ERGODIC INTERPRETATION OF QUANTUM MECHANICS

There is no bright science if there is no fun. Quantum mechanics are very accurate, but with out a clear interpretation of its burocracy, has becomed just the more extensive practical exercise of linear algebra, with models the best explains "how" at the price of forgiving about the "why". Copenhagen, Pilot Wave, Multiverse, von Newman,... Do we surrender? Feynman said: "calculate and shut up!" and everybody obeyed,... which has restricted us the fun of interpreting Reality at the "femtos" scale. Basic symmetrical properties like rotation, reflexion or translation in space and time, has been useful for modern physics, but how do those symmetries behave on scale? Only if linear, translation will hold the Correspondence Principle (invariance), but if non-linear momentum in some scale, may not translate in momentum in another scale, like kinetic energy is seen as temperature. Reality can share principles and paradigms only between linear related scales, and this is precisely what Lyapounov demonstrated it does never happens if both, space and time are involved: space and time evolves at different speed depending through the scale. So momentum is not the same, but as only dependint in space coordinates, position in invariance to scale.

The fact that a model is falsable only makes it useful in some interval of space, time or scale, not a True by itself. Classical gravitation is very precise in its interval of applicability, but not more true than the GR. Each theory has the scale-detail-accurancy of its paradigm. Scale, detail and accurancy are different cartographic variables: a zoom can increase the scale without improving the detail or precision, and adding more pixels can increase the thickness of the grid, but without improving quality of the inputs, it do not affect accurancy. Models may adapts to scale by adapting the technical capacity of precision consecuently with the improvement of the technical capacity of observation, or there will not be useful anymore. Like space and time, scale is a coordinate.

Idealized models are useful as approximations until Reality becomes more demanding: dynamics between equilibriums are no longer the norm and changed paradigms. Equilibrium is the exception and the cyclic quasiperiodic combination with sudden disruptive moments of emergency -to local syntropy- and catastrophe -to the entropy-, the norm. As an exception and perhaps because its idealization, linear and perturbative quantum mechanics describes quite fine identical but distinguishable particles (labels), so fundamental and "well-behaved" approach to this scale is consistent: convergent, ergo reversible, reductible, predictable,... Reality will become more demanding when we need to interpret quantum scale, further than calculations: is Reality linear and perfectly elastic at quantum scales, or is just a sufficient idealization that gives us accurancy enough to our tecnical capacity of observation?

Theory of Mind, by which our mind and our scale is the reference of the reality of other beens and scales,... sometimes useful -when linear-, but maybe not true, against de “Umwelz” approach -when not linear-. QM allows the application of the principles of Elementarity -elements with no structure-; of Normality -by which applies the Central Theorem-; Ergodicity -by which space and time statistics are proportional-; and Correspondence -the atomic or nuclear angular momentum is analogous, while not identical, to the classic-; just because QM is consistent inside its linear paradigm -principles- and scale-detail-accurancy. Hidden behind a window and lots of forms partially unfilled -and dozens of arbitrary constants, which are the measure of the distance from idealization to reality-, bureaucrats look disdainfully above their glasses, at the queue of information seekers. Arrogance compensates for their insecurity... if anybody interprets QM, anybody will understand Reality.

We are always on the edge. Perturbative theories applicability run aground when trying to explain non-linear couplings, (variational method, nucleons engagement, molecules stability,...). The LQG loops theories run aground when trying to compatibilize the invariance of the variable

diffeomorphisms in time, with the canonical quantization. Theories of supersymmetries, KK extradimensionality, strings, multiverses, branes,... run aground with no-experimentation facts. CP broken symmetry is not enough to explain the over balance of matter, but to let us know about the non-fundamentality of quanta. Masses acquired according to arbitrary values in a palette of 5 orders of magnitude -0 if we include neutrinos-. Three particle families is the minimum for “CPT Theorem” -with only two, the angle of Cabibbo could not be complex phase-, but also the maximum. The problem of flavour -permissible and prohibited mixtures- or is there a symmetry of flavour? Oscillation -double beta or chiral-. Absence of right-handers and mass of neutrinos by seesaw mechanisms. Protons that do not disintegrate. Absolute zero, infinite or infinitesimal values and their renormalization. Virtual seas. The supersymmetry and spontaneity of broken symmetries -without explanation about mechanisms further than “fluctuations”-. Lepton transmutation. Strangelets, preons, prequarks, techni-quarks, strangelets, s-higgs,... Laws beyond the horizon of events. Identification of the ABEGHK boson -Higgs- of a smaller mass than the top quark -which does not confine itself to the others, since it decays before because of weakness-. Too many questions postponed because theory works at enough accurancy. Inside details will be the inflection new physics, pending of a change of scale. All these questions and the attitude has to be calculate and surrender about interpretation? M. Veltman and G 'tHooft demonstrated the non-renormalizable nature of quantum theories of gravity.

Because CPT Theorem, and although it is very exceptional and slight, reversibility is not strictly preserved at subatomic levels and so, either entropy is not a law of systems with interrelated elements, or elementary particles are themselves systems, treated as fundamental or elemental just for idealization requirements. Confirmed temporal asymmetry with hundreds of millions of "decays" in the SLAC, CP is preserved as a flow according to the Continuity Law, as self-emergent phenomena,... and perhaps not even the Energy Conservation Law can be extended to every scale of space-time. If so, quantum interactions are not perfectly always reversible and their supposed elasticity is not exact at some scale or interval... and in science: the exception that proves the rule.

Relativistic, quantum and dissipative theories, do not seem to be complete: to merge GR to QM they have both to cross in our scale with time asymmetry, time independent theories at macro and microscales needs to merge with irreversibility. According to space-time-scale axes, there are only ideal approximations to reality, with validity margins depending each one of each one's paradigm... which do not match between them all. GR and QM both have to evolve somehow to include non-equilibrium. To make bureaucratic consistency with maths, we take virtual particles for real, existing in an undetectable time for conserving the sudoku of quantum numbers, at the price of supposing that in that time, energy is not compensated -like it happens in dissipative dynamics between non-equilibrium states, and that is a nice hint-. The more energy, the lower virtual life. In this mathematical ideal context, the strong and electroweak interactions do not present frictional losses, the collisions are perfect elastic, the WZ bosons acquire and yield mass and in a theoretical reductible and reversible “Fermi's Sea”, there is symmetrical creation of matter in pairs... but in fact, they do dissipate CP! If there is disipation, there is entrophy at a lower scale, and then elemental particles may has some deeper structure. Maybe it is not useful to the scales on which can reach our senses and instruments, where the fundamental idealization is enough to the accurancy. There might be a reason behind that asymmetry which generates viscosity, and the only hypothesis is not so, just empty words: Asymmetric Fluctuation.

A cold condensate of ground quantum states has constant pressure and bosons addition does not take up volume. Close to absolute zero temperature, all bosonic realities fit into the same isolated system... but apparently in the Beginning, the Universe had to be incredibly hot, much more than plasma, not cold as less than a condensate. It might fluctuate from near zero to near infinite. Boson split into fractional fermions by kinetic energy -in our contioned by the “mind theory” language,

temperature-, emerges a virtual null pair, each occupies its energy level and creates scarcity of space. For some reason survives a distinguishable time and makes it observable. Asymetric Fluctuation means that “Exclusion Principle” must have created temperature pressure and expansion, moving away the balance... Why there is something a prefered arrow direction?

If spliting bosons at there will be a Pauli's pressure which generate expansion as needed, but the fact is that there are more coordinates of energy states available than fermions and there is inhomogeneity, and localy there are less chairs than candidates, so scarcity. If a higher rate of the levels that allow the expansion, turbulence on flow may occurs localy. As there is localy turbulence, there must be at rest overavailability of coordinates, an at slower speed than the available volume left by Expansion, the flow is laminar, and then entropy is introduced into the system by randomness at the offering of coordinates bigger than demand of occupancy.

With excited states the condensate loses its super-attributes and happens to be governed by rules of scarcity of coordinates and therefore turbulent. In any case, chaos. There is no turbulence without friction and there is no friction without diversity of properties, irreductibility, irreversibility, inefficiency, so Pauli's Exclusion Pressure may explain also mass, and beyond that also there is rotation if there is turbulence, when the available fundamental states are exhausted, rotates the Centrifugal Expansion Pressure added to the Exclusión Pressure, and the entropy will grow more than the scarcity. The bosons may have mass, and a condensate with rotating mass will want to expand even more by centrifugation.

Is rotation reason or consequence of Asymmetry in Fluctuation? Without rupture of a symmetry that produces inhomogeneity and a prefered direction, any fluctuation does not pass from the virtuality. Recovering “Descartes vortexes”, matter had to be a turbulent way of solving a traffic jam, because kinetic energy creation can not be faster than the speed of causality or interaction, which is also called speed of light. Was energy created out of nothing? Was energy splited from anti-energy in sum-zero? Was the Universe metaenergetic itself? or Was energy imported from another system? Is it still doing this?

Angular momentum emerged as a turbulent solution -convictive-, when bubbles of matter came out of the pot of milk. By analogy, lets call it “Cavitation”: air bubbles behind the blades of a propeller. The excess overwhelms the flow, this leads to a hexagonal distribution autosimilar by cells, diversity generates randomness, viscosity became mass, mass induced turbulence, then rotation, and a cascade of events is from that point intelligible by physics. God only had to put a pot to boil and stir it with the spoon... but surprinsingly, the sugar crystalized from the coffe. In the extreme cold of a billionths of a degree -almost in thermal death-, inefficiency or viscosity or electric friction present a phase change: the speed of light slows almost to a stop as could show us L. Hau. Easy to say no-time, then no-flow, but it conmutes and if there is no flow, there is no time.

By evolving a saturated system that maintains its properties, autosimilarity -scale invariance by "infinite" increase of correlation length between local domains-, gives a path-way to modularity and local subsystems can tend towards independence, diversifying to the same extent of their likeness: if others are self-similar, nothing brings me that I have not and no advantage has to relate with them. Physics follow Economic “Coase Theorem”, or viceversa: Pareto's equilibrium or non-scarcity can be performed as thermal death and infinite entropy. But if there is no equilibrium it may evolve smoothly back to equilibrium, or suddenly forward to a phase change, which, according to statistical mechanics, is a renegociated equilibrium between the tendency toward order and disorder. To behave as a system, a condensate must have individualized particles with hierarchical relationships, may lose the conservation of a symmetry and a conservated property, and through randomness, arrise the oblivion and emerge novelty.

Reality -with no +i imaginary terms, turning soft what is rough- does not use to seem smooth of continuously differentiable class C, but more a random selection of histories, ocasionaly with discontinuities, phase changes between non-equilibriums, with bumps and promontories, sinks and precipices, "bad behavior" in points or levels of no-continuity. Inhomogeneity, like asymmetry remains been our fundamental missknowledge. When inhomogeneity grows to extreme, singularities are in which systems can talk with the other systems with palpable realities. If the nerves were continuous wires without intersynaptic spaces, they could not improvise, change,... there would not be decision-points where the environment could be proselitits, and no diversity behavior could emerge. Perhaps the reason is that in their deep organization the particles are not fundamental, but autosimilar ensamble manifestations of a phase change in the initial condensate as a grid at the Planck scale, and therefore divisible,... or not.

Each person emerges in his born to be something more or less with a similar size, weight, color, number of arms, eyes or harts,... The fundamentality of a fellow is an idealization to model masses, but each one has his individuality, his dreams, his friends, his lifes,... Conducting metal offers recurrent potential that limits the allowed energy values to the phonons, emerging a discrete property resulting from a harmonic distribution,... without this being "fundamental". Reality tends to be quantized or continuous, fundamental or collective, depending of the scale. Lets try another analogy, who knows if deeper than just a didactic resource: Perstimulus Time Histogram. We are not able to find rules in the causal behaviour of a single neuron: it never spikes the same response to the same stimulation. If we spike them, each one answer with something analogous to a wave function, but always different between them and every time. But a grup of neurons finds a pattern remained in the interaction between them, and only as a set, they do show same answers as their “response funcion” to the same stimulus: emerges autosimilarity as a “wave-function-like”, which is considered as a “state equation”. Each point of the function means a probability density of the spikes that has already occured, but there are so many spikes in so many neurons, that remains only as an statistical number that summarize a deeper and more complex reality.

Principle of Exceptionality degenerates into Anthropic Principle: while humans are comfortable feeling to be part of an ensamble, the human still wants to be more than a particle of the dust, when what substitutes the linearity of addition for non-linearity of reality are the rules that generate patterns in the system. Principle of Equivalence legacy in the "Theorem of Corresponding States", first announced for liquids but appliable to other populations: no matter each one's density, viscosity, will, strength, ideas, history,.. we all are attracted by gravity according to our mass, not according to any other characteristic.

Feigenbaum found again and again fundamental numbers that determine the self-similarity between the scales to which a system forks and transits to the chaos, and Mandelbrot called it fractality. Far from non-linear and turbulence change phases, elements can be related by simple rules like addition, which gives to each element added self individuality and prominence, but near to Change, systems behaviour depends on the symmetry and dimensionality, both cross related: Universality Class. In the vicinity of the emergency or catastrophe, it does not matter the opinion or intention of each individual and the protagonism is for the system itself, not for its individuals. A a traffic jam, cellular apoptosis, the collapse of the Soviet Union, freezing of water,... described among themselves self-similar without copying one another.

The useful renormalization mess gets a reasonable conceptual justification from the Fractal Theory. At each level of the bifurcation map, the relations between dimensions and symmetries are repeated over and over again, between emergencies -jumps on the time scale- and resonances -jump on the space scale-. Instantaneous and simultaneous are adjectives that may, or may not, be dependent on

time and space scales. The transition of the energy level of an electron is instantaneous with respect to the vibration of the nuclei, which is intantaneous with respect to the bond with another atom, which is intantaneous with respect to the times in which an ensamble of molecules reacts with another, instantaneous with respect to a blast, which is instantaneous to the life of a soldier, which is instantaneous to the existence of life on our planet, ... and whoever who says instantaneously on time, says indistinguishable in space.

Our most accurate atomic clocks of strontium or cesium measure vibration in the atoms to the sixteen decimal, which is in similar order of magnitude as an electronic “orbit”, but it is an eternity for nuclear moments scale. It is difficult to distinguish each person in a crowd, and to differentiate one from the other we zoom in, see their clothes or their faces. Each anchovy has its own identity but for us they are indistinguishable. Distinguishability depends on the scale, and indistinguishability is a requirement conditioned by our ability to zoom... whether intrinsically may or may not be distinguishable. If we place a blade on a film reel -as an analogy to precision- depending on the speed, it will cut a part of a frame, a single photograph, or a more or less long sequence. With our clocks we are in the weak particles scale, maybe the edge of distinguishing frames one by one in the QED scale. Up to now quantum mechanics calculate sequences overlaping all in a single frame and assigning specific weights to the different possible images of the sequence.

Ethimological root of lepton comes from a meaning of lightweight, fast. Emergence can sometimes place a continuity distribution of element into discrete states, but also it can be the scale that make a continuous variable appears to be discrete because a concentration around certain values (in some scale the best resolution image will be out of focus). Depending on the temporal frame of the observer, the quantization may be the emergence of a pattern of behavior in the overlap of the set of times -frequency-, that a customer enters a store. Collapse is what is spent on one of his visits, which breaks the marketing behaviour average of customers. If a zeptosecond -10^-21sg-, on the orders of magnitude of the gluons, was the age of an analogous Universe as old as ours, Plank's time would be as far in magnitude of order to its own equivalent scale of strong interaction: there is time enough for a whole Universe in which emerges complex systems. What happens between the Planck's and Fermi scales?

Böhr atomic model is not an small solar system,... but maybe the Solar System could be modeled as the S state of a giant atom; and a binary star system with non parallel spin could be modeled as the P state; or even shapes Dstate-like emerge from appropiate configuration of a stars system. Quantum mechanics can be an interpretation conditioned by scale, -which maybe is just the order of approximation of a Fourier series- if a long-lived god, for whom his instants were our eons, He would describe a star or planetary system with some limitation in the scale units that can be distinguished with His measurements. At a single glance, He would not appreciate the orbits but "He saw overlaped milions years", and at His scale, would be easier and enough to know about the probability of finding a planet in a certain place. The probability that Mars will escape and become an outsider from the Solar System is not zero, just as Venus has a non-zero crash probability with us. In the long term for our scale, the position of each planet contains indetermination from the hipersensitivity to the initial conditions in another “divine” scale. The "wave function" as a descriptor of a planetary system independent of time (in a such long time that does not matter when each planet is in each position), would be possible to be modeled as containing central field potential, interaction between planets, conservation of angular momentum, tidal effect, sensitivity to initial conditions,...

Just like QM modeling the position of the Earth is a cloud of probability if seen as overlaping time periods of millions of years of the existence of the Solar. Every time the planet has been in a position with respect to a fixed coordinate system -SCM-, has been and it will be with a different

moment: because each time went by a different orbit. Even there is a very low probability -but positive-, for the Moon to be fired away of the System and become a pilgrim in the dark space... like we were in 1999 or like an analogous “tunneling effect”. The observer defines the accurancy of the measurement, at the cost of exponentially cutting in order of magnitude its linear projection in time (at least one of the Lyapounov exponents is positive and the precision diverges expontentialy).

The Principle of Uncertainty may be only a human way to the limitation in the distinguishability. If the identical can be distinguishable because its position, (labels of quantum states), the indistinguishable because our accurancy limitation could also not be identical. If Mr. Tompkins, in his daydreams with a clock marking eons instead of seconds, fixes a point in spacial central mass coordinates, he would have an exponential cost in the knowledge in direction and speed of the times that the planet has passed and will pass through that point (many times with different momentum by a single number means the need of an statistical value). If Mr. Tompkins determines a moment in time, having no initial conditions, he has no basis on which to extrapolate assuming "good behavior" and will not be able to know his orbit, but at the most a probability value. Where it goes, if he does not know where it comes from? Fixing a point in space in a long elapsed time, needs to average "directions" when passed that point, and vice versa, without it being a fundamental characteristic, but a limitation of any system observed from another level, another scale, another fractality.

If taking a shortcut in "the the three bodies problem" we consider a planetary system in which a year is a fraction of a femtosecond -beyond the limit of our measuring capacity- the description of the orbits of the planets would be more complicated wave function than quantum, just because diversity of mass of the bodies. We do not see in the fluttering of a blowfly its wings against a window, but a cloud of probability, and we do not need to crush or collapse him against the glass to convince ourselves that if we do not know at any moment the phase of its wings, it does not mean that has not wings but some kind of basic and elemental cloud around. What for one scale is small, for another is large. What for one scale is instantaneous, for another scale it is parsimonious. What for one scale is determined for an other is an overloap of histories, all happening in a frame available for him.

Quantum model "shortcut" bypasses the limitation of distinguishing, leaving the battle behind, but there are a a couple of dozens of parameters far away to be fundamental and it does not make reality more quantized, but more understandable on quantized language from the perspective of analyzing jumps between stages of development. At accessible scale level to our clocks in relativistic limits, electron speeds typical in the environment up to less than 1% of c, are estimated quite succesfuly introducing perturbations of second order which expresses as spectrographic bands. We merely have clocks capable of distinguishing the full life from birth to death of an electroweak boson, and with great difficulty the existence of particles like muons or tauons ("only" we reach a dozen decimal of a second). Because we do not have clocks that distinguish times many orders of magnitude greater than the Planck scale, up to 10^-44, we idealize the events on those thirty -30!- scales as indistinguishable. Thirty zeros where nothing happens? Nothing happens because we are not able to distinguish frames? The wave function is a "temporary state function” of a ensamble built up from the same particle at many points in time and describes collective behaviors at a more basic level. G. 't Hooft, proposes at Planck's scale a deterministic and binary reality, and indeterminacy is a consequence of the ignorance of the relationship between that scale and its quantum "macro-scale".

If anything demonstrates the utility of quantum mechanics, it is the misunderstanding of its fundamentality and the inconsistency of its scales. How may be the wave function of a billiar table along all games, during all days of its life for a God that has His references in time frames of eons? The fundamentality of a billiard ball depends on the scale of the observer and the linearity of the superposition depends of the states of idealization and disregard for interactions between different

games. Trapped in the Groundhog Day, she remembers only the collapsed last day, but he has to remember all overloap repeated days: how can he talk with her about the same day?

Structure -depends on the topology- and functionality -depends on time-, are related with neighbor scales and not only among their counterparts that shares the scale: hemoglobin with reaction rates much higher than those of respiration, is related to the pulmonary alveoli, which are not of their level. The fractality in the scale of space generates self-similar structure that is discreetly repeated, by levels: hives, bees, organs, cells, organelles, molecules, atoms, particles,... Fractality on the time scale generates a self-similar function that is discreetly repeated, by levels: cosmological eons, stellar cycles, evolution of ecosystems, lives of individuals, their cells, intersynaptic hormonal concentrations, the chemical reaction, the stabilization of atomic orbitals, strong interactions,... But space and time are not linearly related. "I believe that scientific knowledge has fractal properties; that no matter how much we learn; whatever is left, however small it may seem, is just as infinitely complex as the whole was to start with. That, I think, is the secret of the Universe."(I. Asimov).

For a thought itself, make no sense to determine the most fundamental synaptic pathway which generates such an idea. Reality is reductible only if its so soft -so, idealized- that can be analized as linear. Reducting systems into linear subsystems, cuantized structure and functionality, emerge in biology as "equivalence classes" in which functional flows are modeled according to mathematical techniques of "compartmental analysis". While Totalitary Principle tends to ignore it, reducted and idealized model of description of reality are very limited models, while its success may make us forget it is not fundamental reality itself. The distance between reality and a theory is the number of arbitrary parameters that model needs. To try to quantify gravity is to site at the same level a fundamentality of 4 or 5 arbitrary parameters to another phenomenological paradigm, less fundamental of 20-25 parameters.

If a God would like to describe the life cycle of a fly, he would do so according to references on the dimensions and scales conditioned by His senses, instruments and paradigm. The hierarchy according to the emergency of configurations in the scale, can impose discrete units in continuous fields and vice versa. If the complexity grows with scale and with more complexity greater instability, until the counter is set to zero with the emergence of a new hierarchy level, the quantum is the demonstration of a deep contradiction between Cosmos and Chaos. Between Apolo and Dionisus, rationality and intuition, enginyeering and art. Is complexity an invariant attribute of reality or is it a distance from our position on the scale?

So, the fact that mathematics works to describe with such an accurancy the phenomenology of quantum relations, does not mean that particles are really fundamental. The CPT Theorem, the discrete nature of energy values, the number of arbitrary constants, the value of masses and the diversity of properties, makes one suspect that there are continuous hierarchies from which they emerge. A particle is described according to a probabilistic distribution that is summarized according to attributes and language of a higher level of hierarchy: position and moment and their interaction by coupling the wave functions. If there is viscosity at subatomic level, even with order of magnitude greater than the Universe life itself, do quarks and leptons decay? What were the energy levels allowed in the early particle ensambles of the early Universe? Fine Structure may have changed from the CMB to our days.

If quantum numbers of a “fundamental” subatomic particle, describe the state variables arised from the auto-similar behavior of systems at smaller scales, the ergodic interpretation restricts quantum algebra model applicability, to a consistent useful range of scales. At smaller scales the treatment migth be again statistical. If statistical quantum mechanics, double the statistic approach, following lower scales could be statistical of statistical of statistical,... At any level, even in those Universes

inside the 30-scale indistinguishable frame, between two states of an isolated system the energy will be conserved, but there will be an intrinsic quantum level time-arrow, and there will be stochastic quantum level trajectories in the processes for the conservation of the energy, which will not be equivalent in time to flow from the same level of energy to the other same level of energy.

The interrelation between elements of the system changes something in the system, regarding that any relation has happened and elements remain pure and isolated: relationship makes rough what was smooth. Not all possible microstates with the same energy gap but different flow length, do not fit in the same reality, and the first path that, by chance or by being more direct, occupies the state, acquires a privilege, a potential that requires energy without apparently having invested energy: it just holds energy flow until it loses its privilege. Being the firstborn offers the best option to get a legacy. The faster succession of microstates acquires advantage, but the faster or the simplest, may not be the most efficient story from one to the other level of energy, since one can attend to the time-arrow and the other to the process (an example in chemistry would be a direct reaction or mediating an enzyme).

Reality is not driven by maximum efficiency, but by a constructual optimum in space-time: the best of the possible trajectories among the most probable, with limitations in space, time and scale. Maybe not the most efficient neither the most represented, or the average, but some microstate between all them, depending of the time available to do the selection and collapse. The trajectory of opportunistic-constructual microstates will thus have a relative potential energy, coming from the advantage to had been the first to reach to new state, which has not been transformed into action, but which requires to any other more efficient microstate additional effort to fire away the first occupancy, and such asymmetry would nullify the Energy Conservation Principle... if the Principle of Increment of Entropy did not exist. (Sun Tzu: "Victory is obtained before the conflict", and "The defense makes you invincible and the attack vulnerable").

The main mechanism of bactery control in our body is the "barrier effect", and beyond the well known “darwinian” defiance, a good reason for prudence with antibiotics. At any level of scale, Entropy may be something analogous to the Cost of Opportunity or the hypocrisy degree: requirement to others what one's self does not have. In the transition from one state to another, a muon, a response, a species, a product, an idea, a theory, an organization, a molecule... acquires better capacity for action or potential energy than another, perhaps more efficient: just a matter of opportunism somewhere and somehow, between the shorter way and the quickest way, in the space-time-scale frame available. To throw out a resident is more expensive than for the resident to resist, and that opportunity cost can be measured by the difference between the degree of relevance of both microstates, when they are one changed for the other. The opportunism in the process of adaptation to a change, is equivalent to the difference between energy efficiencies or length of flows, and depends also of the frame, so of the distinguishability. That potentiality does not depend on the time: an state function.

Any linearization of a high degree equation introduces a limitation on the applicability range of simplification: a fragility to the butterfly effect of a non-relevant variable which in a broad enough spectrum of application is presented as necessary (from strange to rare, from white to black swan). Linearization depends always on the scale: imagine a curve that we simplify by a succession of tangents, each of them locally limited to its interval: then the range of applicability or locality will depend on the scale and kurtosis of the function. "Eureka" is a program that puts competing equations to fit hidden patterns in a curve, but the best in one interval, is not in another... what we already know when we simplify locally by Taylor. The sensitivity of coordinate dimensions to their applicability, or exponent of divergence, also depends on their nature: time is more resistive than space, and both more than scale.

Monty Hall's Paradox. Intuition is logical only from a single paradigm for both: if what we try to understand refered to analogies is expressed in the same language of our experience; but if you have to choose between the conclusions of logic and those of intuition, always choose logic because intuition is conditioned by our scale, paradigm and senses. Perhaps indeterminacy is nothing else than a "drunk talk" between non-corresponding scales and chaos, maybe a term that includes too many ways of interpreting the excessive and subjective complexity of causality, with limitations in accurancy of our senses and instruments. Relativistic and quantum physics, with dissipative dynamics, have revealed themselves as rabbit burrows of counterintuitive countries, where symmetry, causality or scale lose their meaning when questioned from our intuition, and tries us to give up to interpret. The self-defeated scientist, resists the strength of common sense and causality, trying to sell logic and explain what he does not understand. Turbulence is the cornerstone of the physics of the future, ... “although the future is no longer what it used to be” (P. Valèry).

Paradigms restrict allowed questions, but stupid question deserves angry answers: a collapse of the wave function. Of course collapse depends on the observer, while reality do not accept the limitation in scale-detail-accurancy of the observer for distinguishing. A neuron does not think, it does not conceive what a thought is, it is silly and not only does not know how to add 2+2 but does not even understand the question, it has its chemical language not measurable trough an intelligence test,... Correspondence is not a Principle, but a Faking way to think when non-linearity. If we force a question, the neuron answers us "plays dead" or “jumps” or "switch spikes off" or "nothing at all",... “Umwelt” is the name of the world as perceived for non human minds: we do not neither ask a brain as a whole what its electric potential is, when we add 2+2. A quantum as the emergence of an overloap of an ensamble of the same system on time, does not understand the concept “where” unless we agree with it the scale (collapse), or at least does not share the phases-space of reference or the Universality Class (dimensionality) Respect to which references or even paradigm? Position has an axis scaled. As stupid is a device that individually asks citizens how clever they are, as to neurons by their calculating ability, or to molecules of a gas by its pressure, nor to the particles of an atom by its momentum.

We pretend that the quanta are small balls or big clouds as appropriate because we want they share with us the scale and states description. Properties such as speed, angular momentum, orbit and even position, are analogous to pretend the plants have musical preferences. The concepts that systems can understand do not have to make sense at the atomic level. For physical language in a cluster gravity description, a star is a dimensionless material point in a space of finite dimensions that curves the space-time -without need of transmitting particles-, but it do has dimensions. For another physics paradigm a quantum is extensive in an abstract space of Hilbert. Non-linear complexity scales after a bifurcation, do not share properties, nor attributes and nor language. A brain is not a very big neuron, more neurons does not build a bigger brain, nor make people aware for demography control, responsible consumer or solidarity, makes society responsible and socialy commited. Scales change the language of interrelations.

Linear sum of good intentions of a mass of people, can produce a lynching. A single molecule of a gas has a kinetic and potential energy at a certain temperature, that may not correspond to that value in degrees and does not make sense if asked individually: it does not know what the question temperature or pressure means, but the ensamble will behave according to those properties, and do know those concepts. A particle that passes through a double-slot is asked in a language that it does not understand, between options on which our way to measure does not make sense for it: where are you going? "I do not know, once here, another time there, I'm more comfortable in one region of your coordinate system than in another,...". It understand position as we do, but not momentum. Ants does not talk in our language. Applying the “Non-Hair Theorem” to estatistical thermodynamics, we asks a molecule of a gas what pressure do it has?... when it can answer when it hits a wall, which vector transformation of kinetic energy comes in and out. If the observer calls this

pressure, it is his way of seeing it, and for this he must put a wall. A ball will understand his traumatic experience of bouncing in a different way than the jai alai player: maybe to one does not make fun and the other does. Without a wall, the system does not collapse under pressure.

Interference pattern is built one by one in the classic double-slots experiment, not by blow: a single particle seen as an ensamble during all the frame we are able to measure, does not create a pattern, but participates in it by following a rule of density, by the limitation of distinguishing in our precision, badly called probability. The wave function collapses by randomly choosing the same three coordinates for all, assuming they see reality as our canonical references... the same Mind Theory that creates gods and cloud atlas, wants to see positions and moments at scales where they lack meaning. Asking force them to answer, instead a ouija, crossing a wall of Euclidean coordinates in human scales, in the middle of a car race in a circuit in quantum coordinates, and waits. The wall forces a phase change in a system with collective behavior of cars many times rounding the circuit, that we call fundamental particle.

Uncertainty and indeterminacy are not fundamental properties of quantum particles, but a way to describe in our bureaucratic language with mathematical limits of our dimensional relationship and capability of distinguishing them. Discretization of the energy levels of the subatomic particles, like phonons, are only emergencies of a more fundamental population behavior when synchronized: just as the metronomes or fireflies are modeled when phase their rhythms. There are numerous examples in dynamic systems in which a continuous phases-space is self organized in concentric surfaces -limit cycles- or lobes -torus- with discretized values, not because they are fundamental, but emergent and self-similar. Neurons respond as discrete excitable systems once a threshold of potential is passed and spikes another neuron, regardless of the size of the disturbance, according to patterns to unique spikes, numerable, sustained harmonics, bursts,... coupling.

A stick suddenly introduced in the wheel of a bicycle with a given linear momentum, determines the radius in which it stops, but concentrates all the angular momentum to turn it towards the front and to stamp the cyclist against the asphalt, with a force that does not depend on the particular radius among all the indistinguishable ones in which the stick has chosen to be. By accounting rules, what it can not be measured, does not exist (externalities): we are allowed to lunch only what is on menu. By quantum mechanics, exists everything that can be described: we have to eat all the menu options, without need to choose. What the bureaucracy prevents, promotes new jobs. The God's Algorithm of the Operative Research: the optimal paths to find a correct solution, demonstrates the strong limitation of the Principle of Totalitarism. Would an observer know every frame of Cinema Paradisus's kisses, or every kiss?

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