounds. Across the West, the nominalist currents, favoring the singular, were always considered as stimulating objections that needed to be tamed, up to and including Peirce.

(b) The practice of an oppositive and exclusive logical disjunction (the being is, the non-being is not), without which language cannot pretend to be adequate to reality.

(c) Dialectical mediation, where – provided that they are understood as a thesis and an antithesis – opposing elements give rise to a synthesis, without which there would be no reduction of the elements to "wholes" made up of integral parts: whence the trinities of matter and form in the living; of being and non-being in the becoming; of the one and the multiple in the procession and recession of the One; of the Father, the Son and the (Holy) Spirit; of the thesis, the antithesis, the synthesis; of the ruling class, the proletariat, the classless society; of a Firstness, a Secondness, a Thirdness (Peirce); of the mother, the father and the child (psychoanalysis).

(d) The primacy of final causality, that subordinates material, formal and efficient causality, to the extent of postulating a "raison d'être" that demands that the specimens of a species – for Plotinus – should respond not only to such characteristics but also to such numbers, and that – for Leibniz – assumes that all events affecting a subject (of proposition and action) are pre-contained in its definition; to the extent of conceiving a "radical evil" – for Kant – which is more or less prefigured by Shakespeare's *Richard III*'s Gloucester, Goethe's Mephistopheles of Faust, and Sade. This also explains the fascination, until Valery, of Satan, that is not only a static evil principle, like that of primitive Hebraism and the Ahriman of Zoroastrianism, but a "will" so sufficient, so "free", that it no longer pursues the good. To what we can attach the conviction that there is an absolute happiness, which can be defined as an intellectual bliss (the

understanding of ends), and that goes from Aristotle and Plotinus to Thomas Aquinas and Spinoza.

(e) The trust in the *a priori*, Plato's underlying inspiration also declared by Kant, which is usually only controlled by the non-contradiction of the theorems deduced from it.

(f) The increasingly general engineering, as an intellection and then as a responsibility towards nature. Plato's demiurge, Aristotle's first motive, Plotinus' Noûs, the Creator of Christianity becoming co-creator since 1033, Descartes' God enjoying the shortest paths, Voltaire's great watchmaker, and the Axiom of Taine are all highly gifted engineers.

It is essential that an anthropogeny should note that these six philosophical strands support and suppose one another. For instance, to obtain the singularity that the ontological argument is (the existence of God deduced from his essence), which continues from Anselm (11th century) to Lavelle (20th century), it was necessary to have confidence in the language, in the sufficiency of the *a priori*, in the reciprocal implication of "raison d'être" and finality, in the radical will, and no doubt also an unshakable faith in the deductibility of the whole (to pan) that culminates in the procession and recession of Plotinus or in Hegel's Great Logic.

In this way, the cohesion of a philosophy is so great that, at the end of the West, Hegel ended his Encyclopedia of Philosophy with an entire page of Aristotle's *Metaphysics* quoted in Greek, without translation and without any commentary. In the same way, as the West was practically finished around 1950, Sartre made declarations on the freedom of conscience where culminated two millennia and a half of philosophy with an *a priori* that went as far as insanity: that "conscience" could not be affected by any influences from beings external to it, but only influence itself on their occasion.

Within the framework of a same philosophical movement, the Anthropogeny will then note the distinction of temperaments, of which idealism and empiricism, or more fundamentally endotropism and exotropism <6B>, are the two most important. For example, the Western couple Plato/Aristotle, or the Indian couple Çankara/Ramanuja. The fact that these were not so much different philosophies as complementary aspects of the same philosophy has often been remarked, particularly by Kant and Bergson.

21C4. The style of philosophies

The pre-philosophical theories of things, realized through images, music, intense writings, emerged to us as a more or less ecstatic conjunction of endotropy and exotropy. In contrast, philosophies – whether idealistic or empirical, and therefore more endotropic or exotropic – have been widely endotropic, that is to say that their initiators and disciples first sought the creation of a mental site from which Reality, or even the Real, became available to them by mental embrace (techno-semiotic) and by rhythmic fusion <1A5>, through the resources of speech and writing. In other words, all philosophies, whether they were more written or more linguistic according to their choices, exploited the endotropic resources of language.

Firstly, the general order of propositions is an illustration of the structure attributed to things. For example, Plato's eristic linear dialogue, Aristotle's accumulated notes, Plotinus' methodical dissertation, Thomas Aquinas' questions, Descartes' rules, discourse, meditations, principles, Locke's essay, Kant's critical treatise, Hegel's leitmotif, Nietzsche's apothegms, Deleuze's rhizomic dialogue.

It is even up to the very texture of the philosophical text that everything is in place to achieve vast and sustained enjoyment. The Presocratics wrote in lines, Lao Tzu and Nietzsche in verses. Çankara's Sanskrit is regarded as supreme by the Sanskritists. Rhythm and horizon are achieved in a muted but constant manner in the prose of Thomas Aquinas, Kant, and Hegel. Through his perceptive-motor and logico-semiotic field effects, Descartes is as stupefying as a Latin writer, in the *Meditationes* (gravely bland in their French translation), as he is as a French writer in the *Discourse*, and his case is exemplary because, without these linguistic resources, he could not have asserted that he could "feign" to be without a body and to not be in any place or any world. Plato, through his writings for the general public (exoteric), which are the only works that have reached us, combines the resources of all the literary genres of his era, particularly the theatrical. Aristotle only seems to be an exception because we only have his esoteric writings – student notes or personal writings, such as undoubtedly the *Metaphysics*, – and that we have lost his exoteric writings, which Cicero assures us that they were a golden river of eloquence ("flumen aureum eloquentiae").

Therefore, translation is as detrimental to the understanding of a philosophy as it is to that of literature. Reading ten lines of a philosopher in the original version (*Tao Te King*, *Bhagavad-Gîtâ*, *Das Kapital*) tells us more about him than perusing his complete works in a foreign language that ignores his movement, if it is true "that a great philosophy is not a philosophy that arrives but a philosophy that leaves" (Péguy).

21C5. The vulgarization and vulgarity of philosophies

To measure the connection that exists between philosophies and the cultures in which they originate, the anthropogeny will focus its attention on the popular expressions of these philosophies, whether later and anterior. In the West, the notion of Providence (videre pro, see in advance, foresee) will have had the good fortune of gathering in a vehicular form the philosophical strands of the adequacy between language and Real-Reality <8E1>, of the apriority, of the force of initiative of efficient causality under the rationality of final causality, and of the autarky of consciousness. Providence became so closely tied to the thought of the West that, as the State replaced God, the appellation of Providence State emerged spontaneously. And Plotinus (3,14), who is not familiar with mythological assimilation, compared PromèHeFs, related to the Sanskrit Prâmathyius, the maker of fire, with PrômèHeïa, understood as providence.

Another achievement of Western scholastic philosophical vulgarization was to spread to all – learned and humble – that there are four qualities attributable to all beings "as beings", and called transcendental in this sense: unity, intelligibility (truth), appetibility (good), and activity ("ens est unum, verum, bonum, activum"). In other words, that any being – insofar as

it is and holds together – is themes of intelligence and appetite, and realizes passages from power to action. At the same time, for everyone, contrary to Hebrew tradition, evil as evil was separated from the being, or explained more subtly by a lesser being, according to Augustine. The four causes of Aristotle, final, efficient, formal, material, or the doctrine of the soul and body as form and matter, were also popular successes.

An anthropogeny must thus point out the relationship of antecedence and consequence going from the systemic of a culture to the systematic of a philosophy. Indeed, long before the first Greek philosopher, as early as the end of the sixth century BC, every rational Greek craftsman started being convinced that being is one, true, good, active. And also, long before Aristotle, that there were four causes; and that among the causes, the final cause coupled with the will was the most decisive; that phenomena have a “raison d’être”; that judgment is the responsibility of a mind (noûs) that analyzes and synthesizes its elements; that there are definable, determinable, and serial practical ends, etc. In the same way, long before the first Chinese philosophers, all of the Chinese – because they lived in China, a gigantic hydraulic machine, and because some of them spoke and wrote Chinese, a language with monosyllabic glossemes conveying tones – shared the opinion that there is no monolithic truth, that every affirmation already contains a certain opposite (the non-exclusive “wu” negation), that there is an endless conversion of everything into everything. Etc. Thus, a philosophy is not only vulgarizable, but it is vulgar, vehicular, just like the gesture-dialect and the writing which conveys it, and of which, for the most part, it thematizes the structures, the textures, the growths.

This delineates the social function of philosophies. It has not been to uncover truths, which were often sensed and practiced in their environment long before them, and to which, by claiming to establish and systematize them, they often only add fragile exaggerations. For example, Descartes – seeking to justify a burgeoning mathematical physics – postulated the extent as a clear and distinct idea: “Give me extent and motion and I will build the world for you”. Or Kant, who, seeking the “conditions of possibility” of Euclidean geometry and Newtonian physics, which were also flourishing, postulated a priori forms of sensibility, categories of understanding and regulatory ideas of reason, all three of which were highly questionable.

The social function of a philosophy is not to provide a “moral” guideline either. We can see this clearly in the famous maxim where Kantian practical reason climaxes: “Act in such a way that the Maxim of your Will can each time be accepted as the Principle of a General Law” (Handle so, dass die Maxime deines Willens jederzeit zugleich als Prinzip einer allgemeinen Gesetzgebung gelten könne.). Those are indeed the main strands of the Western philosophical movement: maxim, will, principle, generality-community, enactable law, realization of values, etc. But, at the same time, there is nothing that prescribes what any concrete action should be.

Nevertheless, the theories of things that are philosophies have been anthropogenically fruitful. Through the logical, linguistic, and textual rhythmization they brought to their authors and to the circles of their followers. Through some participation with the universal; for example, Plotinus constantly enduring the sufferings of a long and fatal illness. Through the exercise of systematicity and the search for a foundation, however untenable it may have been. Through a global and globalizing moral inspiration beyond specific prescriptions: the case of Kant’s above-mentioned maxim, of Bergson’s “dynamic” morality, of Augustine’s “ama et fac quod

vis”, of the Beatitudes of Jesus according to Nietzsche and Jaspers. The debt of Beethoven’s “transcendental” music sentiments to the transcendentalism of Kant or the post-Kantians are a good illustration of these advantages.

In this way, philosophies survived not so much as bodies of teaching, which were often perceived as sterile by most, particularly since the passage to WORLD 3, as they survived in the form of a few phrases and words that are sonorous, vague, but enlivening by virtue of their immensity: Sein, Zeit, Vernunft, Etre, Néant, Médiation, Noûs, Macromicrocosme, Übermensch, Raison d’être, Idea, Possible, Composable, Will, Representation, Tao, Tch’an, Bodhi, etc. The inaccuracy, the approximate and the bluff played a decisive role in Homo’s enjoyable practice of the rhythmic endotropy and the lightning of the Ultimate. How disconcerting for *L’Etre et le néant* [Being and Nothingness] if it had been correctly titled: The Being and neantization? Nietzsche, master of the apothegms, had a gift for shocking titles: *Menschliches Allzumenschliches*, *Der Antichrist*, *Jenseits von Gut und Böse*, *Umwertung aller Werte*, *Also sprach Zarathustra*.

This is understandable by the fact that a philosophy consists in indexations, just as mathematics does, as shown by the panoply of philosophies proposed above, but that unlike a mathematician, who explores pure (discharged) indexations proliferating in very large numbers thanks to their very purity, the philosopher retains only a few, usually a couple – yin/yang, light/shadow, a priori/a posteriori, synthetic/analytical – and this not so much for their purity as for the vastness of their logico-semiotic or simply perceptive-motor field effects. His psychological analyzes set aside, Plotinus’ metaphysics, although renowned for its subtlety, can be imparted in a quarter of an hour. Some philosophies, such as Zen, exerted the deepest influence primarily through a few gestures of the head, hands and feet.

However, the anthropogeny will be careful to remember that it is difficult to locate the focus of a philosophy, simply because it consists in indexations. We just read Kant’s “Handle so, dass die Maxime deines Willens (...)”, insisting on the legalistic character of the remainder of the proposition: Maxime, Prinzip, Gesetzgebung. But wasn’t the key point, on the contrary, the unusual singularity of “handle” and “deine”, whereby the ultimate responsibility lies with the individual, in a Luther’s and Rousseau’s perspective, since the legal terms were only secondary and can be explained by the formidable prestige of the Law between 1789 and 1850. Likewise is *Der Antichrist* such a misinterpretation of the West, since Nietzsche was more moralist than philosopher, and saw then a movement of moralizing and legalistic repression in the first Greco-Roman-Christian-Socialist millennium, whereas it was essentially about an apocalypse of light (Johannine, Pauline, Plotinian, Origenian, Augustinian, Erigenian) or even about a great Soul (Stoic) and unanimous Body (Pauline and Plotinian), with some rare and short moral imprecations being addressed to the Shadow, denial of the Light, much more than to behavior (the precepts of conduct play a very small part in the *Epistles* of Paul).

Moreover, the anthropogenic influence of philosophies significantly varies from one civilization to the next. Taoism and Confucianism penetrated the minutest details of daily Chinese life precisely because they were “demanding but available” theories, as noted earlier. Because of their “strict and protean” practice, the *Upanishads* still permeate discussions in India today. The ambiguous status of Arab and Hebrew philosophies led the former to appear among socially tolerable heresies, while the later fostered a mistrust of definitive truths and the cult of

a turbulent exchange and contractual relationship through the Jewish people. Conversely, the very methodical character of Western philosophy turned it into the privilege of exclusive circles, protecting itself from outsiders through its haughty structure more than through its content.

21C6. The compensations of philosophies

The ambiguous status of philosophies makes it easier to understand that, underlying them, compensatory or complementary graspings have flowed, always and everywhere, either repressed or at least underground. Hence Dionysian and Orphic Illuminism, under the Apollonian and formal West. The Bhakti, tender devotion, under the cosmicity of central Hinduism. Amidism, a practice of social mercy (there is no individual salvation until everyone is saved) under the austerities of Japanese Zen. A certain animism and a Gnosticism under Plotinism, whose intellectual exigency believed, however, that it would combat them.

We will also add, to the complementations, a few thunderous exclamations that burst in contradiction with a philosophical axis and its strands. For the West, Pindar's line "Man is the dream of a shadow", which Shakespeare echoed two millennia later: "Life's but a walking shadow (...), a tale told by an idiot". Or Heraclitus' saying: "Of all things conflict is the father", which still resonates with Hegel. Or the statement of Sophocles' *Oedipus to Column*, that "The best thing is not to be born at all".

In all these cases, the reader or listener will admire, will be sensitive to the strength of the phonosemics, and may even nod in agreement for an instant. But his own main philosophical motion will stay sufficiently constant not to be shaken in its basic rhythm and horizon. A contrario, this shows the necessary role of repetition, hidden by the variation of the paraphrase <17F7>, in the production and reproduction of philosophical systems.

21C7. The Greek philosophical plasticism

We have seen the extent to which pre-philosophical theories of things were plastician, with only more analogizing or macrodigitalizing inclinations. We must also add that the same is true with philosophies, and that even those intended as the less carnal and more objectivizing, such as the Greek, have long followed an inescapable plasticity in a manipulating, transversalizing, rhythmic primate, who manipulates even his thoughts (or ideas).

21C7a. A material plasticity: The Ionians

Influenced by the rational Greek craftsmanship, philosophical plasticism started seeking the fundamental material element, which it conceived as a stoïkHeïon. This word, from the root *stikH (to align), designates “the small aligned line, the character of writing not as distinct or isolated, but as a constituent element of the syllable and the word” (Bailly). In other words, in WORLD 2, the Stoïkhaia were those “integral parts” from which one believed to be able to build “integrated wholes”, and ultimately the integrated Whole that was supposed to be the Cosmos-Mundus. Between the elements and the wholes, then the Whole, there was the analysis (analysis, lysis ana, upward decomposition), and inversely the sunthesis (synthesis, sun, thesis, putting together previously detached elements). However, the root *stikH specifies that, in this double journey, arrangement is essential; among the Pre-Socratic, kosmos (order) is commonly associated to taksis (order by arrangement). This is essential to understand the way in which physics called mathematics in Greece (general theory of the trait-point <19A>), but also how – in this view – the ordinality of numbers always prevailed over their cardinality (it is probably the Indians, relayed by the Arabs, who reversed this situation).

In this circumstance, the prime element (stoïkHeïon) was that whose plasticity seemed to plastically engender the others. It was water for Thales, air for Anaximenes, fire for Heraclitus, to which Empedocles added earth, before binding all four elements identified by gravitation, i.e. by Love and Hate. According to the abstractive Greek “right distance”, Anaximander even envisaged a “pure plasticity”, a “plasticity as such”, the apeiron, the non-determined (a-, peiras, term, bound). Under another side of the same contemplation, Democritus noticed that all figures could be obtained from unbreakable neutral elements, which only vary in quantity and position (in arrangement, taksis), the atoma (a- negative, temnein, cut), which would one day become our atoms.

Thus, ancient Ionians perceived things in accordance with a Kosmos (order), a PHusis (engendering), a Taksis (arrangement) shared by Great and Small, in a macromicrocosmism (Kranz), where they were in the strongest sense all-together (xun-pantôn) in a universal plastic similarity. And on this occasion, they devised the greatest integrating happiness that Homo has ever experienced: “Olbios, os tHeïôn prapidôn ektêsato ploûton” (Blessed he be the rich, he who has acquired the richness of the gods’ intimate-sensitive-intelligible thoughts!). The sculpted, archaic KoFroï and Korai always have their lungs full.

21C7b. An ordinal geometrical and numerical plasticism: Plato

But was not the absolute macro-microcosmic similarity of everything to Everything most surely realized in the proportions (harmonia), where the perceptive totalization of geometric forms and the ordinality of numbers intersect at best? Around the same time as the Ionians played with water, air and fire, another path emerged, at the other end of the Greek world, where the Pythagoreans (since we only have legends of Pythagoras) stopped using full glossemes (fire, earth, water, air, indeterminate, atom) as their primary elements, and choose

instead the indexes that had been discharged (purified) from mathematics, i.e. lines and numbers. This operation, which was also plastic, took place in a tactile, auditory and visual form at first, even *a posteriori*, since, after locating the ordering of the stars, it was applied to the harmonic division of zither strings and to the exploration of the combinatorics of small stones (calculi, calculations) placed precisely in rows (taxi). The enthusiasm was such that the sage believed to have found the source of music and of the world, but also of morals.

And in one century this *a posteriori* plasticism became *a priori*. The Demiurge of Plato – a rational Greek craftsman who prepares the Creator engineer of the co-creative Christianity in the year 1000 – builds his cosmos by assembling the elementary polyhedra, which are elevated to the status of eternal “ideas”. And let there be no mistake about it, these ideas remain plastic. The ideaï, the idea-figures, and the eïdè, the essential forms, share the same root *Fid as eïdeïn (videre, see), and, in the myth of the cave of the Republic, a lamp placed from behind projects their proportions onto a wall.

The very geometric and ordinal Platonic (plastic) proportions were in such harmony with the philosophical strands of the West that, twenty centuries later, we find them being exalted in the work of Descartes. For it was these proportions that, in Descartes’ analytical geometry, bound algebra and geometry together, arranging them one by the other. And which, in his unpublished *World*, governs his physics of a whole universe, where the slightest modification of a form at a point distorts (instantaneously or almost instantaneously?) all other forms.

21C7c. A topological plasticism: Aristotle

The Aristotle who wrote *De historia animalium* was at that time, together with his disciples, an event whose implications we are only just beginning to measure. For the first time, a few Hominian specimens dared to consider things as not only including triangular temple pediments, or even exactly divisible harp strings, but also females impregnated by males, offspring that are born, grow and die.

But these states of affairs are by no means content with the Platonic generating polyhedron. Instead, they presuppose, in the embryogenesis layers, the seven elementary catastrophes that are the fold, the cusp, the swallowtail, the butterfly, the hyperbolic umbilic, the elliptic umbilic, and the parabolic umbilic of the differential topology. At the same time, because such concrete forms (the morpHai, from which originates Morpheus) are in the process of becoming, according to generation and corruption, Aristotelian plasticism, besides space, was going to have to include time, that “<ordinal> number of movements in accordance with the before and after”. Physis was finally considered in its substance, since here it means the action-passion of engendering (*pHu, sis).

The plasticity “in becoming” that the Aristotelians recognized called for a new ontology, where the living beings result from living forms that take time to set up in the matter. Living forms were thus conceived as acts that animated already defined matter (“seconds”), and this as to their capacity, or potential capacity, to absorb them. Let us consider the case of a Hominian

specimen. Under the actualizing force of the paternal sperm, the maternal matter was first, when it was sensitive to it, animated [shaped] by a vegetable form; then by an animal form; and lastly, by a rational form; in proportion to its susceptibilities. Medieval scholars summarized this in a quick formula: *forma educitur e potentia materiae* (the form is “r-ejected” by the power <susceptibility> of the matter).

This ontology was responded to with an epistemology, which had the same fortune over two millennia. To grasp the active form (generic, substantial) in a living being, one must abandon what is individual (*non datur scientia de individuo*) and only retain the generality specific to one’s species and genus. This is what was called the delimiting and totalizing abstraction (*abstractio praecisiva totalis*), revealing equanimity in the horse, and humanity in man. This gave rise in the Middle Ages to the classic Quarrel of the Universals: does the idea of catness concern a reality in cats or is it only a convenient artifact for operational grouping cats? From Aristotle to Thomas Aquinas, to Duns Scotus and to Peirce, Aristotelians generally thought: catness is quite real, insofar as it responds to a natural species; but it is not very real, insofar as it is a generality, and that in the real there are only specimens and not species.

Aristotelian views introduced “Homo theoretician of things” – who until then had been very endotropic and autarkic – to a first demanding exotropy. And it is well known that the master and several of his immediate disciples were great observers of natural facts. Only doctors – and particularly surgeons – had inaugurated this approach, beginning in Egypt, as we can see from the way in which certain Egyptian papyri differentiated between the magical, the semiotic and the factual aspects of the cures for diseases.

However, even with Aristotle, the spontaneous endotropy of the Hominian brain always dominates in the end. Aristotle’s observations are set in the belief that genders are eternal, to the extent that the entire Physis - as Kosmos and as Taksis - is engulfed in a thought of thought (*noesis noèseôs*) and under a motor that moves without being moved (*kinei or kinoumenon*). Inside the universe, Homo remains very much at home, both in terms of his horizon and his desire for rhythm, since everything he will ever observe, we are sure, will reinforce a certain harmony of intelligible similarities, which are the sources of ultimate intelligibility and enjoyment. Theoretical life (*bios theorêtikos*) is the supreme conduct of the anthropos, because, despite the value of physical pleasure, it provides the most consistent harmony. It is undoubtedly because of this very limited exotropy and this definitive endotropy, that, given the very endotropic character of Homo’s brain, Aristotelian biology reigned almost solitary for two thousand years in the Western and Arab worlds.

The anthropogeny has just insisted at some length on the three main characteristics of Greek plasticism: material, geometrical, topological. It had to, because in the West and elsewhere, plasticism is a philosophical strand that has withstood even the triumph of exact sciences. When Pasteur, to his death, erroneously wanted fermentation to be based not on chemical properties that could be isolated from the ferment, but on the whole live ferment, he was pursuing something from Aristotle’s holistic views. When the aging Dirac wanted a physical theory to be all the truer as it was more symmetrical, he was continuing, in the first half of the twentieth century, something of Plato’s proportioning views. To this day, René Thom, who initiated the theory of catastrophes, conceives intelligibility as an intuitive plastic grasp, and his *Sémiophysique* favors embryology according to Aristotle, without ever

mentioning the other species of biochemical formations which are the amino formations <21E2a>.

21D. Pure indexation of physical indexables: Archimедism

And yet, it was with this endotropic plasticism that Archimедism did broke with, approximately 2.3 thY ago, during the most violent rupture of the anthropogeny, as it radically went against the naive desire of the manipulating plastician Homo.

21D1. The Radiance of Archimedes (-250)

The radiance of Archimedes consisted in retaining in the Physis (generalized engendering) what was indexable by pure or discharged indexes, and in imagining the theory of things as a coherent set of pure indexations of pure indexables. Thus, physics achieved an extraordinary coherence of the extent, where for the same things (causes) the same measures would be valid at any point and for everyone. And an extraordinary coherence of duration, where each antecedent state of indexables was linked to consequent states of indexables according to fixed indexes for an isolated system. This new relationship between the before and the after, both spatial and temporal, presupposed a definition of efficient causality that was no longer that of an agent acting towards an end, but that of an intrinsic consecution of indexations of states. This time, Homo's plasticism was thwarted up to its very foundations, since now exotropy would verify and, if need be, constantly disqualify endotropy.

We remember the anecdote of Archimedes in his bathtub discerning the behavior of a body in water when its weight is less than the weight of the volume of water that it moves, and that consequently, it floats. In this case, everything was indexable, both volume and density (weight by volume), while the slow displacement of the solid in the liquid allowed to intuitively grasp the new causality as the intrinsic consecution of states according to the ratio between the volume of the body and the volume of water displaced by the body, and to conclude that the relations of the indexes and the indexed of the two independent variables (volumes, density) accounted for and explained the phenomenon in a far more operative manner than Pythagorean harmonies, Platonic exemplary forms, and Aristotelian appetitive attractions.

Archimedes' revolution was abrupt, and we can imagine it being essentially completed in a few days or weeks, although it required many layers of preparation. (a) The first passage, by Aristotle, to an exotropic plasticism in observing the living. (b) The implicit introduction by Aristotle of a variable "t" when examining the phenomenon of generation and decay. (c) The distinction, again by Aristotle, between the *tekmèrion*, an indicium whose indiciality stems from the nature of a being, and the *sèmeion*, an indicium whose indiciality is sometimes intrinsic and sometimes extrinsic only. (d) Euclid's general theory of pure indexations, and of Archimedes himself as a mathematician. (e) The invasion of Stoic logic in the ambient conducts, which was in the process of adding a dynamic approach to the Aristotelian syllogism, static and

ontologizing, in the form of temporalization: “if...then”. (f) Causal history, which was introduced two hundred years earlier by Thucydides, where states of things and their obligatory (ligare, ob), or intrinsic consecutions were introduced <22B6b>. (g) The secular attitude of the rational Greek craftsman. (h) The increasingly strong idea that the demiurge of things was a rational principle. (i) The equal, complete, transparent Greek writing, since -700 <18D>.

To this we can add the strands of the whole Western philosophy, when we have seen it identifying everywhere – right down to the understanding of the living and even the “reasonable” living that is Homo – motives and impulses leading to goals (final causes), thus describing trajectories (jacere, trans), and yet susceptible of various forms of slowing or deflection, in a game of action and reaction within defined expanses and durations. This, through the parallelogram of forces, is an imaginary that supports the entire classical mechanics, and which is not found similarly thematized anywhere outside the West.

21D2. The rejection of Archimедism (-200)

Archimедism was an astoundingly effective technical instrument. It was also an opportunity for theoretical and practical pleasure, since the things apprehended were connected to each other step by step, but also connected by confirming intersections, in a new kind of rhythm and horizon. This approach should have met with instant and sustained success, given the improvements it offered to the weaponry. However, as soon as it appeared, archimедism vanished from the center of the stage for more than a millennium and a half, leaving the place almost clear for Plato’s geometric plasticism <21C7b>, and most of all for Aristotle’s topological plasticism <21C7c>, itself stripped bare of its concern for naturalist observation, and therefore of its exotropic dimension. This probably had deep anthropogenic causes.

First of all, we shall invoke the Greek mentality. In order to understand most mechanical actions in an Archimедean manner – such as the trajectory of an arrow – Euclidean geometry was no longer sufficient. A differential calculation was now necessary, allowing the quantification of curves, curvatures. Archimedes approached this calculation using his method of exhaustion, which allowed moving from the indexations of the curve to those of the rectilinear through successive approximations. However, this kind of approach seems to have profoundly repulsed the Greek rationalism of the adequate transparency from the being to the noûs (harmonic spirit), particularly what Spengler called his fantasmatic of stereometry. Already the growing and decaying Aristotelian forms were demanding the same calculation, but they did not provoke it, and the Aristotelians were contented with the apparent evidence of the “appetizing” movements expected to carry out the programming of forms without trying to calculate them. This confirms that the Aristotelian exotropy remained sufficiently endotropic to reassure ancestral Homo.

Secondly, the Archimедean approach in its early days was limited to physics understood as mechanics. However, the Greeks – who have been culturally fascinated by the heroism of the athlete’s anatomical forces since Pindar – were probably not very interested in these abstractions. Historians of technology have reported that the Greeks understood the effect of

steam on a piston in a cylinder – in other words, the principle of the steam engine – but only used it for purposes that were more wonderful than useful.

While all this is true, an anthropogeny must note that the rejection of archimedism – which lasted for twenty centuries – resulted from more general reasons relating to the condition of Homo as such. (a) The pure indexation of indexables suddenly traced a field of findings, articulations, consecutions, reiterable definitions, comparable things, con-findable, generalizable, critically variable, and strictly communicable. This was undoubtedly unusual at first for a jabbering and squabbling primate used to establish his own truths relying on the bluff of philosophical, religious, political, commercial argumentation and eloquence. (b) Secondly, the fall into an exotropy almost devoid of endotropic counterpart was also hardly tolerable for an endotropizing Homo who was accustomed to the safety and pleasures of plasticism and final causality. (c) In the same way, taking into account the conditions of observation and the relativity of the result repelled Homo's usual desire for generalization. For those reasons at least, archimedism undermined too much the inherent cheating of Hominian ethos <25B7>, and even supposed a shift of this ethos that would take centuries and would constitute the last avatar of Western civilization <28B1>.

21D3. The triumph of Archimedism (1600)

However, after a millennium and a half of inactivity, the pure indexation of indexables resurfaced and even underwent an explosive development. The anthropogeny must also identify the reasons for this.

The Christian God – who created a cosmos-mundus from scratch – was not only intelligent and esthetic, in the same way as the Platonic demiurge, but he was as determined as he was efficient, and thus a potential engineer. When, from 1050 <13J> onwards, Western Homo saw himself as a co-creator and responsible for the arrangement of nature, becoming now an engineer, he raised the vaults of his cathedrals so high that empirical practice was no longer enough. Increasingly often, he used models and diagrams to demonstrate the fecundity of the pure indexations of weights and buttresses, which led to Piero della Francesca's *De prospectiva pingendi*, which, as Da Vinci insists, made it possible to totalize exact and multiple indexations at a single glance. At the same time, a nominalism took root which, far from the plastic generalities of the Aristotelian substantial forms and faculties, drew attention to the only indexable singularities of things.

The long history of money also played its role. Money had facilitated contractual and then transparent writings required for accurate indexations since the Phoenicians and Greek sailors. Money imposed the idea of an increasingly neutral and abstract exchanger, thus allowing the strict indexation of the merx (exchangeable, merchandise). In about 1450, it applied not only to the exchanged but also to itself, by accepting its self-commitment in the interest-bearing loan, which was initially reserved to the Jews before extending to the Christians under the urgency of the projects fomented by the new co-creative mindset. As a side effect, money also developed the idea of freedom of choice – or free will – in that, as a neutral exchanger, it allowed for the establishment of equivalences between the most diverse “things”.

Finally, it initiated Homo to the fecundity of pure indexes, so much so that the word “writings” eventually became synonymous with accounts and financial transactions.

Then, in the 16th century, the first corpora of indexations of physical indexables began to be compiled, and like in the beginnings of writing, it was once again the stars that – according to Homo’s taste for their highly indexable indicia – were the first to enjoy the new treatment, with Copernicus, Kepler, and Galileo. At the turn of the 1600s, Galileo brought the mechanics of the skies down to earth with the first laws of the fall of bodies. A few years later, Pascal – himself an exact indexer of the states of the fluids or the cycloid, and thereby a mathematician of an exhaustion calculation opening up to infinitesimal calculation – would exclaim about Archimedes: “Oh, how he has burst the minds!”.

In order for modern science to develop, indexables only had to broaden their generality: quantities of movement for Descartes, forces for Newton and Leibniz, energy conserved but degraded as a useful energy for the 19th century, energy globally degraded although locally regadable for the 20th century. Three centuries of idyll ensued. The pure indexation of indexables was confirmed as an operation that required imagination to conceive hypotheses, and practical expertise to verify them, yet without questioning the foundations. Kant’s insights into the conditions of possibility of Newtonian physics – which he deemed infallible at the end of the 18th century – and Stuart Mill’s views on induction at the end of the 19th century, at a time when many people started believing that physics was virtually complete, clearly illustrate this candor. Homo had lost the comfort of endotropy and plasticity, but he had retained the comfort of reason, a word which, after expressing a proportion, could be applied to any calculation with a concrete scope.

Thus, Archimedean science was first of all a form of apotheosis of the distant continuous of WORLD 2. It was no longer only the individual phenomena that appeared as wholes made up of integral parts, but it was also the entire universe of things embraced by Newton’s gravitation, which in turn traced a so-called absolute space-time where all phenomena could be located spatially and temporally by means of Galileo’s group of transformations. Thus understood, the theory of things was summarized in Laplace’s fantasy for a universe whose every state could be calculated retrospectively and prospectively by means of the strict indexation of all its strict indexables at a given moment.

21D4. The “crisis of fundamentals” (1900)

However, around 1900, a profound crisis of foundations took place in Archimedean physics, as in mathematics and logic, as well as in the arts and letters, proving to be one of the main signs of the transition from the distant continuous of WORLD 2 to the discontinuous of WORLD 3. Two interrogations that were then opened specifically interest the anthropogeny. On the one hand, the very notion of indexation seemed less obvious than expected. It was realized that, strictly speaking, the simple measurement of a temperature by a thermometer was a complex operation that only made sense within the framework of a theory, which in turn could only be understood by means of thermometers, in a sort of circularity of evidence that was both manipulating and manipulative. On the other hand, a theory such as Einstein’s General

Relativity was based on Riemann's geometry, which no longer offered the immediate evidences, true or supposed, made possible by the absolute Euclidean space in which Newton was still positioned. The same applied to the discontinuities of the Quanta compared to the intuitive continuity of Newton's differential equations.

These observations validated the idea that “physical theory” (tHeoria pHusikè, as Aristotle already said) was not a collection of phenomena indexable one by one – such as force (f), mass (m), acceleration (g) – and whose indexations would then be connected by calculation, but that each of these three terms was first defined indexically by the other two, $f = mg$, $m = f/g$, $g = f/m$. The relevance of such equations was measured by the fact that their relations – as far as we go – not only matched all the known physical phenomena to which they were linked by a “dictionary”, but also allowed other phenomena to be predicted by means of the same protocols of use. This is what Mach and Poincaré's pragmatism emphasized around 1900 (not to be confused with Peirce's Scotist pragmatism, which was also originally called pragmatism <24B1>).

The general opinion sometimes assumed that the 1927 Uncertainty Relations confirmed the pragmatic skepticism, because it signaled that ultimately all physical indexation depends on the wavelength of the indexing light, with the result that the precision on the direction of an indexed particle is paid by the imprecision on its speed, and vice versa. Yet conversely, Heisenberg's Relations placed the observed, the observer and the means of observation within one another, according to variations which are themselves Archimedean, although sometimes statistical for certain “trains of possibilities”. Thus, Archimедism did not lose its essence. But like Relativity and the Quanta, the Uncertainty Relations challenged Homo's spontaneous plastician intuition. We shall spend the end of this chapter assessing their anthropogenic implications. They can be summarized in one formula: the passage from the Cosmos-Mundus to the Universe. Or more comprehensively: the passage from the traditional Cosmos-Mundus-Dharma-Tao-Quiq-Kamo to the Universe.

21E. From the cosmos-mundus to the universe under the influence of Archimедism

The following views are humble and modest. It is not the task of an anthropogeny to decide on the value of physicists', chemists' and biologists' theses. It is their business and theirs alone. However, it is the role of an anthropogeny to enumerate the theses that – understood well or wrongly, and sometimes even distorted – rub off on large populations, more or less radically transforming their imaginary, i. e. this combination of imagination and fantasy, or objects surrounded by field effects <7J>.

As this chapter has just retraced, Homo has built environments “in his image and likeness” since its origin: the Greco-Roman cosmos-world (cosmetic layout, not non-world), Indian dharma (the order as an indefinite sub-articulation), Chinese Tao (a protean but constant principle), Polynesian kamo in relation to which Homo is do kamo (living par excellence), pre-

Columbian *quiq* (blood, sap, race, lineage of both animals and plants, and even formed landscapes). All these concepts are relatively plastician, exemplarist, in the sense that the forms correspond to Hominian manipulations, and that on the other hand they result from plastician processes in the strong sense – i. e. *with the aim of* producing these forms with their own particularities and similarities, and not others, thus in the manner of a craftsman, demiurgically.

By contrast, if we look at the results of recent Archimedism, apart from the fact that the Hominian form appears as one form among others, natural forms in general do not result from plastician processes in the strong sense <21C7>, but rather, from processes that are not *fore-seen* (seen in advance, as by a demiurge craftsman), neither performed voluntarily, nor rationally, nor naturally, *to* produce these forms; they could produce other forms, which were also (largely) unpredictable beforehand.

Therefore, to replace the overly anthropomorphic concepts of “cosmos” or “world”, “universe” is not a bad choice. The neutral noun *Universum* was introduced by Cicero’s *De natura deorum* and has the advantage – like so many other Latin words – of being vague. *Universum* only asserts that things constitute a “versus unum”, a turned-to-the-one, or even a turned-to-one, without the definite article that did not exist in Latin. It does not prejudge anything about the paths and degrees of the unit involved, except this unit is supposed to comprehend (prehendere, cum) what is attained (attainable) through Homo’s indiciality and indexality. Homo being one relay of the *Universum*. Contrary to the terms “cosmos”, “mundus”, “dharma”, “Tao”, “quiq”, “kamo”, nothing in *Universum* guarantees that the Real does not go far beyond Reality, here understood as the part of the Real tamed by Hominian signs and desires. Nothing says there that the ways of acting and suffering from “things” corresponds to Homo’s manners. It is in that spirit that we shall envisage the new Archimedean imaginary not only of the formations of the mineral universe <21F>, but also of the living universe <21G>, and of the techno-semiotic universe <21H>, although many “universal” characters can be found in all three.

21F. From the cosmos to the universe (or even “infinite multiverse”) in physics: physical-chemical mineral formations (vs. plastician)

21F1. A pointable (indexable) universal age

Among the outcomes of the Archimedean approach, it is probably the idea of an indexable age of the Universe that most affects the popular imaginary of WORLD 3. In the 1930s, this age was deduced from observations relative to the expansion of nebulae. Then, around 1940, this expansion was conceived as the continuation of an initial big bang, which in turn became imaginatively graspable from 1964 with the discovery of the isotropic radiation (i.e. identical at any point in the Universe) at 2.7 K°, and that we consider to be its fossil.

The ten to fifteen billion years commonly alleged since then neither have the classical narrowness of the 4,000 years of Bossuet’s *Discourse on Universal History* nor the

disproportionate (indefinite) plurality of the Great Year of India. They are considerable, but conceivable with some effort of calculatory imagination. Moreover, it is a question of purified (Archimedean) indexations, since, starting from the big bang, the “quantum gravity era” is sometimes dated at 10^{-43} seconds, the “probable era of inflation” at 10^{-35} seconds, the formation of protons and neutrons from quarks at 10^{-5} seconds, the synthesis of atomic nuclei at 3 minutes, the first atoms (of hydrogen and helium) at 300.000 years, the first stars, galaxies and quasars by one billion years, and our modern galaxies by 10-15 billion years <Sc.Am.dec.99,2000 >. As a result, Hominian specimens appear to themselves, there, in a relationship that combines belonging and decentering. Where their birth and death take on a different significance, the significance of an episode. Being a particular event (venire, ex) in a broader event.

Recent descriptions of the death of suns like ours give concrete evidence of this type of belonging. We suspect that their collapse, where the combustion of carbon would replace the combustion of hydrogen and helium, could be very short, about thirty thousand years. Such studies give a face to the end of the star that became our Sun. And Solar Homo, at its halfway point, with five billion years of past and five billion years of future, is able to picture himself all the more clearly as a state-moment of the Universe.

21F2. A linear or cyclic (cycloid), temporal or eternal universe, perhaps even an “infinite multiverse”

Just as much as at the age of their Universe, Hominian specimens – who have a thematized birth, development and death <3B> – cannot be indifferent to its curriculum, based on four main imaginations and imaginary of the course of things. (a) Either an in(de)finite expansion from a hot in(de)finite concentration, if the mass of the Universe is not enough for the forces of gravitation to ever dominate over the forces of expansion: **perpetual expansion**. (b) Or, an expansion, then a contraction following the current expansion, if the total mass is sufficient for gravitation to prevail one day over the expansion, a big crunch succeeding the big bang: **expansion-recollapse**. (c) Or, maybe, after the expansion-retraction, a contraction so intense that it results (elastically, for the imaginary) in a re-expansion, not identical to the previous one, since its initial singularities would be defined by the final singularities of the previous contraction: “expansion-recollapse-reexpansion”, “Is our big bang just one episode in a much larger universe in which **big and little bangs** have been **going on eternally**?”. (Steven Weinberg) <Sc.Am., Dec99,43>. (d) Or, maybe again, the cosmic constants that we observe or postulate and which – in the various versions of the “standard theory” – compatibilize electromagnetism, strong interactions and weak interactions, and which also aim at one day compatibilizing gravitation in a “theory of great unification”, are perhaps only a version of more fundamental laws, which we still do not know, and that would lead to multiple universes, some not very complex, short or long, others complex, and thus long, ours being among the latter, since we are ourselves fairly complex beings: “Some universes might resemble ours, but most would be stillborn”; in this case, “The entire history of our universe becomes just a single facet of the **infinite multiverse**”, (Martin Rees) <Sc. Am, ib.49 >.

These are only examples, since other models are under consideration <Sc.Am.jan01>. For example, a **VSL theory** (Varying Speed of Light) suggests that the speed of light (c) has fluctuated depending on the ages and even places in the Universe. Or, in an already more elaborate manner, a **quintessence theory**, which, in combination with a *dark matter* constituting 26% of our Universe, supposes a *dark energy*, which no longer fits into Einstein's "cosmological constant", but into a "quintessential" capable of repulsive attraction, and which would make up 70% of our Universe. Several physicists then try to conceive this quintessence as a *tracker field*, where movements converge towards the same result for a wide range of initial conditions, as in some chaotic systems. This would make less miraculous that several fundamental values (value of the electron, etc.) are precisely what they must be for our "world" to be possible, and to reach that state-moment of the universe where matter overrides radiation, and where the speeds of expansion are sufficiently moderate for distinct beings (such as mountains, plants, animals, primates, men) to take place, at least for a time.

What interests the anthropogeny is that these views, despite their very different angles of attack, all work on the same verified facts or facts in the process of being ascertained, and are thereby in a close and constant dialogue with one another (cross bracing). And also that, regardless of their theoretical consistency, they do not offer Homo the plastician comfort of the anterior, stable and closed cosmos-world-dharma-Tao-qui-q-kamo. They do not coincide with the development of Hominian or demiurgic gestures, or with the rotation of night and day, or with the development and decay of any living being. A universe that is as unanthropomorphic as possible, while having given birth to a variety of forms of life that we call Homo.

21F3. Hardly or non-plastician primordial forms

As for the primordial forms that today's Archimedean Homo encounters at the principle of his universe, they are not more plastician or centering than the age or curriculum of that same Universe. Let us recall the most prominent forms. (1) **Magmatic** protoforms (or preforms) from which result clouds of dust and gas (atoms and molecules) under the effect of the four interactions: gravitational, electromagnetic, strong, weak. (2) **Stellar** forms, where the gravitation compresses the initial dust and gas to the point of provoking spheres or balls within the center of which temperatures of 10 to 20 million degrees trigger nuclear fusions producing photons which, after a journey of sometimes one million years, reach the surface of the gravitational sphere and make those forms perceived in the Universe as being stars (*stel, stellar, aster). (3) **Galactic** forms, resulting from gas-dust interactions with stars, and which would essentially follow the following sequence: spiral galaxies (2/3 of the galaxies), barred spiral galaxies (2/3 of the spiral galaxies), lenticular galaxies, elliptical galaxies; this sequence follows Hubble's initial proposal, but reverses it <R.jan98.62>. (4) **Planetary** (and **satellite**) forms, balls with much lower gravitational pull than that of star cores, and where the fairly temperate temperature is favorable for physical and chemical geomorphism, and then perhaps one day for living formations, whether they are initiated on site or in the dust carried by stellar winds.

Of these large cosmogonic forms and formations (Gestaltungen), only the latter – **planetary** – have been familiar and intuitive to Homo since its origins. Conversely, the first **magmatic** forms can only be understood from the four universal interactions, where only gravitation (non-relativistic) meets the intuition. The second forms – **stellar** – also demand an understanding of the four interactions, three of which are barely or not at all intuitive. The third ones – **galactic**, which are highly gravitational – are more intuitive, but by assuming formations without formers and without exemplary forms, they also thwart plastician Homo, as much if he belongs to WORLD 1 (spontaneous myths of origin <22B1a>) as if he belongs to WORLD 2 (learned myth of the *Timaeus* or the Neoplatonist procession-recession). For the Hominian specimens of WORLD 3, this combination of simplicity and non-intuitiveness of universal formations validates the imagination and imaginary of an environment that is both involving and decentering.

21F4. A peripheral and abstract non-intuitive referential: the four-dimensional relativistic space-time

The referential of duration and extent remained intuitive in Archimedium as long as space and time were still plastically presumed to be independent of one another; right until Newton's time. However, since the Special Relativity of 1905, the two have been linked in a four-dimensional continuum. Although it is true that the calculation consequences of this situation only concern scientists, the space-time link as such is becoming increasingly popular, if only through a few more or less fantasized paradoxes (time going backwards, the rejuvenation of fast cosmonauts, etc.). Or also, through some works of art since Picasso's cubism.

21F5. A nodal and concrete non-intuitive referential: sometimes undulatory, sometimes corpuscular energy

At the same time as a stable, all-encompassing frame of reference, Homo's plastician imaginary has always needed a central or nodal frame of reference from which forms can emerge and – most importantly – sustain themselves; such was, among others, the energy, the *en-ergeia* of the Greeks (erguein, en, acting from within and subsisting within), whose name became famous. At the beginning of this chapter, the anthropogeny examined the exemplary solutions proposed by the presocrats: the energies of water, air, fire and earth.

However, the reciprocal convertibility of energy and mass ($e = mc^2$) postulated by the Special Relativity dealt a first blow to the plasticity of the energetic node of things. More tellingly, in the Wave Mechanics of 1924, it was suggested that the same amount of energy could appear as a wave or corpuscle, depending on the conditions of observation. The violence of the decentration that took place then in the Hominian imagination can be observed at the 1956 International Meeting in Geneva, where physicists, who were forced to express themselves in ordinary language and thus to confess their common views behind their equations, expressed their torments and conflicts in the face of what Bohr had called wave-corpuscle “complementarity”. Schrödinger even argued that, since this hardly imaginable

complementarity would have one day to be overcome, it would probably be preferable to try to reduce the corpuscular to the wave rather than the reverse. The notion of antimatter that has since been introduced could only confirm this malaise of traditional energy plasticism.

21F6. Quantum effects

The fact that there are not always intermediaries of intermediaries between two states, and that there are consequently “grains” of energy, *quanta*, with “jumps” between these grains, baffles the imagination and the imaginary world of plastician Homo so deeply that, when Max Planck first suspected it in 1905 in his study of the radiation of the black body, he questioned his common sense, and had to be reassured by his entourage. As late as 1990, leading chemists were still claiming to use the formalism of the quantum theory without believing in its principle, which undermined their intuition of causality from one step to the next. However, as Schrödinger urged as early as the 1940s, there would be no stars, galaxies, planets, living things, or any shapes and formations if such grains and jumps did not exist at the elementary level. If it was reduced to Newton’s continuous differential equations, the Universe would be an indiscernible confused continuum devoid of “beings” and “events” (come ex).

However, a recent result mitigates the abruptness of the Quanta. Around 1935, the 1905 theory led to distinguish between two orders among the phenomena of the Universe: (a) an **elementary order**, where “quantum coherence” reigns, i. e. coherence of elements that can be simultaneously in two opposite states (of energy, direction, etc.), this elementary order was postulated, verified in its consequences, but not observable; (b) a **macroscopic order**, where “quantum decoherence” reigns, i. e. the non-simultaneity of distinct states, and which belongs to the observable world. In this framework, the passage from the unobservable state to the observable state was itself unobservable, because any observation would add to the “coherent” observed an energy that would make it “decoherent”. However recently, by exploiting the capacity to work on a single atom, it has become possible to set an isolated atom in two simultaneous distinct states and then to observe its quantum coherence without destroying it through observation, this thanks to another isolated control atom. One can even now grasp the precise moment when the “coherent” atom becomes “decoherent” <R.sept97>. It is probable that, once such achievements are made known, quantum coherence will somewhat cease to be the absolute strangeness it has been for most of the 20th century. And this will then, may be, favor Homo’s sense of belonging to his Universe, even in one of its most confusing aspects for its ancestrally plastician imaginary.

21F7. The string theory

String theories date back to 1970, but they have just recently taken on consistency. In this view, the ultimate components of the Universe are strings without thickness, sometimes open and sometimes closed, whose nine-dimensional vibrations account for the weak, strong, electromagnetic interactions, but also the fourth, gravitation, hitherto irreconcilable with the first three. Of the nine supposed dimensions, the three of our world containing matter are located

at the end of the other six. To confirm this theory of great unification, it would obviously be necessary to verify the supersymmetry that it assumes between particles and sparticles (also known as superpartners; duals of the former), and to verify that the orders of length of the strings are not too disparate – for example around 10^{-18} meters – as well as that they are accessible to the observer, which could become the case in 2005 with CERN's LHC (Large Hadrons Collider). Should this problematic prove to be relevant, it would undoubtedly cause a considerable shift in Homo's imaginary, given its relatively popularizable aspects, as well illustrated by the article by Antoniadis <R.juin01,24>, a prominent theorist.

21F8. Macroscopic effects

For two and a half millennia, physical science has come down from the compound to the elementary, to molecules, atoms, nuclei, quarks, and strings. Now, in recent years, the opposite approach is also being advocated. Sand grains flow very differently according to the shape and rhythm of their pourer, but also according to the configuration, the chemical properties and the vibrations of the place where they are poured. Scale phenomena therefore intervene; the multiple is not simply the multiplication of the same. To understand the universe, going up from the smallest to the largest is as important as going down from the largest to the smallest.

This gave a new meaning to the ideas of morphism and irreversibility. And perhaps it also coincides with new mathematics – like that of fractals – and with new physical theories – like that of chaos – whose new imaginary is facilitated by the mobile and reversible mathematical “writings” proposed by the CD-ROM <18H>. Thus understood, it is not impossible that the “macroscopic”, together with the “quantum”, contributes to dislodge Homo from its theoretical overviews to implicate (plicare, in) and decentralize it in its universe.

21G. From the cosmos to the universe in biology: biochemical-chemical formations (non-plasticians vs. plasticians)

According to Helena Curtis' successive editions of *Biology* – which reflects the general opinion of many biologists – living organisms have eight characteristics: (1) not only complicated but complex organization <11O>, (2) regulated transformation of one form of energy into others, (3) homeostasis, (4) response to stimuli, (5) reproduction, (6) growth and development, (7) adaptation to environments, (8) organizational information contained in the system itself. This, however, presupposed that the chemical forces of the Universe are capable of formations (Gestaltungen) that are quite disconcerting to Homo's intuitive plasticism. They can be called “plastician in other ways”. We shall call them “non-plasticians”, to underline their efficiency after the fact, and consequently their “blind” production (not resulting from prevision).

21G1. Non-plastician (blind) formation of proteins by amino acids. Ultrastructures. The undermining of Western categories (plastician, Kantian).

Ultimately, a living being is a biochemical structure with four main dimensions: (1) A network of **proteins** (composed of amino acids) that ensure the construction of organs and systems (these are the *structural proteins*), but also the acceleration of chemical reactions, which would otherwise take place billions of times slower (these are the *enzymes*, from the Greek *zymè*, ferment). (2) **Nucleotides** that produce the sequencing of the amino acids that make up proteins. They have the property of being fairly accurately reproducible – which has led them to be compared to a “code”, known as the “genetic code”, in a misnomer. (3) **Carbohydrates** (hydrocarbons) capable of rapid activation and deactivation (ATP-ADP), and thus able to supply living systems with local energies that can be mobilized and demobilized almost instantaneously. (4) **Lipids**, which are predisposed to long-term energy storage due to their very monotonous structure, but also to the function of intracellular membranes, where certain inserted proteins create suction and pressure gates (pumps), such as for the exchange of potassium and sodium between the outside and inside of a neuron. In this structure, proteins play a central role, which is why Berzelius suggested naming them after the Greek adjective *proteios* (of prime importance) as early as 1844.

A few dates mark the revolution of minds. In 1898, three years after the death of the very vitalist Pasteur, the Buchner brothers proved that ferments, i.e. proteins, perform their enzymatic actions (their zymases, as they said) even outside a living cell. In 1902, one of the first Chemistry Nobel Prize winners, Fisher, told the world that if proteins act so effectively, it is due to key and lock conformations. Since 1950, we have been familiar with the panoply of 20 amino acids (nitrogenous) that are sufficient to make up all proteins. They have an identical nitrogenous (amino) backbone, which allows them to be arranged in solid short or long chains, the polymers (we say “amino” for “nitrogenous”, because the ancients used to obtain their nitrogen from ammonia near a temple of Amun). On the other hand, each of the twenty amino acids also contains an original element (a distinctive combination of hydrogen, oxygen, carbon, nitrogen, and sometimes sulfur) which causes the polymers they build to curl up into unimaginably diverse morphologies, owing solely to the five fundamental chemical bonds (covalent, ionic, H-, hydrophobic, weak) that are differently applied to the twenty kinds of amino acids. In 1970, Christian Anfinsen confirmed what was already suspected, namely that the power of a protein is solely due to the particular sequencing of the amino acids of which it is a polymeric chain. Proteins lose their properties if they are uncoiled and recover them all if they are allowed to curl up into a ball, in accordance with the singular formations (key locks, suction and pressure pumps, etc.) resulting from the singular attractions-repulsions of the singular choice, number and sequencing of their amino acids.

The two previous paragraphs suffice to suggest that the discovery of **amino formations** is the most violent revolution that Homo experienced in his theories of things. (a) The gap between the inanimate and the animate has been bridged: in the 1950s, Miller demonstrated that it is enough to apply an energy to the inanimate (hydrogen, oxygen, nitrogen, carbon, sulfur, very widespread on our Planet), even a very undifferentiated energy (such as an electric current), to obtain after about a week the animate, or at least its base, its “brick”, the constitutive amino acids of proteins, and which we have just seen that they are sufficient by their choice, number, sequencing to constitute the myriad of possible proteins. (b) On the other hand, a

formation (Gestaltung), or even a decisive formation – that of proteins – is no longer a matter of structure or texture in the traditional sense of the operation carried out by a builder or a weaver, but only results “blindly” (without pre-vision, without the detailed intention of a demiurge) from a sequence at the beginning *ad libitum*, and selected afterwards by the (vital) efficiency of its results. Hence, the cell protoplasm – which is the most immediate results of this kind of formation – gave a new word to histologists: **ultrastructure** (1939). (c) In addition to their “blind” (unpredictable) character, amino formations combine the macrodigital (the algebraic calculation of chemical interactions) and the analogical (such as key-lock effects) in growths <7F> that traditional structures and textures could not foresee. (d) Amino (Gestaltungen) formations allow understanding the rapid, diversified and sufficiently metastable variations that the Evolution of living beings – ranging from viruses and bacteria to primates in one or two billion years – supposes, as well as their adaptation to the unpredictable climates of a planet subject to continuous tectonic evolution. (e) Thus, the biologically unpredictable future takes on an unsuspected virulence, and so does the past.

So, leafing through a Histology atlas has become just as much or more instructive about the nature of the Universe as contemplating images of the galaxies. Nothing better illustrates the rupture of Homo of WORLD 3 with previous philosophies than amino formations, that blindly (without foresight or craftsmanship or demiurgy) provide the essence of the protoplasmic ultrastructures, and yet are not of pure random as was the Democritus’ atomism. Of the twelve categories of understanding in which Kant had summarized the West <20C3fin, 27D3c>, they ruin the three most popular: (a) unity, (b) plurality, (c) totality in the Western sense of intuitionable synthesis, *totus, holos, whole, healthy*; and indirectly undermine or displace the others. The amino formations and the ultra-structures generated from them are something so novel, so confusing for Homo, that even René Thom, the author of a *Semiophysics* (1988) and preoccupied with “morphogenesis”, passes over them in silence, or even belittles them (as “non-intuitive”), being more concerned about “structural stabilities”. If ethics, politics, economics, psychology and sociology experience their first repercussions, it is almost unconsciously. Tectures, painting, music, and poetry are only just starting to tackle them <13M5, 14J1b, 15H1d, 22B9>. We have spoken in their case of **aminoide formations**.

Because they are non-plasticians, or plasticians of new types, the amino formations of biochemistry and the aminoide formations of art decenter Homo from the traditional Cosmos-Mundus, and implicate him in the Universe, much more than recent mathematics and physics.

21G2. Heterogeneities and the coincidences of series

The realization that biological efficiency often results from the coincidence of very heterogeneous elements also had decentralizing and implicating effects. (a) Thus, with few variations, the same enzyme, chymotrypsin, which was initially *digestive*, developed performances enabling it to generate *constructive* molecules (both building and undoing the fibers of the silkworm), and finally *nervous* molecules. Dressler and Potter took advantage of this case, whose study filled the century, to write a masterpiece of biochemical thinking, *Discovering Enzymes* (Scientific American Library, 1990). (b) Similarly, the genes controlling the formation of Homo’s hand and index finger, such as the *shh* gene, occur in very different

organic contexts <R.janv98,44>. (c) In a way that can be regarded as even more fundamental, photosynthesis – the foundation of the edifice of life on Earth – results from the serial arrangement of two cells, the first of which oxidizes water in the environment by releasing four electrons: $2\text{H}_2\text{O} \gg \text{O}_2 + 4\text{H}^+ + 4 \text{ electrons}$, while the second reduces the CO_2 in the medium to water + organic matter, according to the protocol: $\text{CO}_2 + 4 \text{ H}^+ + 4 \text{ electrons} \gg \text{H}_2\text{O} + \text{carbohydrates}$; while the passage of electrons one by one from one cell to the next requires the intervention of a manganese relay <R. Jan94,46>.

However, embryogenesis expresses plasticity, thus structural intuitiveness. We see proteins arranged in layers – endoderm, exoderm, mesoderm – and these layers unroll, roll up, cross over, invert according to folds, cusps, swallowtails, butterflies, hyperbolic umbilics, elliptic umbilics, and parabolic umbilics, in short according to the seven elementary catastrophes, which can be reduced to the singularities of equations that are quite telling in differential topology: $V = x^2$, $V = x^3$, etc., for “organizing centers”; $V = x^3 + ux$, etc., for “universal deployments”. So much so that René Thom – the mathematician who carried out this reduction – thought he recognized there, for the construction of the living, an intelligible “true”, “intuitive”, “explanatory”, in the sense understood by Aristotle’s *De partibus animalium* and by d’Arcy Thompson’s *On Growth and Form*. Let us recall that d’Arcy Thompson started his career translating Aristotle.

But this invocation of a *philosophia perennis* is only partial in scope. As Waddington, who recognizes its interest, notes in a preface to Thom’s *Structural Stability and Morphogenesis*, the intelligibility of organic catastrophes, which can be well described in an intuitive three-dimensional space, does not exempt us from considering their microscopic origin, for example the work of the amino acids of proteins, which are presupposing a description in an n-dimensional space of a quantum nature, and are thwarting any understanding by a plastician demiurge who would providentially intuitize their successive variations.

21G3. A multifactorial evolutionism, with functional and event-driven bifurcations (jumps). This kind of evolution as a general model

In view of this, evolutionism was deepened and radicalized in three main phases. According to Homo’s traditional plasticism, Evolution was first conceived by Lamarck in around 1800 as the result of a sort of active, vitalist adaptation, whereby organisms – that followed a vital plastician impulse – took on forms that enabled them to take advantage of their environment. The giraffe’s neck would have lengthened to access the higher leaves of the first savannahs caused by the withdrawal of forests.

Around 1850, Darwin’s Evolution assumed three factors: a very strong spontaneous **variation** in living organisms; a **selection** of viable varieties by the environment; an **adaptation** to the environment, which was no longer preliminary as with Lamarck, but consecutive. Evolutionism was therefore much less plastician, which contributed to its esthetic and religious rejection. However, due to Homo’s inveterate plasticism, adaptive selection – more than variation – caught people’s attention, unlike the intention of Darwin, who was very conscious of the extreme speed of the vital variability demanded by his theory. In the 1940s, vehicular

Darwinism led to the renowned “orthogenesis”, in which paleontologists believed they could follow Equus selected in a straight line (orthos, genesis) by means of anatomico-physiological variations that fostered its speed of flight, especially thanks to an increasingly long medius, with the other fingers becoming residual. Today’s horses therefore appeared to be the culmination of this process.

It was only since 1950, and even later, that evolution in the sense of WORLD 3 started emerging. Numerous phylogenetic sequences were in fact identified, even in Equus, where the selected characters “progressed” for a while, but also frequently “regressed” in a transitory or definitive way, before “starting again” displaced, sometimes according to real functional bifurcations (jumps) <1intr, 20C4bfin>. To the conceptualizations, to the imaginations and to the perfectionist Hominian imaginaries, the idea of a “bushy”, “mosaic-like”, “multifactorial”, “event-driven” Evolution became increasingly imposed itself, whereby the successive anatomico-physiological formations – while respecting certain laws of structure, texture and growth <7F> – could not however be deduced from them, since they compatibilized so many unpredictable and divergent factors, both locally and transiently.

This view was the result of multiple knowledge: (a) *The movements of tectonic plates* are constantly transforming the continents – hence the climates – thereby eliminating certain races, species, genera, families and orders among plants and animals, while they bring out and support others, according to progress, regressions, detours and jumps. (b) *The factors of variation in organisms* are more numerous than previously thought, like the DNA repair mechanisms that multiply genetic variations which are both frequent and limited. (c) *The constraints of compatibility* require that any variation in any “element” of an organism should always be sufficiently compatible with all other elements of that same organism, so that the whole organism can survive and reproduce. These requirements - anatomical, physiological, individual and group behavioral, etc. - result in the species that Evolution produces and maintains for a certain period of time, all the while obeying quantum effects that exclude myriads of intermediate variations (anatomical, physiological, behavioral). At the same time, this fixes races, species and genera when their environments are fairly stable, but forces them to disappear or undergo a profound transformation as soon as their environments shift; it takes only two or three degrees of difference to disrupt the flora and fauna of whole continents.

Thus, when it comes to the Homo genus, many now see Homo Cro-Magnon, Neanderthal Homo, archaic Homo sapiens, or the variants of Homo habilis, Homo erectus, Homo ergaster, even Paranthropus, not as *preparations of the Men* we would be, but as “*as many Men*”, species and great races of Men, in their own right. Believing thus that today’s Homo, in this ensemble, is a variety among others, adapted to a particular state-moment of the Planet, and that it is destined, in the foreseeable future, either to disappear, or to give rise to another single species, or other plural species, anthropogenic or paranthropic, in geological and tectonic circumstances that we cannot imagine. This is a new opportunity for Homo to conceive itself as a local and transitory relay, rather than as an outcome or a summit, for example as “Consciousness” or as “Freedom”. Homo appears now disseminated, off-centered and involved in his Universe, discovered a posteriori, rather than macro-microcosmic in a Cosmos-Mundus-Dharma-Tao-Quiq-Kamo, postulated and intuited a priori.

Thus understood, Evolution can then become a general model applicable to four areas of reciprocal enlightenment and heuristics: (a) the evolution of species; (b) the evolution of individuals; (c) the evolution of nervous systems, particularly the brain; (d) the evolution of immune systems. In these four cases, in fact, there is an intense production of variations, retained or not according to their effectiveness in the context under consideration. The common model is therefore variationist and selectionist, and a recent interview with immunologist Gerald Edelman can be entitled: “For a Darwinian approach to brain function” <R.sept2000,109>. Assuredly, this model does not forget: (a) the cleavages by which any salient element often reinforces its salience (distinguishing species, individuals, neuronics synodies, allogenic and ideogenic elements) <2A2b>; (b) the resonance-convections, by which, in the Universe, the similar often organizes itself with the similar not only by contiguity, but also at a distance (very distant neurons can participate in the same neuronics synody <2A2c>).

21H. From the Cosmos to the Universe in techno-semiotics. The universal quantum effect or the quantum universe

The first eleven chapters making up the basis of *Anthropogeny* showed how Homo’s body, an upright and transversalizing primate, gradually became techno-semiotic, but without first being selected “with a view to” one day achieve the technique and the systems of signs. This was the result of both divergent and heterogeneous re-selections and over-selections.

In any case, techno-semiotic systems fall within the framework of the variations, selections, cleavages, resonance-convections that are the living organisms that produce them; and thus, they have the characteristics of these systems, being also highly variable, cleaved, convective, selected, etc. However, in the realm of techno-semiotics, the demands of selection are not as strict, given that the compatibilizations are less severe. Technical objects and processes allow for a lot of free play and floating without losing too much of their effectiveness, and signs even more so. Our chapters on tectures, images, music, and above all languages have even shown us the extent to which approximation is tolerated, and even fecund, both for habit and for innovation, to the great chagrin of historians in search for logics. However, as well as having a margin of tolerance, techno-semiotic variations also have lightning global effects: a trait, a note, a letter or a color is enough to turn a message around; an additional or subtracted adverb is enough to confirm or eliminate a religion or an empire. This is all the truer because the signs – and even certain technical devices – act not only as such, but also through the perceptive-motor and logico-semiotic field effects <7A-E> that they trigger, and which give them their halo of fantasy <7I5>. This shows to what extent these techno-semiotic systems are also inhabited by quantum effects.

So, since quantum conditions appear in physics and chemistry, as well as in the selection of the living, and finally in signs and in technical objects-processes, could we not be speaking of a **universal quantum effect**? Or even a **quantum universe**? In the 20th century, artist Marcel Duchamp stood out as one of the most exemplary artists to have made the generalized

quantum effect the topic of his thinking and practice, shortly after he discovered the Quantum Theory <14J1b>.

21I. Hypostasized Categories, or the protagonists of WORLD 3

Each world <12B> is characterized by fundamental words-concepts-ideas. The categories of WORLD 3 can be inferred from the above, and in recent years they have shown a tendency to be grouped in the contrasting columns of two tables:

Degraded energy	Useful energy
Entropy (confusion)	Negentropy
Non-information	Information
Probability	Improbability

In this first table, the link between information and improbability is based on the basic theorem of Information Theory: “the quantity of information in a system increases in inverse ratio (of the logarithm) of its probability”, i.e. “in direct ratio (of the logarithm) of its improbability”. This is followed by a second table, which is more and more concrete and less and less rigorous:

Degradation	Regradation
Disorder	Order
Stereotypy	Organization
Homeostasis	Allostasis
Repetition	Introduction (Establishment)
Monotony	Event
Complication	Complexity
Death	Life
Non-value	Value

It should be noted that these various notions are not self-evident, and that they even fulfill what René Thom called “Pandora’s box of fuzzy concepts”. Particularly in the field of thermodynamics, which concerns the first table (entropy, useful energy, etc.), nobody can boast of having a clear and distinct idea of some of Boltzmann’s formulations, whose full significance was certainly not fully appreciated by the initiator himself. Nevertheless – and this is what interests an anthropogeny – the aforementioned lists uphold a new imagination by the confections of ideas they favor, fantasizing a certain “ethos” of the Universe where three principles prevail:

(a) Energy is conserved in a closed system. This conjures up the **first principle** of thermodynamics.

(b) However, in a closed system the useful energy decreases, i.e. the energy which contains potential differences (caloric, electric, mechanical, hydraulic, gaseous, etc.) which can be exploited for transformations serving plastician or non-plastician formations. In other words, the differences in potentials tend towards their most probable state, i. e. their equalization. Closed systems are increasingly confused (amorphous), they increase their entropy (tropicin, in, blurring inside). This evokes the **second principle** of thermodynamics.

(c) However, locally and transitorily, non-isolated systems (which receive external energies or information) are the scene of regradation; such is the case in Miller’s 1953 experiment where, after a time, atoms of hydrogen, oxygen, nitrogen, carbon, and sulfur [...] form organic compounds including amino acids under the influence of a simple electric charge. The living beings then define themselves as negentropic informational phenomena (a word introduced by Pierre Curie around 1900), which invites us to take note of the fecundity of states remote from equilibrium (Prigogine). With the precision that any local regradation operated by an open system presupposes at least equal degradation in its ambient environment. Thus, Helena Curtis’s *Biology* suggested that energy stored in animal form degrades the environment ten times more than energy stored in plant form. This invokes a form of **third principle** of thermodynamics.

As you will have noted in our tables, the items in the right-hand column must be reclaimed from those in the left-hand column. And the Universe is not more a column than the other, it is the permanent event of the relationship between the two, where Homo appears in our close Universe as the most striking dividing line in the universal drama that results from variations, selections, permanence, cleavages, falls, resurrections, accentuations, resonances, innovations, displacements, and quantum leaps. It is indeed a *drama*, not a *tragedy*. The tragedy was plastician; it was even the culmination of the plasticity of WORLD 2, even recapturing Evil in the magnificence of its language and gesture <22B4>. Drama – which simply means action-passion (drama, *dra, to do) – creates forms that are as much or more non-plastician as they are plastician. And creates them by ultrastructure as much and more as by structure and texture.

Besides, instead of the physical protagonists of the drama of the Universe, would it not be more judicious to remember other protagonists, chemical for instance, with bonds that we observed above on the occasion of the amino formations <21G1>: **Covalent bond, Ionic bond, Hydrogen bond, Hydrophobic interaction, Weak interaction**? Few actants shed so much

light on Universal Evolution, of which Homo, decentered and involved (plicatus, in), is a singular fold. These chemical protagonists have the advantage over the couples entropy/negentropy, disorder/order, probability/improbability, etc., of thwarting more reliably Homo's intuitions and illusions as a plastician demiurge. Their biochemical scope places them somewhere between physics, chemistry, technique and semiotics. Moreover, the same amino formations, chains of links, invite us to punctuate the history of the Universe according to the entries on the scene of other protagonists: **elements-mass**, at the stage of minerals; **chain-links**, at the stage of proteins; **links-meshes**, at the stage of cells; **rets-networks**, at the stage of neurons, now mimicked by the **rets-networks** of recent technical and semiotic formations.

And professional cosmologists consider even more fundamental protagonists of the universal drama, those whose compatible variations allow envisaging multiple universes within an "infinite multiverse", of which those protagonists would be only the very monotonous or very richly differentiable varieties according to the case <cf.Sc.Am.dec99,49>: gravity, cosmological constant (Einsteinian ratio between gravity and expansion), density of fluctuations, stronger or weaker nuclear forces, number of dimensions, etc.

21J. The Universe as a possible between possibles (strong and weak "anthropic" cosmologies). Or the Universe as being-there. Physics and metaphysics

The new universal actants, – the great interactions, the quantum conditions, the electron energy values, the cosmic constants (h and c), etc. – have provoked two remarks: (a) they have produced a geological and biological Evolution whose last outcome that we know of is Homo; (b) if the quantities and qualities that define them had been vastly different, or even slightly different, this Evolution would not have taken place, and perhaps it would have been impossible.

From here two attitudes emerge among the scientists themselves. For some, the Universe would be "anthropic" – in other words, it would be made for man (antHropikos) – either aiming explicitly at him in *strong anthropic cosmologies*, not being far from presupposing an intelligent will at the principle of the universe, or implicitly including him as the culmination of a Universe susceptible only to increasing complexity in *weak anthropic cosmologies*. In this first attitude, what alerts an anthropogeny is that in both versions of anthropism, our Universe is grasped as one possible among a field of possibilities, where then its realization rather than another seems to presuppose some demiurgic intention. Here we can note a remanence of WORLD 2 that conceived the Universe as a Cosmos-Mundus according to the World/Consciousness cutting <8A>, with more or less theistic or rationalist interpretations of the presence-absence ideations <8D>. To think starting from "sufficient reasons" goes together with thinking starting from "possibilities" (compossibles). And to think starting from possibilities is to be a metaphysician, just as Leibniz dared to be until the end, and as we still find echoes of it in Sartre. It is in this sense that *Anthropogeny* felt it had to acknowledge that Homo – as a possibilizing animal – shows "metaphysical" tendencies from infancy <6>. This is true to such an extent that physical

and metaphysical tendencies often overlap in our species. Aristotle had produced a “*tHeoria pHusikè*”, bringing order to the growths (*physis*) of the cosmos around him; the considerations he made to situate these growths in a field of possibilities and sufficient reasons were compiled under the banal title of “*meta ta pHusika*”, from which the Middle Ages derived a noun and an adjective. It was a mere coincidence of formulation, but one that said a lot.

In contrast with this metaphysician view – and hence according to an approach that is less faithful to the habits of WORLD 2, and then perhaps more indicative of WORLD 3 – universal actants and their quantitative determinations are grasped as a fact, a given, a “being-there”, for us the only primary “being-there”, which does not have to be justified by sufficient reason - like a specific realization, or a possible within a wider and previous field of possible - neither epistemologically nor ontologically. For instance, this is Martin Rees’ conception of an “infinite multiverse” <21F2>: “The seemingly designed features of our universe need then occasion no surprise”. In this second view – rather than to point towards the primordial World/Consciousness distinction – the ideations of presence-absence point towards the primordial Functioning/Presence distinction, and thus also towards a Reality/Real distinction where the Real is understood as comprising both describable functionings and indescribable presence(s) <8E1>. If metaphysics is a view of things starting from the possible, or sufficient reasons, then we must ask ourselves whether this second approach – favored by Archimedean practice – does not exclude metaphysics, which would appear to be a general Hominian tendency <6>, but one which has reached its paroxysm in WORLD 2.

The putting aside of metaphysics, if it were to be confirmed, does not mean that all philosophies would be set aside, since they more or less support *philosophical beliefs* that are religious, anti-religious, rationalist, agnostic, etc. We will have the opportunity to reconsider this when we situate WORLD 3 in the anthropogenic triad: religion/belief/mysticism, in the chapter on lives <27F1>. Concluding WORLD 2 and its initial “world/consciousness” partition, the dying Bateson declared that, after all, there was only one philosophical problem: that of the (nature of) consciousness and he admitted that he had not addressed it. WORLD 3, which tends to privilege the initial “functionings/presence” partition <8>, probably opens with the same question, but in a different way: is the fact that in the Universe some functionings are accompanied by presence to be taken as a mere fact, or *must* Homo – and more importantly *can* Homo – find some reason for it? If he *can* – and incidentally if he *must* – then there is metaphysics. If not, this metaphysics and its postulation of ultimate reasons is the transcendental illusion *per se*.

SITUATION 21

For an anthropogeny, two things have particularly turned Homo's conceptions upside down, setting aside all traditional philosophies. On the one hand, it is the discovery of amino acids, and consequently of amino and aminoide formations and, on the other, the cosmological views of the Universe, of which Homo is a state-moment. These two points essentially demand a new philosophy. There is a danger that the genetic nature of this chapter may have somewhat blurred the violence and fundamentality of these two ruptures.

Translated by Paula COOK, 2020

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