What is it that's happening?

(From **¿Qué es lo que pasa?** Lucina 2006. Translation by Eduardo Guzmán Zapater)

Agustín García Calvo

Universidad Complutense de Madrid
28040 Madrid
Spain

Abstract. The book's foremost aim is to present a dis-covery or un-covering of how 'things' are and are not. This involves a counter-definition of 'reality' that avoids its confusion with 'Nature', 'universe(s)', 'matter', 'object', and includes its 'ideas' about itself, so discarding problems of 'object/subject', '(human)observer/observables' and the like. The present statement is partly inspired by many recent studies in Physics, of which a critical selection is also offered. Yet the main finding stems from a certain withdrawal of the need to uphold the truth of reality, of 'things' and 'oneself'.

Contents

INTRODUCTION

Whatever this may do to the readers, it will surely be felt as it is being done. I only have to anticipate, so as to avoid their taking
for what it is not and thus nothing be done to them, this
undeception: that this is not a scientific `theory´ nor a `philosophy´ either: such productions are always too realistic (or idealistic, which amounts to the same) in their insistence to account for things from within things and, from amongst them, persons, so as to be able to discover truly something about how Reality itself is (and how it lies).

This, to the contrary, is a dis-covery, that is, a lifting of the ideas or beliefs with which Reality constantly defends itself from being discovered; and it does not distinguish between `faith´ and `knowledge´: any knowledge or science is faith as soon as it includes in it the Future, that is, telling as passed what has not passed; but that is precisely what Science forcibly does.

This dis-covery is, for the moment, inspired by some hundreds of readings I have been doing in recent years of reflections, inventions and contradictions of more or less honest or unruly, and almost necessarily quantum, physicists (or, on less occasions, computer scientists or philosophers of Science and, more frequently, mathematicians still sensitive to the problems involved in the foundations of their art), or of papers or books but, above all, through entries in the Web provided to me by the invaluable help of Jose-Luis Caramés, his diligence and his dexterity in searching; and of some of such readings I include notice here, in chapter III as well as in the APPENDIX, so that readers may somehow take part in that inspiration.

But, of course, something far more deep and elementary has been inspiring this attempt: the discontent with the lie, however real it may be, suffered by any common sense or non-existing-folk remaining within me. [1]

[1] The verb `to pass´ is used in this tr to try and render in English two different meanings of the Spanish verb “pasar” as used by the author, that are customarily seen in contemporary English as “to pass” (in many of its current uses) and “to happen” (or “pass”). Sometimes also “enter” or “happen” have been preferred to “pass” for the sake of clarity, like it is also the case that the author sometimes uses “suceder” (“happen”, “occur”) or “entrar, entrada” (“enter”, “entry”), though the instances of preference of one or the other do not coincide between the original and the translation, and hence one will find “pasar, pasado” translated most frequently as “pass, passed/past” but sometimes also as “enter” or “happen” and their derivates anslation.

I

1. Certain terms are used here, such as `reality´ itself, which do not come from the common, from the living language, but rather originated in culture and writing, in the medieval schools of Science and Theology.

On the origin and development of the words `reality´ and of Reality a first anticipation was given in the essay `Sobre la realidad o de las dificultades de ser ateo´ *LALIA 1973,* which was probably my first step in the path that has led, with the passage of years, to the discovery I now submit. About `existing´ I made some remarks in *DE DIOS* 1996, 27-31, and prompted others to trace its appearance (and that of gr. *hypárchein*) and avatars in theological writings. On `cause´ (Sp. *causa*) some notes can be found in `De la génesis del Fin y de la Causa´ LALIA; and its vulgar appearance as `thing´ (Sp. *cosa*), in connection with `cause´ and *`thing´ in Science, already started to be treated duly in the `Prolegomena´ to the edition of Lucretius *De rerum natura / De la Realidad* 1997, 34-35.

2. But such terms were imposed, in our diverse languages, upon spoken language and people already several centuries ago, in such a way that it has become habitual to hear, for instance, talk about reality, declare something real or say that something exists or does not exist. And hence it occurs, given what I will later expound in more detail on the equivalence between `a reality´ and the `semantic vocabulary of a language´, that Reality, as it presents itself to us today, cannot be independent of the use of those terms, nor can I avoid using them precisely when speaking of or against Reality.

3. I certainly try to abide, as a methodical principle (and thus I also try to demand it from others when appropriate), by the following: that any theoretical finding formulated in a special language, from a philosophical jargon to a mathematical formula, as long as it does not arrive at giving a statement or reasoning of itself in the people's common and living language, is still very far from being a true discovery (if it is not the case that it wholly misses such aim). But, precisely when trying to discover what's going on in this so-called Reality, one cannot avoid using learned and scholarly, relatively vulgarised terms as those, if only to submit them to judgment, question and doubt.

4. In any event, worse occasions to be led astray are thereby eschewed, such as, for instance, among theoretical physicists, instead of talking about `reality´, doing so about `nature´,

`universe´, `world´, or also `worlds´ and `universes´. Since it is clear that such manners of speaking are realist, in the sense that they include those notions or ideas, and the theoretical and explanatory objects themselves, within Reality; and, when the attempt is made, as here, to speak about Reality itself, that is something which can only be done from outside Reality. How this, which strikes as impossible at first, may however be done, I trust that the readers will recognise it in due course.

5. It is important to stick here to a precise use of those vulgarised, learned terms, and to the clearest possible delimitation of their meanings; which is what I proceed to propose in these paragraphs.

This, certainly, is a regimental operation, that can only be done by force of arms, for the meanings of words, if they are left loose to their usages, including those of philosophical or scientific languages, cannot help turning vague and ill-defined. The aim, therefore, is just to determine precise meanings that do not depart too much from the usual ones and to hold this writing abiding by such precision all along its course.

6. `Exists´ *(*Sp. *existe)* was introduced into the language as a vulgar equivalent to `there is´ *(*Sp. *hay)*, but deceptively so: since *`there is´* is an indicator without any meaning, while `exists´ purports to have it and say something like: "that of which it is spoken, being what it is, is there": compare "there are roses" with "roses, exist", "that rose, exists", "the Rose, exists". `To be there being what it is´ will be the sole meaning with which `to exist´ will be used here whenever it is required.

That there may be roses or scent of them somewhere is, indeed, possible, and more so the least it is known what that is about; but its being a rose, or scent, without having, in whatever language it may be, either human or of `things´ themselves, a word `rose´ and another `scent´, that a thing may exist without an idea of the thing, is a piece of stupidity that should have never been and has been uttered repeatedly throughout History: such confusion between there being something and its being in reality such or such thing is the broth in which the whole stock of nominalisms and realisms has been boiled.

7. Thus, we take `to exist´ as the verb corresponding to the adjective `real´ and the noun `reality´: real is what exists, what exists is real; reality is the fact or condition of existing (in many uses, therefore, interchangeable with existence), of the existence of existing things, taking `things´ in the broadest possible meaning; and Reality is the set, never closed as we will soon see, of any existing things as there may be.

8. Only that this last formulation contains the word `thing´ *(*Sp. *cosa)*, which does not belong to the learned or philosophical dialect but to the common language and is, therefore, much more complicated and elusive

(somewhat telling is its origination from Lat. *causa*, in its rather legal value of `case´, `question´, very likely repeating the history of Lat. *res*, likewise originally `court case´, in which use it has to be linked to *reus* `the subject to the proceedings, the defendant´, like also in its value as `property´, `cattle´, upon which we will soon dwell a little in respect of `money´; as far as the learned Spanish word *causa* (Eng. *cause*) is concerned, likewise imposed on the language of people centuries ago, its legal prior to physical use is readily clear),

the fact being that, in Physics or Science of Reality, `thing´ is precisely the term that tends to evade use and definition, being replaced there by others such as `particle´, `body´ or (material) `corpuscle´, `object´, `observable´, which, purporting to refer to more particular or determined things, allow in this way the issue of `thing´ as the general constituent of reality to go overseen.

Already in the `Prolegomena´ to my edition, pp. 32-33, I noticed how, in the poem of Lucretius, exemplarily so, the word *res* fluctuates between referring to the (composite) things pertaining to Reality or also to the entities of the sub-reality that accounts for reality, to atoms and even to the void.

9. On the other hand, `reality´ (and `thing´) may also be defined as `that of which it is spoken´ and `named beings´, which combines with the meaning `condition or (open) set of any existing things´, but underlines duly the unbridgeable gap between `reality´ and `what speaks of reality´. At the same time, it should be clarified right away (I will insist on this further on) that `reality´ (and `Reality´) is used here as a generic denominator capable of embracing any form or appearance of reality or existence, though Reality is not, really, one Reality but rather appears only as multiple and diverse realities, which I call idiomatic, in that they depend on the semantic vocabulary of the relevant tribe's or society's language: in reality, there is no single common reality.

In parallel, common language or grammar, which is however ingrained or underlying in any language, does not appear in reality other than as the languages of Babel; and, as we noticed in *Del lenguaje,* 1979-1999, common language lacks words with meaning: it only has a place, empty, for the semantic vocabulary, which is filled in each Babel language. Likewise it should be noticed that scientific dialects, even in formal languages, to the extent that they may serve to speak about

realities and have, therefore, terms with meaning alien to their own organization, do not evade either such idiomatic condition and only in vain can they aspire to refer to Reality in general.

10. In addition, there are, finally, something like degrees of reality, things that exist more or are more real than others; and, in order to specify the meaning of this, it is useful to resort to the case of the supreme reality or reality of realities, whether it be God, *ens realissimus* (or *–um* depending on whether it is personalised or not), or Money, which is substituted for all and any things, and notice how that utmost degree of reality goes hand in hand with the ascent to the highest degree of abstraction or idealness: by being devoid of especial or distinctive qualities, it comes close to unveiling the condition of `reality in itself´.

Note that, when in Physics the attempt was made sometimes to define `body´ (or `matter´), one could not help following, more or less outspokenly, the negative way, to find that it is that which, like Money, is deprived of any distinctive quality save for the simple one of existing or being real.

11. As, indeed, such cases of supreme degree of reality help us understand the most elementary of the laws that apply to things or existents, to wit: that the reality of things is established by a collaboration of the `idea´ of the thing (which is the same as the meaning of its word) with `quantifiers´ (primarily, natural numbers), insofar as the idea requires, in order to be fixed and confirm the reality of the thing, its quantification, at the same time as numbers require, to be operative and make realities, the fixedness or firmness of the idea of the thing: to be able to count sheep, it is required that all sheep be one and the same and do not differ at all from one another, but, conversely, for a sheep to be what it is and come close to realising the `sheep´ ideal there is no way other than counting the sheep that make up the herd.

Countless formulations of and speculations on this have been made from the start of History, most of the times damaged by an unwillingness to use the common language to say it. On my part, already since the book *De los números* 1976 I have been trying to formulate this elementary notion in a manner more and more simple, which will never be simple enough.

12. The reader is therefore encouraged to bear in mind the meanings with which `real´, `reality´ or `to exist´ are used here (just like `idea´ or `meaning´ or `thing´; as for other terms of the scientific or philosophical dialect, such as `cause´, `infinite´, and `objective/subjective´, among others, they will be dealt with in due course), as it is Reality, and not anything else, what constitutes the subject of this

writing and is concerned by the discovery here submitted.

II

13. Reality for `us´ or for `Man´ is nothing but a case of reality, which is simply imposed upon `us´ as the most immediate of such cases, dependent upon the metrical illusion specific to `us´ that was denounced in Protagoras' axiom, properly understood, whereby "of all things man is measure, of those being whatever they are, inasmuch as he is what he is, and of those not being whatever they are not, inasmuch as he is not what he is not", on which we will dwell again after setting out the discovery; that is to say, insofar as, enclosed in `our´ reality, we consider general reality from `us´, we are incapable of discovering anything true about reality. But, for that same reason, it is appropriate to start by finding out the particular manner in which Reality is presented to `us´.

14. Reality presents itself or is imposed upon or sold to us in various successive appearances, as layers or sections of a scale of reality, upward or downward, depending on how it is taken. The first or more immediate one is what we may term as personal reality, that is, the one which is imposed upon anyone (and constitutes him/her as one) through social relations, by the empire of established laws or rules, by the movement of money and the sway of Power over certain territories or numbers of souls.

Those are, therefore, the types or reality to which people more directly prove to be sensitive from time to time, when cursing money, the family, work, the governing lot or the State.

And to denounce, in such realities, the fallacies they need to subsist I, myself, among many others, have been devoting spoken and written studies and diatribes throughout my life.

15. But the fact is that from the start of times (that is, of History: the more or less 10,000 years we are aware of) the Power imposed on peoples, with its commercial regulations and its statutes of Justice, has developed an idea about the sky, the earth and, in general, what is usually called physical or natural reality, in order to sustain itself.

It is not worth the effort to stop here and continue unravelling the mistakes surrounding

`physical´, *phýsis, nātūra,* `natural´, and how, in accordance with the customary getting the wrong end of the stick, social reality, immediate and primary, is passed off as second or derived from physical reality, taken as first, which in fact developed secondarily as an idea or faith in the reality of the sky or matter.

16. It is thus the case that, if we call `Power´ any arrangement which, from the top of society and consciousness, reduces to End and Principles the endless possibilities of people, physical reality is inseparable from Power

(from the primitive image of the tribe's chief followed always by the magician, priest or fortune-teller, to the same nowadays when State and Capital earmark most of their expenditures to the development of Culture and, in particular, the researches and realisations of Physics or Science of Reality, where I include the other Sciences subordinated to Physics, all of them are superficial, but not deceptive, appearances of that inseparability and mutual dependency of one and the other reality),

and any claim that the reality of celestial spheres or of electrons is independent from the laws governing society and the movement of money is illusory.

17. As a result, any denunciations made of the fallacies and absurdities of social reality, much as they may always be living testimony of the never total conformity of people and common sense with the ideas on the world, the laws and the faith that are imposed on them, are reduced time and again to a certain uselessness due to the fact that, behind those social laws, a belief is on the defensive in that there are certain natural laws, and that social and personal reality is based upon a prior undisputable physical reality; in such a way that, no sooner a discovery of the falsehood has been made with the consequent collapse of a form of social reality previously believed upon than a new (and the same) social reality will take over reconstructing itself on the realist conviction that the sky so orders or matter is matter.

18. That no realist left-wing rebellion or politics can, given its own submission to the general idea of `reality´ and to the computation of possibilities, do but contribute to changing things to remain the same, is something that we have discovered and reasoned already in lengthy way. The boy rebelling against his Parents (Work, Laws, the Future) is led to shut up time and again by making him see that the fact is that things are what they are, reality is reality (to wit, ultimately, money), and even resorting to the numbers that sustain reality, science and money: "the beans are counted" ("son habas contadas", Spanish for: "it's a sure thing") or "Pitagoras doesn't lie".

19. This being the case, since any protest against the superficial realities of Power, however lethargic and bloodthirsty they are, has to run, not among those most sold of the servants of State and Capital, but even among the most compassionate of the fathers of the homeland and even the most good-willing of the mothers, into a resigned statement such as “That’s the way things are, son”, there is no alternative but to go back to Physics to try and find out how things are.

III

20. Already in the book *Contra el Tiempo* 1993, 2nd ed. 2001, without paying especial attention to physical theories, I had started to attack logic, languages, both vulgar and mathematical, in the service of Physics, to the extent that I was capable of penetrating them, since I felt that should be the first step aimed at trying to demolish the dominant ideas on Reality, given what I stated in §¶ 11 of Reality sustaining itself by ideas and quantification; and in the collection *Contra la realidad, estudios de lenguas y de cosas* 2002, I outlined denials of ideas constituting Reality and its knowledges for various purposes and in the form of reviews of books from several sciences.

21. But it has been from that stage, in the process of the debates going on and the sudden thoughts popping at the political gatherings in Madrid's Ateneo, in the course of eight years of weekly sessions, that I have been trying to enter deeper into physical theories, in force and contradictory as they are; in this task my main support has been professor of Mathematics Don Luis Caramés Casal, who, also wandering away from his own studies and showing not only perseverance in the search but admirable knack in selecting what could most serve my aim, has provided me during those years in addition to notices, so useful for a layman, on mathematical conventions customary amongst physicists, with a long series of publications and, above all, Web entries on a great variety of studies on Physics (sometimes on philosophy of Science or computing theory), which nowadays find through the Web an easier way to show the contradictions and doubts burgeoning in studies of Physics, as soon as the physicist allows himself to revive the problems hidden under the formal and mathematical apparatus, which tend to be bypassed in more orthodox or popular science books.

22. Those numerous, more or less unruly studies have served as inspiration for the discovery I now try to formulate here. One sole representative case I will use as central guide in this introduction (leaving notice on many others to the APPENDIX), which arrived to me as I was on the point of drafting this statement and is useful to unveil more immediately the current contradictions amongst physicists concerning Reality: the compilation Andrew E. Chubykalo & Viv Pope & Roman Smirnov-Rueda succeeded in making in *Instantaneous Action at a Distance in*

Modern Physics, N.Y. 2001, of answers by physicists of the world to the basic question of admitting or not the immediate action of one `body´ on another, that is, without the intervention of a physical medium or measurable time, with 23 pro and 14 contra.

23. The point here is not to extend, in respect of the fundamental issues, a realist debate, that is to say, one trying to reach, within Reality, the theory that best accounts for Reality, but rather to find, in the theories and their rationales, signs that appear to be particularly revealing of the essential falsity of Reality attempted to be discovered here; since we believe that, although Science, in its primary and dominant calling, is in the service of Faith and Power, as was reasoned in §§ 15-16, that is no obstacle for the very passion of research, given precisely the incompleteness and fallibility of any real institution, to succeed from time to time in unveiling the failures and fallacies of the ideas (and theories) that sustain Reality. And to that aim I anticipate now some notes, not so much haphazardly chosen and ordered, on the issues of theoretical physics that are more relevant to this attempt.

24. ON PRINCIPLES AND SCIENTIFIC METHOD. Which may be the relationship, if any there is, of the theory (and its mathematical formulations) to a prior `physical reality´, independent of the acts of observation and measurement,

> or, if not directly, by means of intermediary entities, `observables´, or also `facts´ understood, according to G.B. Brown, quoted by A.K. Assis in *IAAAD* p. 48 , as “an assertion that can be verified”,

and, on the other hand, its relationship to the success of the prediction, verifiable by experiment, and also to its practical applications, is an issue that has produced such wealth of contending statements that hardly can a study or Web entry be found which, though referring to particular researches, fails to show the author’s obligation to report his attitude on such relations.

25. It is known that General Relativity, as a `dynamic geometry´, and the quantum theory arisen from QM as a `probability-governed analysis´, have been the two dominant forms of theory throughout the past century. From their invention to the present, they have tried to arrive at a combination or, at least, theoretical compatibility, not without running time and again into more or less radical criticisms

and denials.

Th. E. Phipps jr. *IAAAD* pp. 137-39 protests against the idea of `scientific progress´ as directed toward a final theory and advocates a plurality of theories. T. Bastin & C.W. Kilmister *IAAAD* p. 299 notice how Special Relativity and QM developed as "two languages" apart from each other, although (pp. 304-305) "physicists will continue to assume that they are talking about the same world". Clear and passionate rejections of one and the other theory arise lately; thus Viv Pope *IAAAD* p. 10, "Compared with Mach's systematic philosophy, Einstein's `relativism´ was no more than an eclectic throwing-together of logically irreconcilable bits of empirical philosophy and Platonic metaphysics" (but note that the theories were not born from a philosophy but from the need to account for experimental problems), and thus, likewise, Caroline H. Thompson *IAAAD* p. 358 "Full and proper investigation might well trigger the next scientific revolution! If all claims of non-locality can be shown to be false, perhaps we shall see the weirdness of orthodox quantum theory relegated to history books and science fiction, where it belongs". Rejections of one or another theoretical attitude arise either from the illogical (ultimately, against common sense) or against misinterpretations of experimental data in one or the other. Separate, but not so much, is the issue of the formidable success of QM in its practical applications; that this bears no relation to the "truth" of the theory is stated by J. van Enk & Chr. A. Fuchs *IAAAD* p. 421 (summary): "Notwithstanding its wonderful potential for enhancing and extending our capabilities within the realm of communication technology /…/ *quantum entanglement* /…/ encodes a kind of state of knowledge and nothing more. /…/ In short, nonrelativistic quantum mechanics and the speed at which physical signals can be sent /…/ have nothing to do with each other. "

26. ON OBJECT, LOCATION, OBSERVER, REAL DIALECTIC. The old (and, in the end, vain) philosophical question of `objective/subjective´ has become a living concern for physicists in their attempt to understand (in common language) the theories interpreting experiments that, in turn, purport to verify them; even more than Relativity theories, Quantum theory with its threat of non-locality for the object. This question draws the attention to the act of `measurement" in physical facts, and hence to the involvement therein not only of the `observer" but of the linguistic convention. From there, and from the consideration of `symmetries´ in reality, a return is seen sometimes to acknowledging a real dialectic or dialectic of realities; and, besides the relationship of the object with its localisation, the entity itself of the object (e.g., `wave/corpuscle´) finally appears as dependent upon such fundamental dynamics.

F. Selleri *IAAAD* p. 308 decidedly proposes a "local realism" (an objective reality independent from observation; the interaction between two objects diminishing down to negligible as the distance increases; Time and its well-defined arrow from past to future) and relates it to Bell inequalities, which he (pp. 309-16) reviews and perfects. Viv Pope says, *IAAAD* pp. 10-11, that

Mach's attitude (properly relativistic and realist: "*real* reference frames /…/ observer frames, which are essentially *interactive* in a dialectic of reciprocating local processes") does not lead either to a solipsism nor to an "ubiquitous `God's eye view´", but rather "objectivity is /…/ commonsensically assured: /…/ the fact that there are more observers and more things in the world than oneself and one's own ideas is known to us, not by any fancied `divine intimation´, but simply by *communication",* thus coming close to recognising language or reason as something which is neither objective nor subjective, and "The whole, therefore, insofar as it is ever a whole, is a *dialectical* whole; that is to say, a Heraclitan rather than a Parmenidean whole". The dialectic condition manifests itself within reality in the various phenomena of "duality and opposition" (positive/negative pole, rightward/leftward rotation) and, in general, in what physical theories formulate as `symmetries´. P. Rowlands *IAAAD* p. 158 relates symmetry with simplicity in this way: "It is, in fact, symmetry which explains the necessity of simplicity. Symmetry effectively means identity in all respects but one, but requires *exact* opposition in that respect, and so we can't have true symmetry until we have stripped down knowledge to the simplest possible way of thinking"; and, relating that to the 4 parameters that he considers as fundamental for Physics, space and time, mass and charge, p. 159, "The symmetries between the four parameters thus have a logical origin in the application of the idea of measurement to the description of reality." As for "relation between bodies", P. Graneau *IAAAD* p. 79 revives Newton's 3rd law, "To every action there is always opposed an equal reaction; or, the mutual actions of two bodies upon each other are always equal, and directed to contrary parts", which, "amended", he reformulates thus, p. 80: "All fundamental forces of Nature are mutual attractions or repulsions of the particles of matter". Recall, finally, how the `particle/wave´ duality, in turn, has been a field of dispute among theories or interpretations of theories since a century ago; among recent solutions the one by M. Borneas *IAAAD* p. 189, who, starting from a "wave-particle duality" as per L. de Broglie, states that "microsystems appear as particles in interaction only, and between interactions they are waves"; and see below in connection with the transmission of signals at superluminal velocity.

27. ON OBJECTS/RELATIONS, DISCRETE/CONTINUOUS, SPACE & TIME.

The presence of matter, after manifold theoretical repeals, continues reappearing, and linked with it is the more abstract or general question of the priority of `objects´ (`bodies´, `particles´) over `relations´(between objects) or vice versa, and that of the possible conversion of (logic, that is semantic) `difference´ into `distance´; and, more specific or traditional, the question of `space´ or `time´ or `space-time´ (with `events´), ideations which were still contending at the end of the twentieth century (like throughout the whole History), intertwined with the opposition between `continuous´, which is something properly alien to Reality, and `discrete´, which is constitutive of Reality but, naturally, problematic.

D.F. Roscoe *IAAAD* p. 176, specifying Mach's Principle as meaning that "… there is some kind of relationship between the distant galaxies, and the idea of relative inertial mass", says, p.

177, that "…the fundamental significance of Mach's Principle is that it is impossible to define inertial frames in the absence of material; or, as a generalization, we can say that it is *impossible* to conceive physical space and time in the absence of material"; in such a way that the apparent locations of relationships, space and time, are relegated to mere metaphors of the very relationships between objects: "we need a theory of the world according to which (roughly speaking) notions of space and time are somehow projected out of primary relationships between objects. In other words, notions of space & time are actually metaphors of these primary relationships"; and proposes, p. 178, "a discrete model universe", such that "it consists of an infinity of identical, but labelled, discrete material particles which are primitive, and possessing no other properties beyond being material". The latter sentence combines, as can be seen, some of the main, perpetual problems of all Physics: deciding between a continuous or discrete reality, accepting a model that "consists of an infinity" and, above all, that the elementary particles, apart from being primary, discrete and material, are to be described as lacking any property but that of being material at the same time as "identical, but labelled" (that is to say, that they are all one and the same but multiplied in examples of itself that are somehow separate and, hence, related), which brings the attempt close to the fundamental question of R., what is `thing´ and what is `one thing´. Furthermore, the issue of `space ´ is implied, as extension, in the question of `action at a distance´ and, as `location(s)´, in that of (non)locality, on which I will come again later. As for `time´, while D.F. Roscoe *ib.* says that "`time´ is to be understood, in a qualitative way, as a measure of process of ordered change in the model universe", I find that S.C. Tiwari *IAAAD* p. 167 (summary), after making the distinction that "… the absence of a medium to transmit action /…/ and instantaneous action are not identical", proposes a " physical reality of absolute time" supporting action at a distance and perhaps gravity; and P. Rowlands *IAAAD* p. 161 says that Zeno's aporiae "… may be taken as showing that we have no right to assume that time can be indefinitely subdivided like space. On the contrary, it seems that time, unlike space, is an absolute *continuum*"; and, faithful to the view of Minkowski and Einstein, Irina Eganova *IAAAD* p. 193 *et seq.* uses the notion of `event´, arisen in an article by H. Poincaré, to propose a "world of events reality" with a "null proper time interval".

28. ON QUANTA AND FIELDS, LIGHT AND VELOCITY. Deciding (or not) in favour of the discontinuous constitution of Reality and, hence, the local separation of the elements (that each one's being what it is, semantically different from the others, implies their being physically apart from each other) is certainly the primary decision; thus, the appearance of Planck's constant is a milestone in the transformation of the theories; but Einstein already in 1905, on the brink of formulating his geometric vision of Reality, was mostly devoted to studying solutions of sugar in water and verifying Avogadro's number, that is to say, making sure that molecules, for one thing, can be counted by precise numbers within a well-determined domain. But computation, in reality, cannot but imply distance and path, and that in turn involves the question of the `medium´; where an `aether´, grossly physical, has to be replaced by `field´, geometric but necessarily taking physical

properties; and with it, inseparable, that of `light´ and `velocity´. All those issues I find, far from being dead or settled, constantly burgeoning in contemporary physicists' studies.

Thus, Neal Graneau *IAAAD* p. 105 (summary) "Throughout the history of the study of natural philosophy has run a constant conviction that light is a substance or effect that is separate from the matter that emits and receives it. This has lead to many useful but nevertheless paradoxical theories that have at various times viewed light as a ray, a wave or a particle", and presents a new theory which, p. 122, "does not involve a substance separate from the matter that transmits or receives signals. Consequently, not only may you never see the light, but there may be no light to see!". Caroline H. Thompson, recalling how (*IAAAD* p. 345, summary) "Violations of Bell inequalities in EPR experiments are now regularly claimed as demonstrating the correctness of quantum theory predictions, with the implication of non-local, non-causal action", dismisses such position and its alleged experimental proof, p. 348: "The real experiments that deserve attention are limited in practice to ones using light. But, in order to make quantum theory apply to light, you have to treat it in these experiments as composed of *particles*. Could it be that this use of an `unnatural´ model of light is what is causing the misinterpretations, ruling out the realist alternatives?"; and p. 358: "I believe that these experiments can, if repeated with slight modifications, show not only that quantum theory is incomplete but that this part of it is actually wrong", and, finally, "is it not time /…/ to look again at the evidence for the photon, and wonder if light might be, after all, obeying the rules of local causality?" As for `velocity´, G. Galeczki *IAAAD* p. 334, after recalling that "Before 1905 `velocity´ was considered an unchallenged, fundamental concept of physics" (reciprocal determination of `uniform time´, `uniform velocity´ and `inertial frame of reference´, under Newton's first "statement"), is obliged to support the notion of `absolute velocity´ in this way (which, in view of its own inherent contradiction, is eloquent to my aim): "Given an unique, fundamental frame of reference, every point-like object has its uniquely defined *absolute* velocity `v(i)´. The relative velocity of two objects, v(ij) = v(j) – v(i), is, of course, reciprocal, provided universal simultaneity exists" (on the latter I will come again below), but notices that action at a distance, p. 337, "is worth questioning only if matter is fundamentally discrete, otherwise there would be no need at all to bridge gaps over finite distances". To mention how this implies the question of "superluminal velocity", "infinite v." (in any event, not the same as `instantaneous´, which I cannot but understand as meaning `without time´) and that of the `arrow of Time´, I recall how E. Comay, *IAAAD* pp. 323 *et seq.*, distinguishes between "interaction travels at an infinite speed" and "travels forwards and backwards", himself dismissing one and the other. And showing well how in it play the very conceptions `wave/particle´ and that of real element as `point´, V.P. Oleinik *IAAAD* p. 252 (conclusions), "… the conclusion about the possibility of transferring a signal in electrodynamics with superluminal velocity results from that (1) the own field of the electron does not obey the wave-corpuscular duality and is of a pure wave nature and (2) the electron is not a point particle".

29. ON FORCES, INTERACTION, GRAVITY, SIMULTANEITY. The

prevailing contradiction of attitudes among physicists can be seen also in respect of the dynamic version of relationships between elements, whether they are called `interaction´, `action/reaction´, `attraction/repulsion´ or `forces´ or, likewise, in computer Physics, `transmission of signals´ from one to another.

E. Kapuścik *IAAAD* p. 415 presents the situation in this way: "Since Newton's time force is a synonym of mechanical interaction. In modern physics interactions are described in terms of fields. The field concept solves the problem of action at a distance. It is the aim of the present paper to show that classical mechanics can also be reformulated as zero dimensional field theory in which all disturbances propagate with finite velocities. Our approach is in the opposite side of the H. Herz approach who has shown that classical mechanics can be constructed without the concept of force. Instead of that Herz has utilized the concept of a curvature of the configuration space. In our approach the forces play the central role as carriers of all interactions." Appropriately for that purpose, F. Selleri *IAAAD* p. 307 quotes Newton's letter to Bentley, Febr. 1693: "It is inconceivable, that inanimate brute Matter should, without the Mediation of something else, which is not material, operate upon, and affect other matter without mutual contact /…/ That Gravity should be innate, inherent and essential to Matter, so that one Body may act upon another at a Distance, thro' a *Vacuum*, without the Mediation of anything else, by and through which their Action and Force may be conveyed from one to another, is to me so great an Absurdity, that I believe no Man who has in philosophical matters a competent Faculty of thinking, can ever fall into it", in clear-cut contradiction with his own discoveries, which, for many, are saying precisely such absurdity; and also refers to the well-known statement by Einstein: "…there is one assumption which, in my opinion, we should retain under all circumstances: the real factual state of the system S is independent of what is done to the system S, where S is a sys tem that is spatially separated from S".

Many today (and among them all the authors answering PRO in the collection I am using), on the other hand, believe that action between separate elements without any mediation is something ascertained by common sense which no theory should mess up or contradict.

Thus, André K. Assis *IAAAD* p. 48, following G.B. Brown, who, in the passage quoted above continued to say that "action-at-a-distance is not just another theory of the propagation of force", reasons to the effect that he who, in the presence of an action between two separate magnets, says it is not at a distance is the one who "hypotheses fingit", and "The refusal to accept action-at-a-distance, has led to all the difficulties and tortuous explanations…"; and, in support of the notion of `force´, p. 49, "All of these force laws comply with the principle of action and reaction. This means conservation of linear momentum for any system of particles interacting according to these laws. These forces are also along the straight line connecting the particles, which means conservation of angular momentum …".

However, there is something to the notion of `force´ itself (I do not forget how Euler struggled with it to reduce it, finally, to the `impenetrability´ defining a `body´) that makes the issue all too `physical´ and thus leaves it subject to the traditional law of `cause´, in such a way that the `action´ may be taken again as transfer (of something, which is not the body itself).

Thus, for instance, Yong-Gwan Yi, in *IAAAD*, advocates, also for gravity, transmission by spherical wave at finite velocity, and says, pp. 450-51: "The physical existence of *IAAAD* is looked upon as a consequence of steady-state observation at an instant of a spreading action propagating with speed *c*. Therefore, in spite of the explicit form of the force equations, I do not think that action at a source is instantaneous. According to the present approach, covariant formulation of the equations of motion is a result of the finite velocity of propagation of the fields being affected by motion of system". And, still admitting the conventions of QM, M. Dušek, resorting again to the "Copenhaguen interpretation", says it thus, *IAAAD* p. 391 (summary): "Quantum mechanics is a `non-local´ theory in a certain sense. The non-locality manifests itself, e.g., in correlations of results of space-like separated measurements performed on two parts of so-called *entangled* states. Those correlations are `stronger´ than any correlations following classical (local) conceptions. However, no measurable quantum mechanical events can break causality. No entangled state can serve for instantaneous (or superluminal) transfer of information."

The stance (vis-à-vis Relativity theories and the customary usage of Quantum theory) becomes neater when the question refers not to subatomic entities but to the `sky´ (where the issue and notion of `forces´ between `bodies´ had to appear first or at the same time as, on the other hand, in the observation of activities of the magnet stone) or otherwise to a `general reality´.

That is the approach of P. Graneau *IAAAD* p. 86, in reformulating the principle of relativity: "The force laws of nature remain the same regardless of which particles of the universe are considered to be at rest", from there coming to Mach's Principle, which is reformulated as (p. 87) "The inertial force of particles and bodies on earth and in the solar system is due to their acceleration relative to all matter residing outside the solar system". M.M. Lavrent´ev & I.A. Eganova *IAAAD* p. 91 (summary) note that "N.A. Kozyrev (1908-1983) predicted and discovered the phenomenon of instantaneous action of true positions of stars, stellar systems, and planets on the state of systems on the Earth". R.A. Herrmann *IAAAD* p. 223, in turn, applying A. Robinson's Non-Standard Analysis, a mathematical entity, to a "physical world", claims (summary) that "a type of nonlocal instantaneous action-at-a-distance does occur in objective reality"; while Roman Smirnov-Rueda, reconsidering Herz's experiments, which would prove a finite speed of propagation of fundamental electromagnetic interactions, and discovering that they were incomplete and only for that reason compatible with Maxwell's theory, concludes, p. 58 (summary), that "a problem of

paramount importance for physics remains open concerning the velocity of propagation of electromagnetic interactions *in vacuo*", thus leaving the possibility for IAAAD free from generally-accepted theoretical impediments. And, finally, H. Hille, after playing with supposed views of Newton and Parmenides, states, *IAAAD* p. 125 (summary) that "The wholeness of Being is thus seen, not as a figment of the speculative mind, but as a sensible reality. Newton's constant of gravity thus expresses the complementarity and the availability of inertia and gravity of objects in constant relation. Gravity is thus not ```produced´´´, as customarily supposed, but is permanently there. Nor is it, properly speaking, a ```distant force´´´, since it is always there in the place where it acts."

30. With this relatively haphazard and superficial survey of physical issues still being raised by Reality, and of the diverse and even contending positions of physicists in dealing with them, what I wanted, first of all and most immediately, was to free the readers somewhat from the ideas and faith with which they are likely to be saddled by the Regime's information organs and popular science, that of those who know the secrets of matter and the origin of the Universe, and to help them feel with me the true situation of Science and that, in spite of the paramount success of believed-to-be applications of theoretical principles in the disintegration of atoms, in electronics and cybernetics, and in the utmost speed of transfer of information, the fact is that the elementary issues of what is reality, where and how it is sustained and what is it that is happening with us, continue, as ever, open and outstanding, and only therefore was I able to offer that bunch of contradictory answers by some researchers who have not wearied of questioning.

31. But, more deeply, I also dare claim that a survey of Physics, even if it has to be done as laymen, may serve myself and the readers alike to get, not a demonstration (as such survey will always be incomplete and at the risk of our partial misunderstanding of theories), but certainly a living suggestion that any attempt to account for reality from within Reality, not using other elements but real facts nor other evidence but experimental testing of the theory's predictions, is bound to be wrong and useless; that not only it was not necessary to check the countless muddles and failures of theories throughout History: there are more immediate and deeper reasons proclaiming the impossibility of such an attempt: there cannot be a true theory (our being, as commanded by the Media, in a stage of progress toward the final Theory, is out of question), since, although the attempt was prehistorically inspired by questioning and lack of knowledge, theories, right from the start of Science, being by force realist and defensive of reality, are devoted to their own

constructions, to test or refute the successive proposals. Nor do I want to interrupt any longer here the presentation of the dis-covery of Reality, and thus I now refer the reader to the APPENDIX, where manifold studies I have read may further support such evidence of the living contradictions in present-day research and theories of Science. In any event, in view of the state of things, it will be understood that the discovery I make has to try and shun that pitfall and fail to be realist, scientific or philosophical. To that aim, I now submit the elementary principles or evidence in which the discovery consists.

IV

32. Reality is not all there is.

33. This is a discovery against Reality: for Reality is claiming constantly and everywhere, proclaiming by all its means, that it is all there is, that there is no more than the existent, that is to say, what is known to be what it is, what has its name or may be given a name, what somehow can be counted and measured.

34. It is a general and necessary condition of Reality, on the one hand, that no exact, closed and perfect determination may apply to its things, and, on the other, at the same time, that its things wish to have, aim to have, be believed to have, an exact definition, that all and everyone of them are exactly what they are; otherwise put, nothing ideal in order (for instance, geometric) may of itself, directly, pertain to Reality, and nevertheless, at the same time, it is a necessity of Reality and of the faith sustaining it that ideals indirectly pertain to Reality, so that such ideals can constitute it as such, and that exact, closed, `yes-or-no´ predications can be made, falsely, of its things.

35. Thus, for instance, a `body at rest´, `state of absolute rest´, are purely ideal entities and never may such a thing be found in Reality, in the same way as Reality may not contain anything answering to the idea of `uniform straight-line motion´ (on the idea of `motion´ itself I will come again later) nor to the ideas of `infinite velocity´ or `point v. ´ or `insuperable v.´ or `pure acceleration´; but those pure ideas are necessary, not so much for vulgar belief and reality, but for the physical science, which must use them to develop theories of `forces´ or `fields´. Moreover, something as `straight line´, which appeared to me (in *De los números* Disimplication V) as idea of ideas and principle of all Geometry, cannot ever occur in Reality, and progress of Science itself cannot fail to acknowledge that what you have in reality is nothing but curves (light itself, which, mistaken as a thing, gave the paramount example of a `straight line´, has to become a curve in the theory), to the point where `straight line´ ends up being nothing but a singular case of `curve´.

36. As for other types of ideal entities, such as Justice, Peace, Love, Evil, Ignorance, Fate, Guilt (and, hence, Cause), Chance and the myriad others running around the world, from Freedom to Information, it is hardly necessary to dwell on them: they are subject to the same condition as the ideal entities of Physics, which, incapable of being things and real themselves, are however part of Reality, insofar as they are necessary for real things (and persons) to constitute themselves in their unrealisable longing for definition and permanence.

37. And I trust, by the way, that the readers will not be shocked at my mixing up so carelessly `material´ things with `human´ beliefs, the aspiration of gross things to geometry with the need for faith in Reality: since that should only shock those who attribute such importance to `Man´ or `us´ as to maintain the division of Reality into objective and subjective, and it is that division (with other falsehoods) what is attempted to be demolished, patiently, by this discovery.

38. Therefore, it cannot be said of things that they are a l l or, any one of them, w h o l e : they cannot be but more or less in number or quantity, and each of them be more or less what it is, never entirely, but at the same time it is necessary that `whole´ and `all´ be stated time and again of many a thing or each thing or the Universe and the set of sets: since such lie is necessary and constitutive of Reality.

39. Likewise it is clear that neither can it be said of real things `none´ or "There is nothing"; since `nothing´ is just as `ideal´ as `all´ (or `whole´), and just as alien in truth to Reality, even if such ideal of complete vanishing is imposed and proclaimed time and again from a belief in the perfect loss of one sole thing or all of them; and therefore, given its own idealness, nihilism is equally realist.

40. But, in addition to that general condition and reason of reality, there are other immediate and sensitive ways to prove (or, rather, to remember: since anyone hearing it knew it or suspected it beforehand) that Reality is not all there is: recognition of the presence of something there is, though it does not exist, that does not exist, though it is there.

41. That something does not refer, certainly, to imaginations, dreams or visions of a `great beyond´, `another reality´, `a true reality´ or `the true Reality´, an `unreal world´, `a utopia´, `eternal existence´, the `motionless motor´, `the end of times´ or the like along those lines: since dreams are always too realist (the dormant does not come out of himself while dreaming or, according to an echo from Heraclitus, fr. 6 of my edition[2], D-K 75, also the dormant are workers and collaborators of Order), and all such visions are not indeed anything else nor do they take us out of Reality, but rather all of them are real and, due to the very fact that they have to be named and attempted to be defined, they are ideas constituting realities and, with a more or less sublime knowledge, it is known what they are.

42. If, therefore, I wish to recall to the readers of this book what they feel

[2] *RAZON COMUN, edición crítica, ordenación, traducción y comentario de los restos del libro de HERACLITO,* 1985 (2nd ed. 1999, 3rd 2006)

there is, but does not exist, something which, in spite of not being real, is lying there even if it is unknown what or where, I have to avoid, in referring to it, using any terms with meaning and employ, always at risk, those that have none and are running in any language, such as the very `it´ or `something´ or `I´ or `(to) me´ or `you´ and `to you´,

before they suffer what, as a lesson and a warning, occurred to them in philosophical jargon and, especially, in the realist assimilation of psychoanalysis, where the I and the It are thus readily semanticised and therefore end up being what they were not in the discovery, and forming part of Reality,

or I can also use the living negation, which is a germinal element of any language, to correct and nullify the meaning of any word having it, like if I say `no end´, `endless´,

before Philosophy and even Mathematics in the service of Physics incorporate the negation into the term, as in `*ápeiron´,* `infinite´, `innumerable´, which thus acquires immediately a negative meaning (with the negation dead), leading not only to `infinite´´s involvement with impunity in the calculus aimed at accounting for physical facts or its becoming an attribute of God itself, without preventing him for that reason from being what it is, but also to the possibility for non-real or imaginary numbers to end up being used also with a certain meaning in realist calculus, or, finally, to have the *á-theos,* the atheist, and the *án-archos*, the principle-less, the order-less, end up being some sort of believers.

43. Subject to that risk and caveat, I remind the readers that there is the endless, or in other words, there is no end: the end constitutes and is inherent in reality, with the precious amphibology of being at the same time the end, goal or final cause whither things are going, thus establishing the Future or empty Time on which all Reality is founded, and the end or final limit (even if it is `limit 0´ or `limit ∞´) which finally defines the endless and reduces it to reality; but the end is solely a matter of Reality, and common sense keeps feeling that there is no end in truth, that there is an endless, even if it does not exist.

44. Another evidence of something there is, though it does not exist, is me, who, inasmuch as I am not real nor have any Proper Name nor am I a case of `person´ or `individual´, I am, however, without being anyone, here, wherever I speak, for instance, about reality, and I am out of the reach of any definition or any predication as may be made of me to turn me real, and I never die, precisely because I do not exist, I do not have a future, while ever-future death is the end constituting my I or

person, real as any thing in Reality; but, since I can speak about it and even about my I, it is clear that I am here, wherever it may be, thanks to not being in Reality, to not existing.

45. I should not stop here to give, as another case, that of language or reason, which is, for instance, saying this: for its relation to Reality is so primary and unique that, without mentioning itself, it is constantly playing in the discovery here presented. It is clear, without more ado, that language or reason, in essential contradiction with itself, must, to speak about reality, be outside Reality, at the same time being what is constituting things and relationships of Reality through, as we will see, the vocabulary of one of the languages, which determines one of the realities of Reality; it is likewise clear that, while it is speaking and acting, no word about it can be said, but, the following moment, it can speak about itself and turn real also; and clear, finally, that language or common reason does not occur in reality, and its sole real appearance are the tribe languages or languages of Babel, just like the idiolects of all and anyone, and philosophical, literary or scientific dialects, even mathematical ones; but NO, which is the heart of all language, is always ready to free reason or language from such a reduction to tribe languages.

46. Many other manners are known to common sense of recalling what does not exist but there is, no matter how difficult it is for it to escape the trap set against it by the words with meaning of the language it is bound to talk in. For instance, I, not being personal (if I were, I would only be an I, like anybody else, anyone at the same time as one unique and singular), must rather be common and public, so that I could allow myself to say, like the other, “My name is legion”, if I were a legion uncountable by anyone; and then, one can also resort, in order to recall something there is but does not exist, to the words `folk’ or `people´, but adding immediately and with no comma the negation, `non-existing-folk´, so as to cut the temptation to mistake it for the sets of I’s or real persons that are customarily termed in Reality as people or folk; since it is apparent that, wherever people is entering and exiting to be or to stop being, that cannot be counted or belong to Reality but is however there and still living, below all consciousness, domination and Power, saying NO to Reality, which is the only thing said by common folk in myriad ways.

47. Finally, so as not to insist on physical or social unveilings of what there is outside Reality, for the reader already knows (and already knew, subconsciously)

how to play the game of hearing what common sense tells him, I will only add this: there is something, for the simple reason that there cannot be all and there cannot be nothing.

V

48. Thus being it, what exists and what does not exist, it now falls to us to try and find out in more detail how is Reality, where or whereabouts is it; and, for that purpose, the most urgent task is to start by laying bare the necessarily false notions constituting reality, even if it has to be done by using the device of Verb Tenses of our languages, through the simple discovery that follows.

49. All and any things passed lie here now, like a map of vague limits or a never-closed set, and thus they have the condition of being known, while anything else there may be is not known of, simply because it has not passed.

50. I cannot say there "all things" since it has already become apparent to us that things can never be `all´ nor Reality be `whole´; but at the same time inherent therein is quantification and hence the condition of `set´ or `solidarity´, which is shown most generally in that all and any things there are in reality participate of the condition of `thing´; and we will see later how the solidarity, always relative, of real facts must also reappear in physical relationships between `bodies´ or `systems´.

51. As for the condition of being `known´ or `known of´, it clearly pertains to things themselves and is independent of whether certain knowers, from certain places in Reality, have arrived or not at re-cognising or verifying the real condition of one or another fact: owing to their mere having passed, their having entered reality and realised themselves, they are in themselves known of, and that separates them radically from what has not passed and is, therefore, unknown, not real.

52. A true oblivion of anything that has come to be realised does not make sense: oblivion refers to something which is not known, which remains outside Reality, and cannot penetrate it. This is how, in psycho-analysis, Freud's conviction that nothing of the passed is entirely forgotten finds its reason and, on the other hand, the discussion of the Laws of Thermodynamics, distinguishing between reversible (doubtless, well considered, unreal) and irreversible processes, ascends from the physical to the meta-physical condition, and boils down to this illustrious platitude: that it is impossible for what has passed not to have passed.

53. It is clear, without more ado, that the notions of `future facts´ or `things that will happen´ are devoid of any hint of truth, as being contradictory with the notion itself of `facts´ or `things´, and only, on the other hand, become part of the necessarily deceptive ideas or beliefs informing and sustaining Reality in the form of claims to take as known what is not known.

54. However, this presentation of Reality as a map or open set of all and any things passed, which sadly cannot help having something of an image or vision inasmuch as, to understand each other, we have to resort to the words with meaning of a language, entails, in revenge, the appearance of such image, for the time being, as static, as if somehow Reality were lying, static, on the other; to correct and contradict which view we have to proceed now to present the dynamics of the device, in spite of being aware of how dangerous it is to use terms as `dynamic´ and `static´, which are native to Physical Science, to try and discover reality from outside Reality. Subject to that caveat, which I hope the readers will share with me, I will now present the discovery's continuation.

55. The attempt to imagine it placed in a static end-less is thwarted by itself as absurd; so `dynamic´ can only be a denial of such impossibility, and thus can I say: Reality is continuously falling, sinking, getting lost, in the other, the non-real, unknown or not known of, and is constantly, in turn, resisting or defending itself from such fall, sinking or loss.

56. NOW, which is something perfectly unreal, ungraspable, inconceivable, unveils itself as a line or boundary between Reality and the unknown, a boundary – one would say— perpetually mobile at a speed that annuls and belies the notion of `velocity´, which is solely real and cannot touch NOW, a pure boundary of Reality.

`Infinite´ or `superluminal velocity´ are scientific tricks not worth our dwelling upon them here, as they purported to refer to facts that are real or the subject of knowledge; were we to play with physical terms, `absolute´ or `instantaneous velocity´ or `pure acceleration´ would at least be something that, given its own internal contradiction, could release NOW from any temptation of real velocity. As for the condition of `line´ or `boundary´, we should apply here the same dialectic as is proposed by Hegel for `principle´: that it is not yet (whatever), since it is going to commence it, and it is already, since it is its commencement.

57. The direct sense of such `dynamics´, enunciated with words as `fall´, `sink´ or `get lost´ because it is impossible to say it with words entirely clean of meaning and one has to be confident that listeners, in due course, will lay them bare of meaning as far as possible (`fall´, for instance, has to be into a `down´ devoid of `up´), is perpetually accompanied by another `dynamics´ in the opposite sense, which I said to be of defence or resistance and which consists in the following: things, which are not such things until they have passed and found thereby their name, their being known of and their relative, approximate definition, are entering to join Reality constantly, now, from the unknown endless.

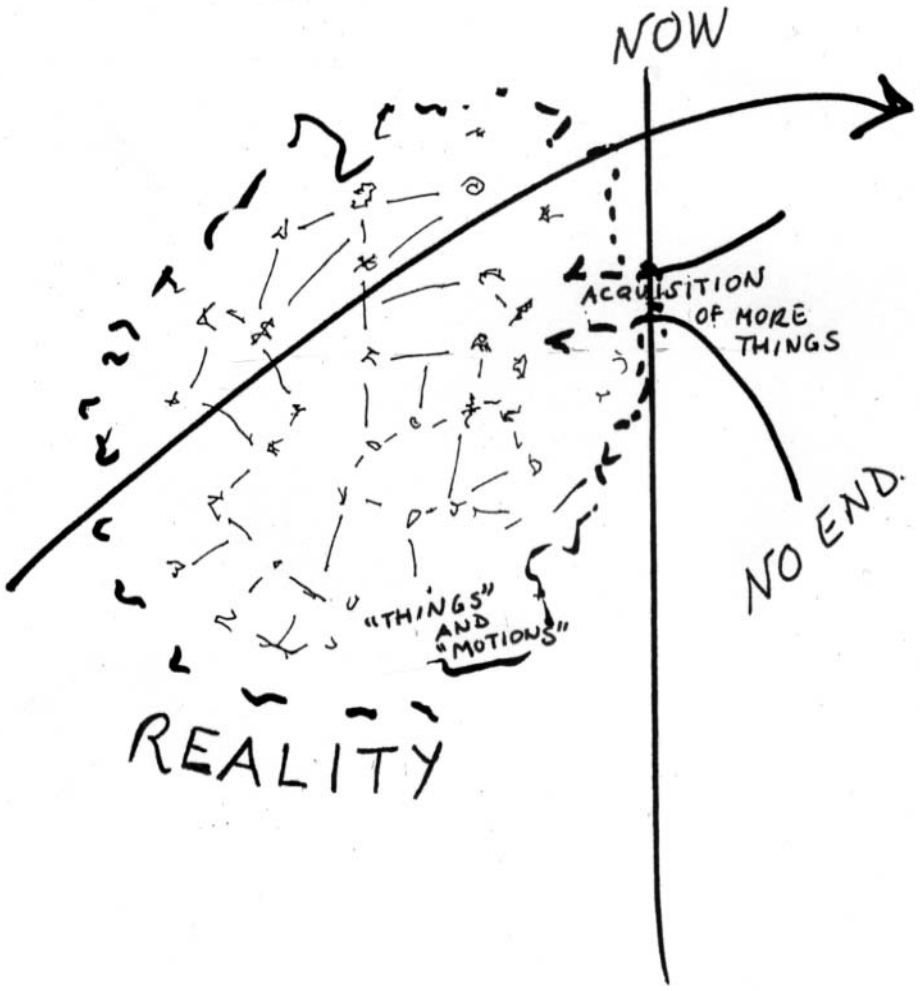
58. There is, in this sense of the `dynamics´, something which resembles and is in a sense reflected in what happens among real facts, when, against the primary realist view, which commands that things happen from past to future, someone points out that it rather has to be the other way around, for it is future things that turn past and never past things that turn future; but here, of course, what has been discovered is that there are no future things (`future´ is only as a constitutive ideal within reality), and the only thing going on is the passing of what has not passed.

59. Existents, hence, the things of Reality, are, so to say, dead, in the precise sense that only thus can they be known of and manipulated (a flying butterfly? is something fleeing and requires, to be known of, its being pinned to the board or in an instantaneous photograph), and only through having lost the freedom not to be what they are, to be anything else and, in a word, not to exist, have they acquired a certain fixedness and stability, the right of each one to be what it is and have its position among the other things within the set or map of the passed;

and, indeed, when it is the case that the thing is a living person, it can be said (with no drama other than the one it involves in itself) that only upon receiving the sentence to his ever-future death (the idea of `future´ being the very foundation of Reality), only thus is one realised, knows who he is, and acquires the right to existence.

60. It will hardly be required to insist in that the being or definition reached by the thing or individual, as real, cannot be but approximate: for, the set of things being necessarily non-closed and ill-defined (only defined and perfect in the ideals that deceptively inform it), each thing likewise can never lie totally closed and being finally what it is: only by the imperative and need of defending its reality must it, in spite thereof and at the same time, believe (and make believe) that it so lies and is.

61. This is, in sum, the dialectic of Reality with what it is not, in a continuous fall of Reality into the truth of its being unknown and a perpetual passage into Reality of something unknown becoming more things, with the point of the dialogue being signalled by this inconceivable, ever-living NOW or boundary between one and the other. That is the main part of the discovery: the rest will be mere revolutions around ideas on things we are led to by the discovery and which may help us understand it.


NOW
ACQUISITION
OF MORE
THINGS
NO END.
"THINGS"
AND
"MOTIONS"
REALITY

VI

62. Comparing this presentation I make of reality (continuously falling into the unknown and, from this, realities forming themselves constantly) with the vocabulary of words with meaning of any language is more than doing a comparison, as will be noticed as I do it, so that it may help also clarify the meaning of the discovery.

63. The vocabulary of semantic or `full´ words of a language, taken at one moment of its usage and evolution, is an exemplary sample of what is a `non-closed set´: there, on the one hand, the condition of `set´, though vague, is manifest since the words in that lexicon are linked to one another by relationships (the `associative´ which were happily set by Saussure against the `syntagmatic´) by virtue of the oppositions in meaning obtaining between one another, and even forming families more or less strictly (though never perfectly) organised in some or other regions of the semantic realm, while, on the other hand, that "dictionary" properly does not have a number of items or `ideal words´, since new words are entering it perpetually, whether they come from outside the language (through intimations from the unknown) and become settled in the apparatus by occurrences of use (to leave aside possible influences from other more or less neighbouring languages) or they are new in the sense that they alter, by virtue of relationships internal to the language, their meanings or denotations, and likewise other words are apparently being lost, becoming obsolete, though never can they be totally lost and forgotten since, after a word with meaning has been coined, it will continue forever, even if it has not been recorded in writing or otherwise, transmitting its semantic suggestions to other words partially inheriting it in use; so that the "entire" vocabulary is continuously getting lost in the outside, the unnamed and unknown which time and again belies its constitution, and is in turn trying to reconstitute itself in the vain attempt to name "all things".

64. Likewise, at the same time the claim of an exact, ideal or final meaning of its words is thus belied. As it is clear that, also here, the condition of the lexical set of not being ever closed and the vanity of its claim to embrace a "meaning of all" is transmitted to each of its items, in such a way that never can a word have an exact or finite meaning, and any definition trying to account for its meaning will be endless

and always incomplete, notwithstanding the efforts by scientific taxonomy or the axiomatics of a special language (mathematical, but maintaining a claim of meaning for its own terms) to fix the meaning of each word and close, hence, the list of vocabulary.

65. This, indeed, is somewhat more than a comparison: since the fact is that reality itself, and the things of Reality, cannot constitute themselves other than by means of the semantic vocabulary and the words with meaning of a language: as I already noted in § 6, out there, in the endless, numberless, and nameless possibilities, there may be something like roses (that is, what, upon entering Reality and being named, became real roses), but it is a vain absurdity for a rose to exist and be precisely a rose without having, in the vocabulary of whatever language, a word `rose ´; neither do special languages (as those of a Geometry or Calculus) escape this, where `things´ are the ideal shapes or numbers themselves turned into objects: there, on the contrary, the creation of the thing consists directly in giving it a name, which is attempted to be sustained by a precise, terminable definition.

66. The reader will have noticed already that, in speaking about the vocabulary, I sometimes referred to a`tribe language´: as it has already been shown to us clearly that true language or common reason can never appear in Reality, where it only manifests itself (necessarily distorted, inasmuch as what is particular, proper, private, what *idio*-talks, is opposed to the common) in the form of tribe languages or particular languages, even if from time to time one of them claims to be the true language; and it is thus that the question of the meaning, general and of each term, could only be referred to the content of a language's dictionary.

This does not prevent from the occurrence in each tribe language of a perpetual strife between what it has of particular, proper, and what it still retains, below that, of the common grammar or logic. But as far as meanings are concerned, as was gradually, clearly discovered in the dialogues *Del lenguaje*, the only thing present in the common language is an empty place for the semantic or reality-referring vocabulary, which only idiomatically becomes filled and constitutes the dictionary.

67. The consequence of this that is most immediately relevant here is that it does not seem, either, that one can speak of Reality without more ado, as if believing there is a common reality, for we discover that reality and things depend on the vocabulary and semantic words in each language; and thus it is: reality is idiomatic:

there are as many realities as tribe languages; and the reality known or suffered by each tribe is the one corresponding to the language (and, in particular, the semantic vocabulary) which, always imperfectly, distinguishes that tribe from others and attempts to define it.

68. That a society, by virtue of ideal and State manipulations, may impose itself upon a vast territory and great numbers of people from time to time (as is notably occurring nowadays or happened in the past with Rome and Latin), and may try to make itself uniform by imposing the same language to all, thus involving the aim to establish a reality that would be Reality, is nothing but a case of the vain human aspirations to the ideal, and does not disturb at all the evidence that all reality is idiomatic and reality has no other way of appearing in Reality.

69. Likewise, Physics or the Science of Reality is a case of that aspiration to overcome the idiomatic in realities, and thus it attempts to present, governed by the most precise, rigid and congruous syntax possible --a mathematical one--, a set of ideas, a theory, to account for Reality without more ado; but it is readily seen that the attempt cannot reach such ideal, and that the language of Physics is also bound to have a semantic vocabulary, of words with meaning, which each theory will interpret as referring to data or observation records or ideal, geometric, entities, but necessary for the consistency of the theory (ultimately, the very mathematical formula acquires a meaning), and that is what reduces Physics to the condition of language, so that it is impossible for a physical theory (let alone a philosophy) ever (it is not a matter of progress) to be true.

70. To start with, through this intermeddling of the linguistic consideration with Physics, we get rid of one of the irritating issues that keep worrying Physics (not Philosophy any more) in its progress: the one concerning whether the observer should somehow include himself in the study of the observed or observable (this was already an essential motif for Einstein's Relativity, and has been producing thereafter, in the interpretation of Schrödinger's equation or the theory of communication with two entangled states, a constant proliferation of contradictory theoretical decisions) or reality should be supposed to be something independent from its observation, measurement and theory. But the approach to the issue regularly forgets that, besides the opposition between `objective´ and `subjective´ (to come back to the philosophers ´ dialect), language or the communication convention, with its charm of not being either subjective or objective, is also in between. Since (it is known) the hardest for a Philosophy or Science (as for a Poetry) is the most immediate: to recognise itself as a case of language, and, in respect of Physics, recognise the very act of `measurement´ (vehemently repudiated by Bell himself) as an act of language. This is how I resort to language (and tribe languages and their vocabularies) in these methodical warnings

on the discovery of what's happening.

71. This may certainly lead to confusion as a result of considering `language ´ or `reason´, as is usually done, as referring to human language (or reason) and to `Man´ or `us´ understood as `men´. It is, therefore, necessary to put an end to that confusion and get ready to acknowledge, with a humbleness which is simple undeception, that human language or reason is nothing but a case of the language or reason which is constantly constituting and deconstituting all and any things in reality, in keeping with what I already anticipated in § 51 as to the fact that things that have passed and become part of Reality have, of themselves, the condition of being known or known of "before" any type of observer can re-cognise them and measure or number and name them in his dialect. Protagoras´ sentence, even if it is quoted, as usual, anachronistically introducing `existence´, "Man is metre or measure of all things, of those existing inasmuch as they exist and he exists, and of those not existing, inasmuch as they do not exist and he does not exist", is customarily taken in a positive sense, but it is, conversely, a statement of how `we´, `Man´, cannot understand what's happening with Reality because we must take it reduced to the level of our measure, taking our type of language, the human one, as if it were the very language or reason. The great difficulty for all philosophy or science consists in that it is always too well adjusted to human measure; even the most subtle theories exploring the ravel of `measurement´ are also all too human; and thus no great progress can be made in discovering the falsity of Reality; but the fact is that `Man´ is nothing but a case of things, and "all things speak", each in its way. It appears, at first, that it is proper of human language to be capable of lying, and, verily, lying is so inherent in and almost definitive of language that a language incapable of lying could not be called language; therefore, in order to come closer to understanding how is it that things also lie, the notion of `lie´ has to be referred to the most general one of `defence´, which has been shown to be, in the presentation of this discovery, the perpetual dynamics of resistance by Reality against its continuous loss: it is in this sense that things, each one and the set of them alike being obliged to defend a reality, cannot fail to lie in so doing, and Men´s manner of lying, with their political manoeuvres or their scientific theories, is nothing but a case of that general defence of things from the perpetual discovery of their falsity.

72. Meanwhile, hence, the reader of this should bear in mind at least that when, in setting out the discovery, I allowed myself to talk about Reality, without any

prior clarification, and even to offer a quasi-visual picture of the strife of reality, always past, and what is not, because it has not passed, with the unconceivable boundary between one and the other in this NOW, he should not be misled by whatever theoretical appearance that may have, and note that I was not presenting a common reality, as there is none, but rather trying to gather under `reality´, maybe out of a pedagogical drive, also for myself, such traits or conditions as I consider to be general to any realities under any idiomatic form of reality in which they may appear. I trust that the reasoning will continue, as it knows, destituting thence images or ideas and helping fade away what in truth could not be painted.

73. But maybe it is still time to extend this entr'acte so as to try and clarify a few questions or possible tangles concerning the method and sense of this discovery and its presentation. That is to say, that, a Natural Philosophy or Physics or Science of Reality having been founded and developed among `us´ since the start of our History (that is, since men have, through spoken record of their feats, an awareness of themselves: the "previous" is only known to Science), ultimately, a concern to reason and account for this what's happening in writing and special and refined languages, when, like now, the attempt is made to come back to common sense, stripping what's happening of established ideas about it, it must be stated as emphatically as possible that this discovery is unrelated to the Science (or Philosophy) of Reality, at the same time as it admits being inspired to great extent by its findings and contradictions.

74. I therefore repeat, to that aim, the summary dynamics of my discovery: that Reality is relentlessly falling into the unknown, hence suffering from the constant threat of a belying of its claims to truth and wholeness, and in view of this it has to be defending itself constantly from such threat, trying to restitute itself time and again after the attacks against its idea or faith in itself,

and such resistance to fall is proper and constitutive of all reality to the extent that, as we will see later, the dynamics (and fall) itself of things within Reality cannot be understood but counting primarily on this dynamics `reality/unknown´, which I hence refer to, somewhat confident, using terms as `dynamics´, `fall´ or `resistance´, that were born to designate physical facts and things, and would apparently lack sense here but do have it inasmuch as they announce their relationship to the real dynamics;

well, as I already pointed out in § 71, the Philosophy or Science of Reality is clearly one of those defence mechanisms and is, in principle, together with any amendments

and progresses it may develop, bound to continue sustaining Reality, which certainly gives constant signs of requiring it.

75. I therefore find logical and consistent that the Science of Reality, either present-day Physics or the old Theology, cannot help getting entangled in a treatment of insoluble problems (most of them brought about by the very development of its doctrine or theories) and, as a result, developing forms of language more and more remote from plain and common language (thus the mathematical formulae applied to real facts, which are, at least directly, impossible to translate into language, just as, since the start of History, the proclamations of the sorcerer, priest or fortune-teller had to be formulated in an abstruse, mystic dialect alien to the vulgus ordered by him to be quiet in the meantime: *fauēte linguīs*), which will not bring them closer to saying the truth about something that cannot have it. Well then: it is owing to its own duty to defend Reality that Science is doomed to embroilment, subtle Aristotelian distinctions and more or less disguised confusion: it suffices to give up that defence for all the native issues of Science or Philosophy to turn clear and simple.

76. Indeed, for someone real as one is, that renouncing the defence of Reality seems to imply a renunciation of oneself. And thus it is. But, at this juncture, I wish to invite the reader not to lose heart in the face of the adventure for that reason, and remind him that, in reality, he has already been sold all the good he could receive and his possible life has been bartered for a future and money, so that he cannot, reasonably, fear losing much with this: at the end of the day, if you reckon, what is one going to be paid for continuing to lie?

77. But, things being set so, I can already foresee the tenor of the objections that physicists or believers will make to the presentation of this discovery: that, while I claim to be dealing with physical and real issues, what I do is resorting to metaphysical notions, by mentioning things as SOMETHING, ENDLESS or I, which are declared to be outside reality, which cannot be measured or computed nor, therefore, be objects of observation or theory.

78. But I assume the reader already has a premonition of the answer to such objections; which consists in this simple reasoning: if it is true that Reality is all there is, that there is no more than what exists, then the objection is sensible and, to account for Reality, one should avoid any reasoning using terms lacking real

meaning: if, on the other hand, what in truth is happening is a continuous fall of Reality into something which is not real, then the sensible would be for Physics to allow itself to fall, in turn, into a meta-physics; which is not certainly any Metaphysics, a philosophical theory, as such bound to abide in the defence of Reality by the same restriction and servitude as Physics, but rather a logic of common sense which does not theorise or build up another system of true reality but, on the contrary, rushes, saying NO tirelessly, to discover any falsehood there may be in the ideas and constitution of Reality.

VII

79. We now have to reinterpret or, rather, disinterpret certain physical phenomena (and, as a mere case thereof, the human, social or personal ones) which appear and are imposed on us in reality, and to understand them in accordance with the play of Reality with what it is not as has been newly discovered; and we must, first of all, account for the doubtless reality of the plurality of things and motion.

80. It is not our task here (let alone for us laymen) to raise again and settle the physical issues necessarily entailed by admitting as natural plurality and motion: let it suffice, for this purpose, with the brief and hurried repertory I advanced in III, and the somewhat disjointed string of quotations from diverse studies added in the APPENDIX, in the aim of proving the problematic condition in which reality appears for any honest and penetrating physical study, and how the issues of `bodies´ and `motion´, far from having been settled with the progress of Physics, continue outstanding today and, perhaps, unveiling themselves all the more sharply and deeply as a consequence of that progress.

81. Our business here is to present in the most clear and simple manner (and, if discursive reasoning were capable, simultaneously) these two opposed findings: (A) that there is nothing more real than the plurality and motion of things, (X) that such plurality and motion cannot in truth occur, that it is logically impossible for them to occur. We find here the neatest and most precise occasion to touch the opposition and relationship between reality (which is known) and truth (which is not known).

82. (A) Nothing more real than plurality and motion, both appearances being implied one in the other to the extent that hardly can a step be made without taking them together: for, if things are not different from one another and (through the conversion, inherent in reality itself, of semantic difference into distance) separate from one another, there cannot be either any translation, which can only be understood to be of one of them with respect to the other (leaving aside for the moment the invention of `with respect to a space´, which is introduced to try, at no avail, to solve the problem by moving it elsewhere, that is, by turning `space´ into a more or less material thing), nor any change in each one of them, or otherwise it

would run the risk of disastrously becoming another (leaving aside here too the invention of `real Time´, which attempts to justify the permanence of the thing as if threading in unity its multiple appearances); and, the other way around, without motion and change, things cannot be multiple and diverse nor anyone of them be the one it is and occupy its own place or path: only motion convinces us that one thing is the one it is, since it is sometimes here and sometimes there, and only its alteration convinces us of its identity; and, since one cannot be who he is but thanks to not being another, who could not be at his place or follow his path at the same time other than by mixing up with one, the need for plurality of things is assured by the translation of place of one of them, if it is believed that the thing remains the same after the translation, and by the alteration of each thing, if it is believed to be in its place.

83. (X) No motion can occur in truth. The rationale for this is offered with utmost simplicity in the formulation transmitted to us through literal quotation from Zeno of Elea (fr. 4 D-K): "What moves does not move either in the place where it is or in the place where it is not".

84. The formula is equally valid for `change´, of course: "One does not blush either at the moment when one is already red or at the moment when one is still pale", or, if it is so wished, in the most melodramatic way: "One does not die either when one is alive or when one is not." On the apparent `change during motion´ and the orange peeled off as it rolls according to Juan de Mairena's pupil, I will come again later (§ 149), and also on the `rotation on itself´ (of the Earth or in the spin of the subatomic element) implied in its translation.

85. Many a time have scholars dwelt on Zeno's famous aporiae, as they were deviously transmitted by Aristotle and his commentators. But of course it is sufficient with that simple and literal formula, of which the cases of Achilles with tortoise, arrow, runner, noise of millet grain or battalions crossing in parade, cannot be but illustrations and developments to evidence the same, their drawback being that they entail shallow and funny issues such as that of the `infinite or not divisibility of time and space´ or `of one yes of the other no´, that blur the clarity of the case.

86. Likewise, I understand that the manifold appearances of patent aporiae in past and present studies of Physics, such as the issue of `non-locality´ of quanta, that of admitting or not a `simultaneity´ between two real or observable facts, that of the conversion of computed probabilities into facts, that of the double trajectory of a photon as being or not two trajectories and two photons, as well as others referred to succinctly in III and still to be mentioned later, are not either but illustrations of the same and consequences that have to be borne by Science owing to the necessary belief in `motion´ and `plurality´ as inherent in reality itself. I refer to the notes in the

APPENDIX for present-day appearances of aporiae in Science.

87. There certainly is a manner of escaping the rationale, which is giving up the notions of `a mobile´ and `place where´, that is to say, giving up multiple and diverse things, each one's being the one it is and no other, and giving up also the localisation of each one as distant from the others, to remain with pure `motion´ as the sole truth of what's happening. But it is already seen that this throws `motion´ outside Reality, into meta-physics, where, certainly, it might suggest something in connection with the `dynamics´ of the fall of Reality into what is not known. Indeed `motion´ is nothing directly real: what is real is speed (which, according to a vulgar Spanish saying about "confundir la velocidad con el tocino", that is to say, mixing up velocity with bacon, has ended up at the same level as bacon), inasmuch as it can be counted and measured, and that is, as we have already seen, a condition inherent in the ideas or things of reality, although, properly seen, what occurs really is a difference in velocities and, therefore, the most profoundly real is acceleration; but, in any event, what cannot be counted or measured is motion itself ("one thing moves more than another" can only be, and immediately is, understood as "faster" or "more frequently"), and `motion´ cannot directly refer to the real but rather is among ideal entities, as `rest´ or `matter´, which, as I warned in §§ 34-35, cannot be things directly but belong to Reality indirectly in that they are necessary to inform it.

One does not usually find anymore references to or generic questions on `motion´ and `quantity of motion´ in studies of Physics (much as in formulations the product of `mass´ and `velocity´ is still considered to be valid as equivalent to such quantity), which is what would ensure their reality; but it is telling to see how, in founding his principles, Newton attempted to use that idea: thus, in his revised wording of the *De motu corporum* (ed. Whiteside in *The mathematical papers of Isaac Newton* 1974, VI pp. 92-96), "Quantitas motus est quae oritur ex uelocitate et quantitate materiae coniunctim" and later on "Ita se habet igitur *uis motrix* ad *uim acceleratricem* ut *motus* ad *celeritatem.* Namque oritur *quantitas motus* ex celeritate ducta in corpus mobile et *quantitas uis motricis* ex *vi acceleratrice* ducta in idem corpus" ; so that the notion has to consist in a combination of the quantities of `matter´ (of a body) and `velocity´ (impressed upon it by alien `force´); and, in applying the notion to the formulation of the `2nd law´ (*ib.* p. 96), "Mutationem motus proportionalem esse ui motrici impressae et fieri secundum lineam rectam qua uis illa imprimitur", the dissenting interpretations that followed in subsequent centuries (which I follow in the paper by Bruce Pourciau `Newton's Interpretation of Newton's Second Law´ *Arch.Hist.Exact Sci.* LX-2006 – pp. 157-207) result highly illustrative as to what, quantity or something else, is referred to by the `change in motion´, and to what type of `force´ ("instantaneous impact" or "continuous force") it corresponds, and in what sense should the straight direction from the point of impulse or impact be understood.

88. Let it, hence, suffice with the juxtaposition presented (which would wish to be a simultaneous superposition, if possible) of (A) and (X) to remind us (two needs of opposing orders, real and logic) that there is nothing more real than motion, to such an extent that it is the very foundation of real Time and, hence, of Reality, and that motion is impossible, and thereby to render undeniable to us the opposition and mutual strangeness of the possible with the real, of truth with reality;

if `truth´, of course, is not taken as usual to refer (*adaequatio rei*) to the testing of an assertion or prediction through the voice of Reality itself; but the refutation of this deception has been made efficiently enough in *Contra el Tiempo*, in particular under the 9th attack, and it is not worth the while to come again on it: what we are talking about here is true truth, ungraspable by any real knowledge.

89. Nevertheless, that mutual strangeness and unbridgeable opposition does not prevent one to be able (and hence, without more ado, obliged) to deal with the relationship between what is truly happening, and is not known, and reality, which is what is known, between what has passed and what has not.

For in the diagram formulating this discovery I already presented reality, what has passed, as floating in the unknown, what has not passed, and, since Reality's `being at rest´ on it, implying its being a whole lying nevertheless on another whole, would be the same primitive stupidity that accounted for the world as being on a camel hump or a tortoise shell, the presentation alone of reality (not `all´ at all) in relationship to what is not carried, without more ado, to a dynamic imagination that turned out to be twofold, the continuous fall of Reality into it and the defence of Reality from it, with a perpetual incorporation of what was not known as facts or elements upon that moment already known and real.

So it is inevitable for us to try and re-interpret the plurality and motion of things using the relationship of reality to what it is not and is in truth happening, thus turning also in passing its issues from physical into meta-physical ones, that is, issues of common reason.

90. The great difficulty consists, apparently, in this: given that reality, as it appeared to us, is the passed, and all and any things passed form part of Reality, for alone of the passed can anything be really known (the non-passed will be known upon its happening, and what is happening, no-one can grasp it), this platitude occurs here: that in the passed nothing can happen, and hence any knowledge of reality can

only be knowledge of things, so to say, dead, static, at rest

(I, myself, for instance, only realise myself, being who I am and becoming known, from the moment I lie dead),

so that, in the end, in Reality nothing can move, nothing happens, and any motion in it has to be mere illusion.

91. This becomes more noticeable (naturally so, since the first nature is the second) if we consider, rather than atoms and photons, our imaginations of History: for it is clear that all epochs are in this one (in our books, records, TV sets), but also that nothing happens in them for they have passed, and this one, in turn, is no epoch nor is it known until it is realised, until it is killed and allowed to be turned into Contemporary History; but that does not suppress the obligation, at each moment, to construe the sequence of (passed or also forecast) epochs of History as a sort of -- distinctly illusory-- evolution, motion.

92. *Eppur si muove!* How to account for that illusion? For also illusions, real as they also are, have to be accounted for. How is it then that motion, as I have recalled, is essential to and necessary for Reality? Which, if any, is the relationship between the true dynamics of Reality falling into what is not known and that motion, as real as illusory, of things within Reality? I admit being unable, so far, to find an adequately simple rationale for this issue, and I am bound to tackle it from several fronts --my apologies to the readers.

93. On the one hand, it has to be acknowledged, of course, that the acts of observation, measurement and computation, looking, hearing, narrating or thinking, done by anyone on real and lying things, do have a peculiar dynamics of their own, in the sense that I now describe their process and takes by succeeding moments: they have to be done so by force, in such a way that if I now take, for instance, a view of the fact, and then, which is already now, another view, if I wish to continue believing that I am seeing the same thing, I have to receive that distance between the two takes as a testimony of process, construe it as motion.

94. The reader will already be seeing come to his mind, to support this, the technical illusion of cinema; and, certainly, we have to find that something similar to that is what must account for the illusion of continuous motion in reality, just like one should think that the invention itself was inspired by what happens with more real things. But, in any event, the comparison should be used with care and somewhat the other way around: for it is clear that what I am saying happens

not to the images alone (that would amount to admitting that the successiveness of discrete and punctual photographs is a continuous, already real, motion), but rather to the `eyes´ of the perceiver or interpreter of them.

95. Nor should issues of more or less velocity hinder the understanding of this (`velocity´ being an idea and quantity, inner and proper to reality, useless to deal with Reality itself): for, just like, if a star is so far away that it has never been seen here yet, nothing will prevent, upon its being finally seen, the light-years it took it to travel to us from being counted, likewise, in order to perceive the path, leap or spin of a particle two observational takes are required (no-one can see an electron at will, just like no-one can see light), however instantaneous may the gap between the two appear to be, which will never be (being, after all, real) anything like the instantaneity of NOW that annuls, being inconceivable, any ideas and computations of `velocity´.

96. In addition, to understand the necessity of motion inherent in reality, it should be noted that, whatever beings perceive motion (among others, as the extreme case, the ones capable of recording and theorising on it), all of them are, likewise, real; and therefore, if motion alone can make sure the plurality of real beings and, hence, the identity of each**,** it is clear that not one's life but one's very existence depends upon there being motion, since otherwise not only Reality would remain static, indiscrete or mixed-up, but one's reality would end up losing and belying itself; thus can we understand the *horror continui*, the fright at continuity (like the one at void, or at the ideas of it one may make for oneself, such as `chaos´ or `nothingness´) suffered by all real creatures, at the same time as that illusory *continuum* alone sustains their existence. We therefore have to assume that the necessity of motion, constitutive of reality, is also a peculiar or supreme necessity (in the sense of `duty´ or `obligation´) for all and any existing livestock or automobiles; and thus we understand that, in Physics, `the observer´, who, were he to be ME in truth, would not be anyone real, must appear converted into a real (and human) being,

to such extent that I see that in many studies of physicists, when they have to refer anaphorically to the `observer´, they feel obliged, obeying to feminist stupidities, to say "he or she", so as not to fall into the `indefinite plural´ and say "they".

97. Now, on the other hand, in order to penetrate more deeply or directly the necessity of motion, however illusory or false it may be in reality, I do not find any means other than try and glimpse something of the relationship there may be between

real motions and the non-real dynamics attributed to Reality itself when presenting the discovery, as continuously falling, right now too, in what is not known and, conversely, the defence or resistance of Reality from such fall producing the constant or perpetual (I cannot say here `continuous´ in the same way) integration of unknowns becoming facts or elements of Reality.

98. The pass I get to with this is no doubt ticklish, in that the point is to discover relationships between what exists and what does not exist, and hence how that dialectic or contradiction between one and the other is, in turn, related to the dynamics and contradiction of forces and motions, as real as they are false, obtaining among existents. I do not know, to say the truth, to what extent such attempt is possible. As far as it may be, I should have understood more deeply the mysteries that the Science of Reality, Physics, cannot fail to raise in passing, albeit trying thereupon to comprise them within its science, or otherwise at least I should call, as I here do, upon those who may have touched or penetrated such mysteries and contradictions more intimately or precisely. For the time being, in order to help the laymen as myself and maybe physicists who have not neglected the issues underlying a mere scientific study of real phenomena, I refer to the APPENDIX containing my readings of investigations that, in many different ways and starting from the most diverse approaches, arrive at making noticeable the presence and vividness of such contradictions or mysteries.

99. Here, to start with, I come again on the issue of the discontinuity of `things´, governed by the necessary illusion of continuity, relating it directly to Time, wherein the problem (at the same time of method and object) of `measurement´ with its conversion into `computation´ is involved. And it will be worth to advance, by way of axiom, this one: Whatever `things´ may be counted, what is counted is Time, in that the semantic difference among `things´ is translated, as I already warned, into `spatial´ separation, distance, in such a way that the very action, real and temporal, of counting them, going from one to another, whether we are dealing with stars in a firmament, sheep in a herd or a rain of electrons, may not fail to involve in the essence/difference of the `thing´ the Time of its computation; and it is useful to place that formulation of the axiom in relation to this other one: Whatever things may be counted, it is money what is being counted, for `money´ is the annulment of the difference between things to reduce them to being purely `things´, whether they were previously gold ingots or head of cattle or slaves or books with their respective titles

or copies of a book or words in a commercial or nonaggression treaty between States or prizes of honour or glory. And this equation of both statements of the axiom turns out to be of pure logic or common sense as soon as it is recalled that `money´, in the end, is nothing but Time.

100. The question involves the very, mathematical, language of Physics. To wit, that a normal mathematic (as opposed to a formal Logic, which is nothing but a strict purification and regularisation of common language) lacks a Negation index (at most, an inequality index as `≠´ would imply in itself the suppression of an operator, not a negation operator; and, as a matter of course, `negative numbers´ have nothing to do with this), while the fact is that NO is the primary mechanism of common language or logic; and linked to that condition is the institution of numbers, the very notion of `number´, wherein is implicit Negation (of undefined quantity, of `more´ and `less´, as in `all´ and `nothing´), and from there that of `unit´, where what in principle and common reason is mere negation of a numeric plurality (`one´ as `only one´ and `not multiple copies of the same´) is converted into a number, which, at the same time as it is the `ratio´ of numbers (`1´ as the exact difference between, for example, `5´ and `6´), is posited as `origin´ of the series; since, if negation could operate with numbers (or with `1´), the result would be falling back to undefined quantity. But, as already in *De los números* and, after, in *Contra el Tiempo* I tried to make some undeceptions from arithmetical conventions, while here I am trying to approach the issues “in the physical manner”, I will not deviate with this and I leave the matter to the curiosity of readers.

101. The most pressing task here is to recall how real discontinuity sometimes appears as numeric or exact (Avogadro’s number, Planck’s constant, experimental and theoretical computation of subatomic corpuscles), that is, that our measuring of realities turns out to give, of itself and as if by nature (*ho theós arithmētízei*), a computation; which is extremely disturbing for he who has discovered that reality is necessarily approximative and that the ideals of `yes or no´, as `all´, `nothing´ and, hence, `only one´ and `number´, albeit governing the constitutive defence of reality, cannot themselves be realised, while in those computations the ideal of exactness seems to be materially realised; and only with that conviction can a Science of Reality fulfil its task. Certainly, to achieve that, mathematics in the service of Science has to make the rigid notion of `number´ flexible, replacing it first with arithmetic or geometric `ratios´, later with `functions´ and finally with `probabilities´. At the same

time, numbers themselves have to be grounded upon a Set Theory (that is, overcome the contradiction inherent in `denumerable infinity´ and admit that `non-denumerable infinity´ and `power of the continuum´ do not escape all reality but serve to account for real computations), the fact being that ("natural") `numbers´ were co-natural with `thing´ at the very foundation of reality, and therefore previous to any theory. We will soon find that this carries the question "to Time": that the first thing to be counted are `times´ (or `occasions´ of the same) and that `times of the same thing´ are, before `things´, `times´.

102. Furthermore, "natural" numbers keep counting, among other `things´, the entities that mathematical Physics goes on developing, whether they be `ratios´ reduced to decimals or successive examples of `real´ or `complex´ or `transfinite´ numbers. The problem, in sum, is that of `measurement´ and its conversion into one or another manner of `computation´, which kept stirring researchers in particular throughout the past century; remember that Bell himself, who with his inequalities invented the clearest artifice aimed at converting probabilities into `yes or no´ decisions, repudiated the notion of `measurement´ in force; and the astonishing success of Quantum Physics computations in their practical applications is only intimating relentlessly the conviction of `exact´ and `definitive´.

103. However, the problem or mystery surrounding the intimations of `exactness´ in Reality and the conversion of `measurement´ into `computation´, of `quantity´ into `number´, which is ultimately that of the constitutive war between `continuity´, ideal or `from outside´, and `discontinuity´, directly informing reality, will have to continue being the subject of debate, more and more `deeply´ and `from above´, in the entrails of `matter´ and into the open sky. But here, to start with, as we go on recognising that real and computable Time is the commencement or foundation of Reality, as anticipated in § 99, we refer the issue to such Time and in it we find the appearances of discontinuity as `moments´ and `states´. Of course we will have to discover that, just like any other `things´, `moments´ are not truly or exactly computable either: the truly exact is NOW, the boundary of the real with what is not real, which, inconceivable as it is, escapes all Science, and its reduction to `moment´ cannot but be approximate (and false) in order to be real.

104. It would be interesting indeed to track the avatars of Lat. *mōmentum* in vulgar and scientific languages, passing from the meaning `motion´ to `one motion´, from `impulse´ or `pulse´ to `temporal pulse´, `moment´, `instant´. It appears as telling that the Latin tag *momentum* may have been reintroduced in the jargon of Physics (after having been used as `moment´ in the semivulgar) to designate, as a property of the element, something merging in itself the notions of `mass´ and

`power´, as if the very `motion´ had become included in the entity of the `body´: maybe *impetus*, `impetus´, would have referred to that less confusingly. Likewise those of Lat. *status*, `state´ in scientific English, to designate something like a (temporary) immobilisation of the `body´ or `system´, which thus tries to make it apprehensible in its necessary mobility.

As for the artifice, of long-lasting success, whereby, by adding amounts of `almost nothing´, a computation is reached which at the same time is accurate (enough) and accounts for the "rough" measurement of `things´ or `velocity´, it is explanatory and even exciting to observe the ways in which the inventors of infinitesimal calculus (Leibniz starting from an atomic notion of `minima´ and Newton from a geometric analysis of the conversion of `curve´ into `straight line´, of `flow´ into `limit´) dealt with their own doubts or uncertainties; as I do now in passing using Newton's writings edited and commented by D.T. Whiteside *The mathematical papers of Isaac Newton* Cambridge 1974, mainly v. III (those of 1670-73) and v. VI (those of 1684-91), and the article by A.N. Kolmogorov `Newton and Contemporary Mathematical Thought´ *Kolmogorov in Perspective,* Providence RI. Am. Math. Soc., 2000, pp. 163-176; and I only note here how the conflict lies in making compatible the idea of `infinite´ (infinite the numbers of the series, without being possible to term as `last´ anyone but the one in which the series ceases) with the idea of `whole/all´, as appears, e.g., in III p. 70, "summa omnium terminorum /…/ erit infinita", where the Future (*erit*), which is usually used for such statements, the eventual nature of the computation, runs into the `summa´ (of all), which is the end (aim and cessation) of the computation. And in respect of the primary infinitesimal quantity which is the `moment´ or, in Newton's terms, `*instantia temporis´*, Kolmogorov *o.c.* p. 166 notes how in *De analysi per aequationes* (1665) he uses `moments´, though not as `indivisible´ but as `vanishing´ perpetually to become `minimum´, the latter being defined, naturally, as `less than any given quantity´ (thus, p. 244, "Nempe quod quotiens, cum x sit satis parua, quo magis producitur, eo magis veritati accedit, ut distantia sua, *p, q* uel *r,* etc., ab exacto ualore ipsius *y*, tandem euadat minor quauis data quantitate; et in infinitum producta, sit ipsi *y* aequalis."; note the "approximation to truth"), and resorts again to that method in the study of `limit ´ in the *Principia*, while the *Methodus fluxionum* "develops in rather unusual form a conception in essence completely equivalent to the modern treatment of differentials with *constant* Δ *t.*" (p. 173); but K. sensibly relates (p. 166) the absence of `moments´ to the fact that "in *Methodus fluxionum* Newton always thinks of fluxions as derivatives with respect to some auxiliary variable *t* which nowhere appears explicitly in the computations." (p. 173; s. relevant quotations there and in p. 166), that is, that the issue is inextricably entangled with whether the idea of (real) `time´ of the computed processes is related (or not) with the time of computation itself, in which the quantities "vanish" gradually toward the end where the computation ceases. Finally, the study and perspicacity of José-Luis Caramés led to me concentrate on the point (*Meth. Flux.* p. 70) where, in stating the problems encountered by `local motion´, he mentions as first this one: "Spatii longitudine continuo (siue ad omne tempus)* data, celeritatem motus ad tempus propositum inuenire", and how Whiteside notes under * (p. 71, n. 81), "Newton has here cancelled the more precise Greek equivalent `τ vûv´. This Aristotelian phrase would hardly come naturally to his mind" (he believes it may have been suggested to him by a first lesson of Barrow's 1665 course of Mathematics, where he says that between the first and last τ vûv of each stretch of time there is a *duration*) "and we are puzzled

why he did not replace it by the more accurate `ad omnem instantiam temporis´". The temptation to convert NOW into `moment´ and real (as already in Aristotle with the Article, `the now´) is clearly latent in these junctures.

105. The stances taken by physicists vis-à-vis the inherited idea of `Time´, real and computable (in years, seconds, light-years or tachyons), in the attempt to subject the unknown time to forming part of Reality, have been and still are diverging or confused. I refer the more or less lay reader to the APPENDIX, so as to receive, as I have, a certain impression of such confusions or divergences. One stance, already seen in Aristotle (s. in *Contra el Tiempo*, 11th attack, pp. 157-164), consists in having `time´ be explained or defined by `motion´, as if motion were more primary or less problematic and did not require the idea of `time´ (and that of `space´) for its realification. Another one makes it derive from `speed´ as the primary reality (which properly is `acceleration´), thereby putting it on the same plane as `space´, creating a `space-time´ in the manner of Minkowski (although in Enstein's equations themselves the opposition of sign reveals the contradiction subsisting between one and the other), a stance that certainly starts from something which is true: recognising that real Time is already ideated as a `space´, which is where its `2 senses´, `from left to right´ and vice versa, come from. Another stance, faced with the evidence of insoluble confusions, is that of trying to suppress `time´ from the formulations and theory. In this I find particularly telling certain studies that show that Quantum Physics equations (I do not know to what type of equations this would apply, if to Schrödinger's general one or to those having hidden variables) can likewise be formulated without *t;* what happens is that this can be done most likely because real Time is implicit in the very *`quantum´* entity, in such a way that it is the *quanta* that play the role of `time´, as per what I anticipated in § 99 in the sense that "whatever `thing´ may be counted, Time is being counted". Finally, I stop in the attempt to eliminate Time that perhaps is the one that has been held for longer, of which I became aware in reviewing J. Barbour's book *The End of Time* and which I subsequently followed through other uses of the so-called Mach's Principle, also used and attempted to be clarified by some of the authors, favourable to `instantaneous action at a distance´, of the book I used in III: it is sought therein to replace the idea of `time´ (and with it that of `motion´) by that of `relationships´, relationships between `things´.

106. The discontent prompted by such stance with respect to the ideas entertained by Science affected (to review it in the form of a short history) not only the idea of `time´ but also that

of `attraction/repulsion´ between bodies, which included generally electromagnetic processes and gravity, as well as, finally, the idea of `force´, which had been hinted as the virtue or violence moving `bodies´ against their own tendency (their `inertia´) to continue lying as they lied or going as they went: since that `force´, as Euler already saw it distinctly, cannot either be believed to be had by the `body´ in itself (which would bring it close to being like one of the organic and conscious beings that believe they move by their own `impetus´ or will) nor attributed to an agency external to `matter´, which would run the risk of being divine and would mean that Science gave up reasoning and accounting for physical facts and causes; in view of which the notion of a `medium´ became imposed, which could not be a mere medium transmitting `forces´ between separate `bodies ´, but rather should explain by its presence the interaction phenomena between `bodies´, that is, shift and assume the notion of `force´ by turning it into another mode of relationing activity; and, once the idea of `medium´ as `ether´ was more or less abandoned as being too `material´, the notion of `field´ was arrived at (primarily under the pattern of the electromagnetic one, but being generalised until encompassing `gravitation´), which had to be, though natively geometric, active and causative (in the fact and the theory's mechanism), approximately at the same time as the notion of `body´ (not without the intervention of semimathematical entities such as vectors and the vector field) became more skillful and subtle, with a twofold, sometimes alternative, presentation as `particle´ and as `wave´.

107. That the `models´ or `theories´, with `time´ directly or indirectly included, were unsatisfactory was something that gradually became apparent to some physicists throughout this last century (but it was so already, even before its most illustrious formulation with Einstein's General Relativity, for E. Mach and certain others), since it implied adopting ideal or geometric entities as real, dynamic, and causative ones, at the same time as experimental verifications of Quantum Mechanics only tortuously fitted into the relativistic model, so that there could be a risk of falling into a division of tasks, Special and General Relativity "for the sky" / Quantum Mechanics "for the intimacies of matter". And this is what led scholars as J. Barbour, P. and N. Graneau or Viv Pope, among others, coming again on `Mach's Principle´, to a view of things that gives up the dynamics and temporal processes as primary realities (considering them, without their saying so, as illusory, however constitutive of Reality), in such a way that "the world" (not to call it, better, Reality) would rather consist in a chart or map of relationships between elements which are "all" given jointly and "all" related to and exerting on one another, if not influxes, appearance conditionings (mutual distance not being directly involved in the degree of power of such mutual conditions), so that `gravitation´, to take the paramount example, would not be an action of one body on another and of the latter on the former, but would be given and present as mutual conditioning of the "form of existence" of each element in relation to "all" others.

108. If this bold outline of the situation of physical theories among us is only half-reasonable, it will suffice to help us approach the issue of `time´ and `motion within reality´. Let us start by admitting, as per the last of the stances mentioned, that the primary are not motions or actions but constituting `relationships´, such that the very status of `thing´ (in which the notions of `body´, `wave-corpuscle ´ or `system´ are annulled, *aufgehoben*) attributed to the separate things is strictly dependent on their `relationships´: since this comes close to recognising that physical facts as (spatial or temporal) `distances´ or mutual `influxes´ or `interactions´ are manifestations of the logico-semantic condition of `things´, which establishes the terms in identity depending on mutual oppositions of meaning, and this somewhat discovers the equivalence, according to what is said in VI, of Reality to a vocabulary, relatively arranged but always idiomatic or tribal, of Names, Adjectives, Verbs (bodies, properties, interactions) and to the associative relations that govern its arrangement.

109. However, I feel that understanding the illusion, so powerful, of `motion´ (and Time) as an immediate appearance of reality, though made easier by the survey of theories in §§ 23-29 and the considerations made in §§ 101-105, still demands a motive inherent in the very constitution of Reality, which I cannot find within Reality: for how can one understand the need in it for an interpretation or illusion of `relations´ between `things´ as `motion´? It is this open question that leads me to search for that need an origin outside, a colloquy of the dynamics obtaining between the passed and the unknown, and vice versa, with motion and Time within Reality. And I trust it will be understood that it is not a search for causal explanation what urges me here (since `cause´ is a notion internal to reality and linked to real, non-true Time; and even the most brilliant breakthroughs of Physics have at least come to question the `cause´), but the desire or lack of logical congruity between the truth (unknown) without and the illusion (known) within Reality.

110. Indeed, if one were to set out to look for a cause of motion, far simpler and more efficient than modern theories is the one held in our first atomic theory by Democritus-Epicurus-Lucretius, in presenting, below and as explanation for reality or things proper, what I am bound to call the sub-reality, where there are only atoms and void, though proceeding also to imagine the relation between one and the other, in the most distinct manner in Lucr. *DeRN* II 62-215: for, there, atoms, owing to the calling which is their very being or “their own weight”, cannot do other than fall down in a perfect vertical, until (216-250) one of them, owing to indetermination, caprice or

creative imperfection in the law of its obedience to the fall, deviates minimally and only thereby originates the *plāga* or collision of one with another which is the sole interaction of atoms between themselves (nothing can be done by one of them to another except for impacting), and what alone causes atomic conglomerates or things, reality, to crop up; however, if one were to stop and ask why should atoms fall (with different weights depending on their `class´, but all at the same ”insuperable velocity”), it is found that there is no reply other than this: what makes them fall is the absolute absence of resistance which is space or void, seeing that in sub-reality there is no other mode of being, that is, of not being, and it is thus how, in a letdown to Aristotle, the First Motor, Cause of Causes or God itself is no other than void. The truth is that I am not making here a physical theory to explain things (and motion) through other sub-real “pure things” (and their motions), but rather discovering the loss of reality in something which certainly is not any other, true and underlying, reality; but I do not doubt that such scheme of the old atomists has been inspiring me a lot in studying the problem, as I now continue to do.

111. I do not have the means to know how the unknown truth and the real illusion speak with each other (I have offered a quasi-pictorial representation of that relationship or dialectic between one and the other, though such that it cannot lead to a supra-real Geometry, and that it has to belie itself each time it becomes present), so that I have to satisfy myself, for the time being, with the following precisions on the scheme of the discovery of the relationship between the real and what is not real, as well as certain considerations to great extent nourished by observing what, in the meantime, is happening with the apparatus and mechanism of language and tribe languages.

112. In setting out the discovery we said at the same time that Reality is the never-closed set of all and any things passed (for only the past is known and real is only what is or can be known, what is or can be spoken of) and that Reality, while it is sinking into the unknown, is also acquiring new facts that become such upon entering it; which already seems to suggest that the dynamics of the relation between the real and the other implies a dynamics within Reality, which has to be reorganised “wholly” time and again as new elements enter it.

113. It is, however, important to note here, between the two senses of the relationship of the real to the non-real, a radical difference in respect of (dis)continuity: for the first sense, the one of the loss of reality in what is not known (since it has not passed) refers to something truly continuous and, hence, inconceivable (intimate and necessary to any real being is, not the *horror vacui*, but the *horror continui),* a true time, having no measure and one sole sense, which, being

unopposed to any contrary, is not, really, any sense at all, and which is passing now, what, seeing that NOW is in turn ungraspable, unideatable, does not allow it any occasion for cuts or intervals; but the reverse sense of the dynamics or dialectic, that of the defence and reconstitution of Reality, requires an entry juncture or step (we would say, without being too foolish, "of identification" or "of baptism") for the new elements coming from the endless to become known and real `things´, which rules out without more ado a true continuity, so that we will keep on saying that the process is taking place constantly or perpetually, but taking care to prevent that from meaning "continuously": since the first thing that occurs there is the conversion of NOW into succeeding `moments´, thus inaugurating real, discontinuous Time with (being as it is ideatable) two arrows of sense, which will be the very foundation of the things and events internal to Reality.

114. Now, this obliges us to admit the notion of `momentary states´: the referred-to step consisting of succeeding entries and the realisation or falsification of NOW as `moments´ already presents reality to us as consisting in a motion or change between things, only that with the marvellous condition imposed upon us by discontinuity: that such change needed by reality to sustain itself must occur by successive and momentary (a `moment´ being the minimum of real Time admissible as a stretch or section) `states´ (without a stop, no ideation of things is possible), in such a way that, seeing that no observation or measurement of a thing or phenomenon is possible other than by taking it in two of its `states´, it is already understood that the `motion´ of change of one thing or, if the thing or fact is localisable, of translation is nothing but an appearance (and, for the case of theoretical observers, interpretation) of the gap or distance between the two `states´.

115. By the way, the notion of `state´ or `system's state´, which has become of customary use in Physics, designating each of the determinable positions or conditions of a system (the body of yore), partly coincides with the one I present here; and the case of the entangled state of "two" (for instance, photons), in both its appearances in Physics and information technology, may serve as an illustration of that condition, as necessary as contradictory, for all things and events of reality of going through `momentary states´.

116. Well, this condition, which strikes as absurd or impossible in the case of the things happening, turns inevitable and distinct if we refer it to the language which

is saying, among other things, precisely that. Of course, true language is speaking now, and seeing that NOW is not anything real, thus it turns out that common and true language does not appear itself ever but realising (and falsifying) itself in tribe languages; but, already within reality, one has to admit, as it was distinctly and even graphically represented to me already in the first volume of *Del lenguaje*, a crossing of two modes of Time that cut each other neatly, the Time in which it is spoken and the historical Time in which a language evolves and changes its grammar, both of which cannot coincide at all: no-one can speak in the Time of History (only the dead are there, and we make ourselves an idea of their `epochs´ owing to their being passed and known), and during the Time of speaking nothing can change in the apparatus of language, which has to remain identical to itself in the meantime, as only thus can it serve as a trustworthy code for more or less lengthy communication. This is what accounts precisely for the notion of `moment´ and that of `momentary state´: since language, indeed, goes through `moments´ in each of which NOW realises (and paralyses) itself, and through `states of language´ in each of which nothing passes in the apparatus, so that the `evolution´ or `motion´ of language is, for the historical observer, a mere construction of the passage from one `state´ to another.

117. More precisely, the statification or annulment of time takes place in several levels that I have called `simultaneity blocks´ *(bloques de simultaneidad)*, some being properly grammatical, as the ones of `sentence´ , `syntagmatic word´, `grammatical syllable´, in the languages that know it, and `phoneme´, while others are `of a wider wave´, where the permanence or state is no longer directly governed by the grammar of the language. But it is not so relevant here to dwell on these details, and for those purposes I refer to the afore-mentioned book, *Del lenguaje.* In any event, we may refer the precise notion of `moment´ to the `minimum block´, which is that of production of a (segmental) phoneme, seeing that possible analyses, as those that have been done, of the `phoneme´ in `traits´ no longer have anything to do with the stoppage of production in a `moment´ or `state´.

118. Naturally, all stoppages, statifications, simultaneities, blocks and moments are properly conventional, as befits the very condition of `language´: below, the endless and continuous time keeps fleeing and any `moment´ dissolving in an inconceivable NOW. However, this should not deter the readers from using these linguistic considerations to understand reality: for, as I warned before and will continue to warn, the conventionality of language should not be but a case of a `conventionality´ (we may thus call the mechanisms of `defence´ from loss in the endless) that is informing reality itself.

119. On the other hand, the crossing of the Time of speech production with the Time of language change, which are in principle alien to each other, could not fail

to show, in the very diagram I used to represent it in *Del lenguaje* p. 99, a cutting or crossing point between one and the other: that `point´, which is purely geometric and may not refer to any real Time whatsoever, we may, however, take it as indicating something that affects the constitution of real Time (hence, of Reality itself) and is important for better understanding it: to wit, that in the `moments´ (and, in general, `simultaneity blocks´) of production Time is suspended, and it is only the linking of `moments´ in a chain what is construed, and created really, as process or motion, the one of the real Time of speech or production, and, it may well be said, the one of life, the one counted in seconds and minutes; that is not the real Time of History, where no-one speaks and languages evolve or, rather, suffer changes to their apparatus; but I understand the point where one and the other Time cross in the sense that the immediate institution of a real Time, by linking in a chain the `moments´ (and other larger `blocks´) of production, gives rise to the institution-- when language no longer speaks but is being spoken of, turned into an `object´ or `thing´ of reality, and through ideation of `pasts´ and their chaining together again construed as `evolution´ or `change´ (a `motion´ where nothing moves and nothing happens, since it is past)-- of a real Time of a higher order, which is not the one of speech and life, but the Time of History.

120. The difference between one and the other Time, of course, is not quantitative: apart from the grammatically-governed `blockages´ required for interlocution, their maximum being the `sentence´, a more vague necessity is imposed of maintaining the apparatus for social communication, to such extent, for instance, that a message, whatever its length may be, recorded in official contemporary Spanish five years ago can be heard again today without the slightest change in grammar being noticed, and, nevertheless, reflecting upon the case one will first of all think that, in spite of those conventions of blockage and stoppage of Time by `moments´, language must have been changing in the meantime, and thereupon, carried by the `infinitesimal calling´ that seems inherent in realist ideations, one will attribute the change to a continuous series of imperceptible alterations that, added like negligible amounts in an integration, have ended up producing perceptible transformations in language. Which is vanity: for no thing can really happen either during the `moments´ of temporal annulment or in the connection between them, as of links in a chain. The difference between one and the other Time, so clear-cut that it has allowed us to speak of its crossing, is that of being as if in two planes of reality, which, in the particular case of people of human speech, correspond to a separation between `conscious´ and `sub-conscious´: the system changes among speakers not while they are speaking (there they are too busy dealing with realities other than their language) but in the other real Time, the non-personal or sub-conscious, where an accumulation of options and decisions by an assembly of countless people on their own language results in the (never continuous) transformations or mutations of a language and its grammar; and it is in that sub-conscious operation and in the `moments´ of that historical Time, alien to the conversation between speakers, where the, realist, historian of languages should locate, if he can, the mechanism of changes.

121. For our own purposes here, what I just tried to formulate concerning language, the institution and annulment of real Time in the `moments´ of production in speech and the `states´ passed through by the system in its historic mutation, should be transferred without more ado to Reality, the problem of its discontinuity and the apparent `motion´ of its things in a real Time that is founded upon the `momentary states´ which Reality has to pass through in the perpetual defence of its constitution. For the question of *lógos* and that of *phýsis* have to be recognised as being inseparable; and reason or language, when it speaks of itself, may not but declare its own contradiction, according to what can be heard from the remains of Heraclitus' book: "all things being produced according to this reason…" (language, being realised in the vocabularies of tribe languages, constituting Reality; fr. 1) versus (frs. 40, 108 D-K) "of all those whose reasons I have heard no-one gets to the point of recognising that the intelligent is separate from all things": language, intelligent or discoverer, without and alien to Reality, inasmuch as the speaker cannot ever be, at the same time, what he speaks of.

122. Think, in passing, about the trap laid by evil-minded historians of thought, who wanted to get rid of Heraclitus by attributing him a faith or doctrine of `motion´ or flux, opposing it, for greater tranquillity, to Parmenides, who would sustain another one of the `state´ or `eternal permanence´. It's just as well we are still capable here to put the lie to the manipulations made by these adjusters of thought to reality, who are threatened by reason in fr. 13 (28 D-K), as I had to restitute it partly: "the most creditable of those credited [with knowing, only one thing knows: of what he] knows [not,] being on guard. And, nevertheless, Justice will also apprehend the fabricators and witnesses of falsehoods", most likely referring to what we discover here of the `need for defence´ (that is, `falsification´) of Reality itself and, within it, of Philosophy or Science.

123. I trust that this referral to the study of what happens with languages may have assisted in specifying the discovery, to which we were led by reality itself, of `moment´ and `state´ (and `momentary states´) as constitutive of real, discontinuous Time (where the time in which Reality is sinking, continuous and endless in truth, is realised and falsified), which thus consists, in different and crossable levels of realisation, of `moments´, being the realisation and falsification of NOW, inconceivable, and `epochs´ resulting from the gap or distance between `states´, which is, in turn, taken as `motion´ or evolving sequence.

But note that the very term ποχή initially had a meaning of `stoppage´ or `suspension´ of (it has to be understood) Time.

124. Still, however, the dynamic appearance (and interpretation) of relations between `moments´ and between `states´ as `motion´ or `evolution´ seems to me to be impossible to be understood of itself as "connatural" with reality itself, and this again leads me to think that, although the reasons given already unveil the foundation of Reality in the discontinuity of its things or events, that is to say, the institution of real Time with its `moments´, `epochs´ or `states´, where nothing happens nor may anything at all happen in truth (and only this has given it its two arrows of sense, as the left/right in a space, so that the future may there be shown as passed), nevertheless, the appearance of continuous motion (or change) under which that presents itself and is received has to come to Reality from outside; that is to say, while the discontinuous constitution by `momentary states´ is directly due, as we have seen in the diagram, to the constant or perpetual (but not continuous) entry of things or events into reality, on the other hand, the appearance of continuous motion has to be due to the primordial dynamics of Reality falling endlessly in its unknowingness, so that the motion and change within Reality and its things would be imitating or taming the true time of the fall, continuous (thus ruling out any

computation of speed) and with one sole sense, which, being unopposed to any other, is not in reality any sense at all. This I have to take it as applicable to all and any forms of `motion´ between things (and between `moments´) and interactions, not only including `universal gravitation´ but the latter being perhaps the first thing that has to appear as a reduction of the time of true fall to reality. The fact is that taking the l e a p s from `moment´ to `moment´ or from `state´ to `state´ as a continuity is an obligation for real beings (and for their science), although it is, naturally, a false continuity, imitative of the true one: since, were they not to be taken thus, the interval between `moment´ and `moment´ would open as an abyss of incalculable extension or duration, so that the untamed, unreal continuity would threaten to introduce itself "transversally" into reality. This may be how the *horror continui* imposes, in an apparent paradox, the conventional, fallacious admission of continuity in the stretches or lapses of reality.

125. If I continue mixing Grammar and Physics, this may be better understood by means of a reflection upon language and certain mechanisms of its tribal appearances related to `localisation´ issues. It is obvious for anyone that one cannot truly say "I am silent" or "I am dead" or "I am crossing the finishing line" or "So-and-so treads on the finishing line at this very instant" or "I am kissing you" or "You are biting my tongue" or, without any need to resort to so blatant examples, that one cannot in truth use what in some languages, as this one, is called a Present claiming that it refers, in reality, to NOW, which is alien to any reality; but, at the same time, it is necessary for the speakers, real as they are, to believe that it is possible and they are doing it: only thus, what in truth is happening to them and they are incapable of conceiving is assimilated by them to their own reality and reduced, as a "real Present" or "moment", to the line of real Time that has ended up being their lives.

126. More particularly, certain languages as these, the Romance, have a device, that used to be called Past Imperfect at schools, which, as I explained it in the dialogs *Del lenguaje III* and in *Contra el Tiempo*, consists in that, when a predication in the past is made (the only of which predications can be made: of facts, of reality), instead of making it directly, it is made by an imaginary transposition to the past of the act of saying it in the Present: "Estaba pisando la raya" (Sp. for "He was treading on the line") = "(Dije en ese momento) `Está pisando la raya´ ["(I said at that moment) `He is treading on the line´"]; "Me había muerto" ("I had died") = "(Al momento pensé) `Me he muerto´ y me di por muerto" ["(Thereupon I thought) `I have died´ and took myself for dead"]; "La estaba besando" ("I was kissing her") = "(Me dije) `La estoy besando´" ["(I said to

myself) `I am kissing her´"]; "Me mordías la lengua" ("You were biting my tongue") = "(Quise decirte) `Estás mordiéndome la lengua´, pero no pude" ["(I wanted to tell you) `You are biting my tongue´, but I couldn't"], etc., in such a way that it may be seen how NOW, of which nothing can be said, has become `one moment´, spatial, real, in the line of Time, a `Present of the Past´, about which, being passed and real, nothing prevents anything from being said.

127. However, the case of the Present index is nothing but one of the demonstrative or deictic indices that can be found, with idiomatic differences, in every language. Since, what we are saying of the whole (never closed) set of Reality as being forced to go through `states´, changing to be the same, has repercussions on each of its `things´, the latter likewise obeying the law of `existence´, which consists in having to be what they are and never being able to be it entirely, and hence they have to be changing constantly to be the same,

like, in the semantic vocabulary of a language, the insecurity (and defence) of its never-closed set impacts upon the meaning of each of the words included in it, that suffer likewise a perpetual insecurity and need for definition, to which they aspire, in vain, through the mutations from one to another state of language,

and likewise, as far as quantifiers are concerned, just like Reality cannot be `all ´ or `whole´ nor any precise number, one cannot be precisely `one´ (not even properly `two´, which implies `three´), but the ideals of being all or whole and being one are informing their realities. However, besides ideas and quantification, inseparable constituents of reality, there is `localisation´ (for which the demonstrative indices of vulgar languages are used), and there the question of `locality´ and, hence, translation `motion´ presents, for Reality in general and for `things´ or elements, this difference: that Reality has nowhere to be, since the endless is no place (and that is why the only mode of relation that remained available to Reality was falling or getting lost in it), while `things´, manifold and separate, have to manage to position (and move) themselves with respect not only to each other but ultimately to the `field´ determined by the very act of speaking of or dealing with them, the `world in which´ (it is spoken), as opposed to the `world of which´ (it is spoken), which evidently cannot be one and the same, bringing forward interesting, grammatical and physical, problems.

128. First of all, a split between the language of Physics and vulgar languages: the need for the language of Physics to be a mathematical one (at least for the essential formulations of laws or relationships between elements) is rather telling:

for a peculiar trait of Mathematics (so obvious as not to be usually noticed) is the exclusion from it of the use of deictics, that is, of references to the act of production of its own formulae, in such a way that the treatment of its `objects´ and the syntax of its formulations only play with `meanings´ (properly speaking only when it is in the service of a Physics referring to `things´) and `quantification´ (whose indices, `numbers´, become in turn `objects´ and acquire a certain `meaning´), while vulgar languages are constantly alternating semantic mentions with localisers as `here´, `there´, `you´, `me´, `mine´, `today´, `now´ (and `Present´ indices), or also (with the simultaneous inclusion of a "generic semanteme") `this´, `those´, `that´, `she´ and even, in the languages having one, the Determinant Article, as `the´. Which means that, while semantic vocables and things of Reality are, on the one hand, constantly trying to settle their being or identity (through the contradictory means of being one different from the others and belonging to a class, family or type where all are the same), on the other, they are constantly trying to establish or position themselves not only (syntactically) by relation to others, but with respect to the `field´ being determined by current production.

129. Therefore, to understand where those indices point at is also most likely of interest for Physics (and its `locality´ issues), which, having to use, as noticed, a mathematical language, one lacking deictics, cannot enter directly that interplay with the `field´ of production.

130. Certainly, it is useless to replace that interplay of vulgar demonstratives by a reference, in a mathematical system, to `possible worlds´, in the manner attempted by Montague for the formalisation of the English language, or otherwise: for possibilities are, in truth, endless (and thus they put the lie to Power and fanciful `beings in potency´), but, as I tried to reason it in *Contra el Tiempo*, Harangue and 9th Attack, as soon as they become ideas of `the possible´ and, for example, `set of possible worlds´ or `future facts´, they turn semantic and realist (with their corresponding numbers in probability calculus) and are no longer useful for this attempt.

131. Likewise in Philosophy, when its language finally acquires a demonstrative term, as in the exemplary case of *Dasein*, in the same way such attempt, born as it was from an honest and well-aimed tendency, is impaired by the fact of its being immediately "substantivated", that is, its no longer pointing at the field `in which´ to become another thing `of which´ it is spoken. And, without a doubt, the failure or assimilation to reality of psychoanalysis consists in that deictics are similarly "substantivated", while they were trying to point at somewhere outside the semantic reality, and thus `the I´ (or `the ego´, for more daintiness) or, as a counterpart, `the it´, can no longer harm (dis-solution, dis-covery) anybody, but rather force me to proclaim time and again, against the

mistake, “I am not the I”, “The I is not ME”.

132. How, then, is that `field´ or `world in which´ where demonstrative indices operate? The first thing to do is recognise that speech production is just as real as any other physical process (whose condition of `motion´ is what we are asking ourselves about) and, therefore, that `field´ cannot help being real, though it is so certainly in a peculiar manner, due precisely to what `localisers´ may add to the mere semantic and quantitative reality: but we also find that in their operation an attempt (necessarily bound to fail) is being made at positioning reality outside itself, that is, at maintaining the difference (fundamental for the logic of reality and for all Physics) between `thing´ and `place´: as if the primary, sub-real intention of indices as `here´, `now´, `I´ were to position things or meanings with respect to unreal “points” as HERE, NOW or ME, to wit: to the endless where Reality is sinking and to the true, continuous, time of its loss, but the real condition of elocution or production immediately obliges to replace HERE, which is not any place, by a region, more or less extensive and vague, as the one surrounding, in real space, the act where “here” was said, to replace ME, no-one really, by one real who said it, and NOW by a `moment´ or, even more, a `momentary state´. That is how the `field´ of deixis appears as reduced to real, but at the same time as animated by an attempt to point at the truth, strange and contrary to the ideas of reality, of what is happening, and thus, I trust, the notion of `positioned reality´ acquires a clear sense, reconciling the real (semantic, quantitative) condition with the allusion to or influx from what is happening outside Reality.

It can be said of SOMETHING that THERE IS and that it lies HERE NOW because SOMETHING, like HERE and NOW, is not anything real; but for a rose to be lying here now it is required, first, that it exists, and then it cannot be NOW anymore, since NOW does not exist.

133. Some (and perhaps a lot) of this can be transferred without more ado to the issues concerning the position or (non)locality of elements in the realities of Physics. It seems that the very research finds that it is impossible for “a thing” (body, particle, photon) to be, at the same time, determined in itself (“semantically”) by its properties and their quantity (matter, mass, impetus, charge, force), and positioned not just relatively to other `things´ (including `the observer´) by “syntactic” relations, but in the `space´ or `time-space´ or, rather, in the `field´ that is determined by, and in turn determines, the activities and relationships of the `thing´ itself, which is what comes closer, in reality and physical theory, to the `world in which´ discovered by the

deictics of languages and Grammar as Pragmatics.

134. I can only glimpse or hint at whatever the Uncertainty Principle, enunciated as being impossible, at the same time, to know (observe, measure) the `impetus´ of an element (the momentum, where its `dynamic power´ and its `mass´ are already duly included) and its localisation in any type of field, may have to do with this; likewise the correspondence with the issues of localisation (or simultaneous double localisation or non-localisation) of quantum elements: and, certainly, I do not have available the means or the ability to formulate more precisely such connection between the issues. But maybe this warning on how, in Grammar and Physics alike, the opposition appears of the (approximative) definition of the `thing´ by its properties and quantities to its (approximative) definition by position (its `point´ or `trajectory") within a `field´ established by the act producing it as such `thing´ (the `motion´ it requires to subsist) may prompt others, more learned and skilful, to reformulate (non)locality and other related issues more precisely and, at the same time, more "from outside".

135. As for the manners in which the physical question of `continuity/discontinuity" has obliged the mathematical language itself to develop computation procedures aimed at dealing with infinitesimals or "negligible" differences and make them crop out, from their direct incognoscibility, by summation or integration, to the level of the visible or measurable, with the consequent success of the computation in its physical and technical applications, I already discussed those developments of calculus and infinity and the continuous function in *Contra el Tiempo*, 2nd-3rd and 12th-13th attacks, and I should not stop here to repeat or correct such discussions of the evolution of Mathematics.

136. What I wished and have tried to show clearly here is that `motion´ (and with it the plurality of `things´), being illusory, albeit with an illusion necessary and constitutive of reality, c a n n o t be understood within Reality

(where `understood´ does not mean `explained´ but rather `discovered´),

and thus I take the history, already long (only relatively so, for the measure of a human life), of the manifold failures, disappointments and disputes among physical theories, as suggesting that, if that cannot be, it is not due to the imperfection, always progressable, of the means and the talents, but for a deeper reason that has to do with the relationship between reality and what, being there, does not exist. Physical

processes may be described and the relations among ones and the others or how ones become the others be explained, but all of that is done taking for granted the very principle of `motion´; and, when the latter is questioned, the reason for it can only come from outside Reality, from the dynamics or dialectic I try to discover between reality and that where it is getting lost.

137. It is, therefore, important for our purpose to study the `impossibles´ that Science has to introduce and, at the same time, to declare, more or less explicitly, that they are not given in reality. The first of them is the `endless´, whose presence is so apparent (however inconceivable it may be) inasmuch as it is nothing but the negation (or declaration as `absurd´ or `contradictory in itself´) of the contrary hypothesis or belief that "it has an end" or "it is all" or, already against grammar, "there is all". And, on the other hand, no Science of Reality can make a step without ad-mitting or intro-ducing infinitude (`infinite´, `infinitesimal´), naturally, by turning it into a `thing´ or `idea´, by making it conceivable, manageable, integrable (as a `sum of infinitesimals´), and, finally, a `set´ or `whole´; what amounts to the same as the need for `limit´, which cannot help being acknowledged as unattainable, though, being `infinitely approximable´, it is taken as a real substitute for the endless.

138. Like `impossibles´ for a Physics (and any Philosophy or Science of Reality) are ME, NOW, HERE, as I pointed out before in respect of the mathematical language of Science: the presence of ME NOW HERE is equally immediate, irrefutable, and my or their reality is or are equally impossible, and I am or THEY are unmanageable for a Physics that, to deal with ME or with this what there is HERE and NOW, has no alternative but turn us into realities, as `the observer´ (or `the subject´), `the place´ or `the moment´. However, it is telling to see how physical investigation itself must have run into the issues of `singularity´ that could not but be raised to it, in spite of the evidence that `singularity´, for instance, `one (sole) electron ´, is beyond the reach of any Science or Philosophy. Thus, the purely ideal or geometric idea of `point´, entirely alien to any possible, theoretical or experimental, realisation, had to be introduced in turn and unveil its endlessly problematic condition.

139. There follow, in another order of `impossibles´, those we have already mentioned as `ideal entities´, which cannot directly be `things´ but are necessarily sustaining the `being´ or faith of `things´, as a condition or part of their `existence´.

They are, above all, geometric entities such as `straight line´ (and `point´ born from the crossing of two straight lines), totally alien to reality but showing well the need for `ideas´ suffered by Reality for its very constitution, that is, the ideal condition of Reality. I have already raised in passing, §§ 34-35, the ideas of `body at rest´ and `uniform straight-line motion´, acknowledged to be irrealisable (a consistent Relativity has to rule out any absolute `rest´ and discover, for any real trajectory, including, as foremost example, that of `light´, the need for `curvature´) but nevertheless required by the Science of Reality to account, based on them, for the phenomena of `strength´ versus `inertia´ and those pertaining to relative `velocities´ and `acceleration´.

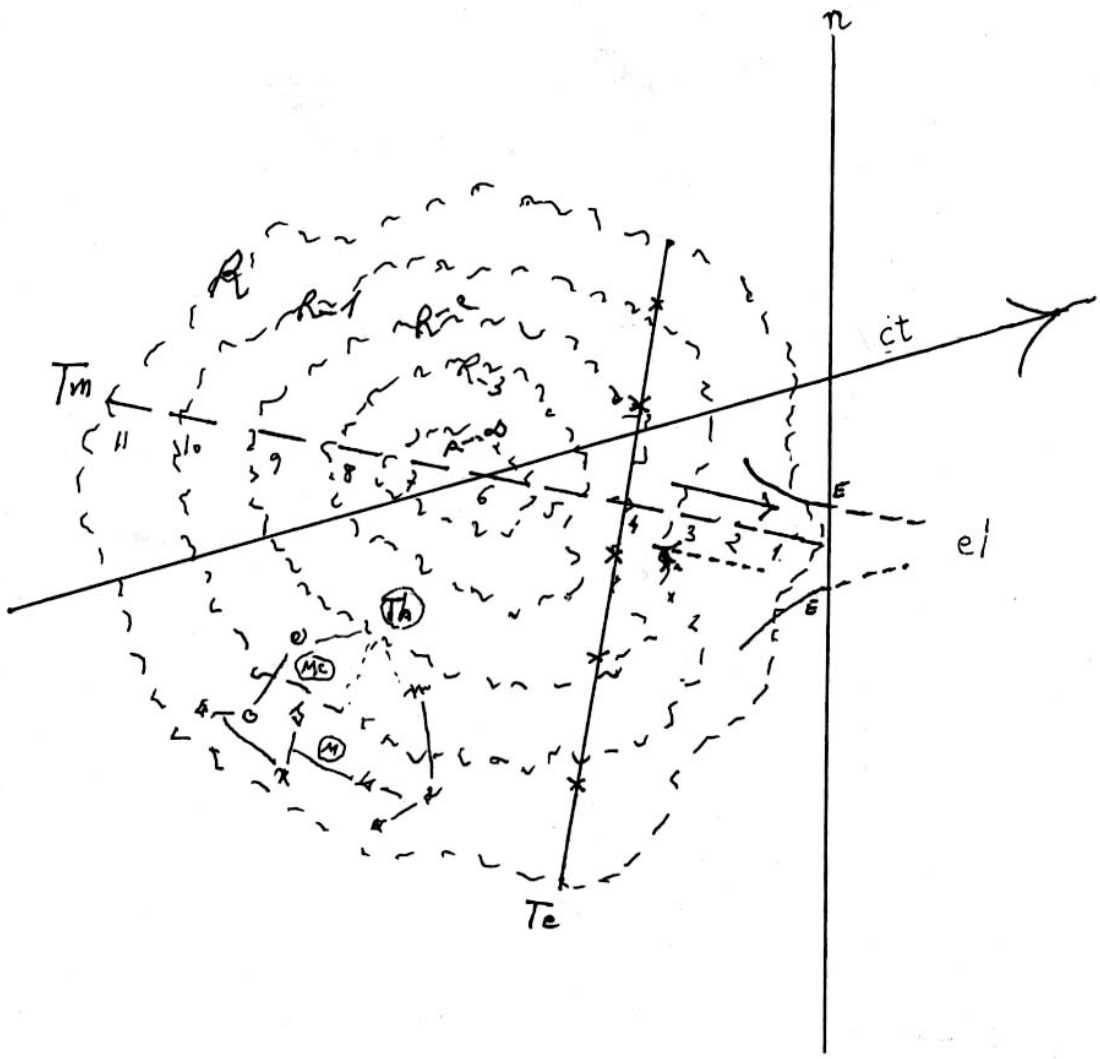
140. Another one of these ideal entities, related to the subject now discussed, is the *`perpetuum mobile´*, which may have been agitating the brains of physicists and laymen alike always but acquired a clear (negative) presence upon the establishment of the Laws of Thermodynamics; which laws declare it irrealisable as being a machine that would derive from its operation the energy to continue performing its work without any external contribution (against the 1st Law) or, which turns out to be the same, with one sole domain of acquisition (against the 2nd), but, thereby, implicitly declare the need for that ideal of the *`perpetuum mobile´* for them to be formulated and to account for the phenomena, by attributing to physical causes, that is, to causes internal to Reality, an impossibility which no doubt lies in the very constitution of Reality.

141. Finally, with the study of these ideals irrealisable but necessary for the constitution itself of Reality and the Science trying to explain it, one discovers that, as we already anticipated in § 87, the very idea of `motion´ is not itself real (nor measurable or countable)—it is another `impossible´ in reality, but necessary as such an idea for Reality, for the realisation of its phenomena and `things´. This is what moves us (in my feel, also necessarily, with another necessity) to discover the reason for real motions (among other physical `phenomena´, magnetic `attraction/repulsion´, the contradictory constitution of `body´ as `wave/particle´, the `velocity of light´ and, below all of them, `universal gravitation´) in something from outside Reality, which cannot be but the relationship of Reality to the other, the dynamics or dialectic of what there is, endless, with the existing.

142. That such a thing can be done (in other words, its not being forbidden

beforehand by any human or divine law) without it being nonsensical to enunciate the relation of the real, false, with the possible, inconceivable, is the possibility which opens simply upon recognising that the common reason or language that does or may do it is, as is stated in the fragments by Heraclitus recalled in § 121, within and without Reality at the same time. Certainly, that requires an agreement or convention with the audience or readership, to the point of accepting, as a way of understanding, not only to speak of what cannot be spoken of (the endless or ME or NOW or true time), only to, on the spot, retract what was said, but even, all that being unideatable as it is, to figure it, in contrast to the ideatable and real, by lines and a drawing that erases itself as it is being drawn.

143. This is how, now, by way of summary, I will come again on the graph I allowed myself to use in order to present the discovery, adding certain details on the sense in which the indications given on `motion´, `real Time´ and `things´ should be taken:



NON-REPRESENTABLE:

el the endless
ct continuous time, that of the fall of R into el
n now

REPRESENTABLE:

R Reality, in its latest `state´ until now
R - 1, R - 2, R - 3… prior `states´ of reality, comprised in R (R - ∞ as a joke for mathematicians)

Th `things´, manifold (represented by a few), multi-shaped, imperfect

M relation between `things´, interpreted as `motion´

Mc rel. between `things´ from succeeding `states´ of reality, interpreted as `change´

E enters from the el something which is realised (and named) as `things´ constantly

1 – 2 – 3 … succeeding `moments´ of Tm, starting from this, `1´, in which `n´ turns into `a moment´

Tm real Time, discontinuous, interpreted as continuous, of `moments´, provided with 2 arrows of opposing senses

Te second real Time, of epochs, crossing with Tm at each `moment´ (here drawn for `moment´ 4), as another plane of reality, that corresponding to R - 1, R - 2, R - 3, …

144. Let us give further details concerning `T´, since we say real Time is the very foundation of Reality. `Tm´ is in truth discontinuous, as is imposed by the fact that the entry (acquisition, creation) of new things has to occur by successive, constant, non-continuous `acts of creation´, and the first occurrence in that process is

the conversion of `n´ into `a moment´; but at the same time `Tm´ has to claim to be, present itself as, continuous, for the simple reason that, otherwise, the gap between successive moments would open an abyss in reality which would disintegrate it, would break the necessary illusion constituting it. This false and necessary continuity of `Tm´ has to be understood as an insinuation or influx from `tc´ in Reality, which (let us not forget it), being "porous" or never totally closed as it is, is constantly threatened by the truth from outside, by the discovery of its falsity.

The claim or appearance of continuity is taken, first, as in respect of `us´, in the sense of a conscious or ideative interpretation in `things´ provided with consciousness and with ideation in the manner of human language or reason; however, `man´ not being but a case among `things´, it is clear that, what we call in our terms `claim´, `appearance´, `interpretation´, pertains to the constitution of the `things´ or `facts´ of reality itself.

145. `Tm´ has been allotted two arrows of opposing senses: one goes from `moment 1´ or present, that is, the last reduction of `n´ to `moment´, toward succeeding previous `moments´ (what, already fully introduced in real Time, which requires reducing the `el´ possibility to ideatable `futures´, turns into `going from futures to pasts´), and that is the only sense in which real processes actually occur and may properly be computed and recorded; but, in turn, `T´ needs (in order to be real as a `space´ with its `right/left´ opposition) the claim or ideal of an opposing sense, according to which "we go toward the Future" (to wit, toward the reduction of more `el´ possibilities to new `moments´ or nowadays), a sense that somehow "imitates" and falsifies, within Reality, the true time of the fall of the real into the discovery of its unknowingness; and it is this sense, purely ideal or "geometric" (as no real being may pass from having passed to not having passed), what, however, with the customary paradox, assures its reality, by contraposition, to the real sense. But this mechanism will appear more clear upon entering the other plane of Time, `Te´.

146. Indeed, also "present" at each `moment´ of `Tm´, as if on a transverse plane, is the joint Reality of the succeeding past realities R-1, R-2, R-3, …, that is, the `Te´ or plane of the `epochs´ or `states´ through which Reality has passed, more or less distant (this not meaning necessarily, however, more "blurred" or less "present") from the `state´ corresponding to that `moment´.

Once again, if this is taken, as is more immediate, for `us´, the conscious or ideative in the manner of men, it appears as images of Time, epochs of History (or album of private or family

memories, or phases of Prehistory, or geological eras, or even theories on the Universe), but that is not but a case and mode of what I am saying, which must apply to any `things´ whatsoever as they maintain likewise, at each moment they pass through, a permanence of their pasts, of which phenomena as the strata in a rock or the growth rings in a tree are perhaps not all too unsuitable images to help us understand.

147. Well, then, imagining now the line of `Te´ as a mirror plane laid across the road of `Tm´ may provide useful suggestions on the two opposing senses of real Time: the "mirror" of each `moment´ is moving away from the one in which it was `moment 1´, and thus it follows, as any `thing´, the really real sense of Time, of conversion of `nowadays´ into pasts, but at the same time it reflects the steps in the "road", gone through in the order `m1-m2-m3-m4´, and reflects them, naturally, in reverse order, `m4-m3-m2-m1´, which presents the reverse sense (not traversable really) of `T´ from the past to nowadays and, by consequent and false ideation, toward the `el´ possibilities reduced to futures; and maybe this imagination is not too deceiving to suggest to us the ideal, illusory but necessary condition of the sense of `T´ through which we are supposed to be going, with Reality, from the Past toward the Future.

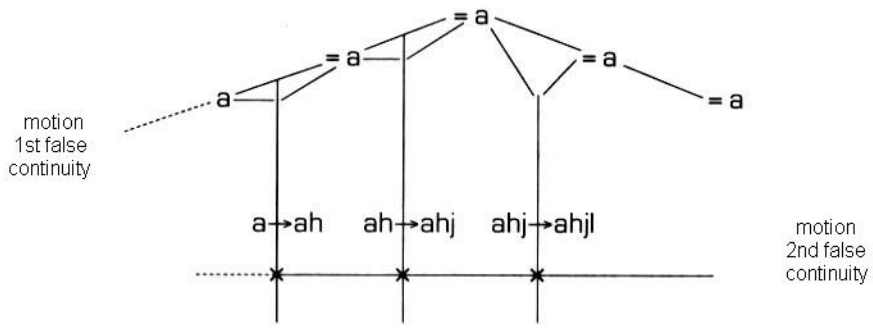
148. Still, finally, after having recapitulated and renewed in diagram the gist of what I discover and say, certain reflections on it come to my mind that may help precise the sense of the discovery. One has to do with the fact that, when discussing `motion´ and the issues it engenders to Physics, I have been treating `change´ and `translation´ as cases of `motion´ in general, almost as one who believed in space-time and that the change in a thing is also a translation in the 4th dimension or Time. But those are imageries of scientists and laymen alike, and a distinction is due to be made between both real illusions, that of `motion´ (of place ) and that of `change´ (of being).

149. The Uncertainty Principle, at which I already hinted timidly in § 134 as revealing the contradictions inherent in reality, appears to me now as one of those finds that, though obtained in the investigation of quantum and sub-real entities, can in truth be generalised outside the quanta and be referred to any `things´ whatsoever: one cannot at the same time know what a thing is (its `distinctive essence´, its `own power´) and where it lies: for, in reality, only `motion´, supposedly continuous and hence excluding all `lying´, is proof of its identity, of its being the same here and there, in one or another `point´ of its path. However, that proof of identity is plainly false, since it is also known (and it is also real) that, while it moves, it is changing,

as, in the brilliant pages of A. Machado *Juan de Mairena* XXI, the pupil opposes such considerations made by Mairena in agreement with his master, Abel Martín, by presenting the example of the orange rolling and being peeled off as it rolls, or in quantum theory the spin of an element brings forth, by its own mutation, the very identity enabling it to account for its motion with respect to others, thus reproducing what in astronomic Physics was the `rotation on itself´, of the Earth, for instance, being involved in its translation over the field, where I think that, without such change or perpetual alteration of the star itself, no motion through the sky could be imagined,

and besides, it cannot be changing with the same (though false, but real) continuity it is moving with.

150. This is where the function of the scheme of the two real (and false, inasmuch as they claim to be continuous) Times should be found, that is, the Time of `moments´ and that of `states´ of reality at each moment, which give rise to `epochs´ and `evolution´ in their sequence: for this, ultimately, should refer to the very opposition and relation between both phantasms of reality, `motion´ (of translation) and `change´, as per the following diagram:



151. While it moves, `a´ does not change: that is what sustains its identity, and with it the illusion of continuity of the first real Time; but, being in truth discontinuous, in the cracks or breaks between its `moments´ occurs, on another plane of reality, its alteration, a→ah→ahj …, also discontinuous in truth as is shown by that notation by accumulation of discrete mutations, but which, considered in its sequence, may, not so necessarily, give an illusion of `continuous evolution´.

The difference between both planes of reality is well exemplified with the case, referred to in §§116-120, of the Time of speech as opposed to the Time of change in a language's grammar. It can be noticed clearly there that the motion of speech takes place at the level of the conscious and voluntary, where interlocutors give heed to the `sense´ of the sentences; the change, meanwhile, occurs at the subconscious level, where the innumerous community makes decisions on conveniences for altering the apparatus. This difference, mutatis mutandis, should be generalised to the planes of motion of and change in any things whatsoever.

152. With this, finally, we have to come back to the constitution of Reality in numberless `things´ and their mutual relationships. For, just like no straight-line trajectory can be given, truly, in reality but the (geometric) ideal of `straight line´ is necessary to maintain, together with that of `(continuous) motion´, the constitution of Reality in `things´ which are, albeit innumerable, multiple and distinct, thus, in the same way, the ideal of `cause´ is belied: for common sense dictates that endless

causes are no `cause´, and the idea of `causation´ demands the arrangement, again in `straight line´, between one thing and another. And this implies too that (using a, perchance, casual coincidence in Romance languages, with the passage from learned to vulgar vocabulary from Lat. *causa* to Sp. *cosa*, etc.) endless things are no `thing´.

153. So that, swapping now (in accordance with the views of Mach, Barbour and other physicists) `causes´ for `relations´, thus eliminating or belying real Time itself with its 2 senses, which would be that of `cause → effect´ (`efficient cause´) and that of `effect → cause´ (`final cause´), it turns out that, on the "map" of relationships which the ideation of Reality has become for us, it must be thought, no doubt, that relationships have to be between a[illegible]l a n d a n y `things´ forming part of Reality; and this requires an immediate clarification.

154. For, Reality being, like each `momentary state´ of reality that it passes through, what we call or, rather, undefine as a `non-closed set´, which is constantly denying the mention `all´ or `whole´ (mere ideal necessary for the constitution or falsification of Reality, just like `nothing´), that type of quantification `all and any´ requires a clear understanding that we may only obtain by introducing in it `eventuality´, that is to say that what it means is `all things being or as may be (realised) ´, so that the apparent computation by addition termed as `all´ is not, itself, but an endless process, depending on `what happens or is happening´, and better said in the Eventual Mode, `what may happen or be happening´, and the very series of ("natural") numbers may never be an N or `all´, as its infinitude is nothing but the fact that its sequential presence depends on the eventual realisation of the computation of more and more `things´.

155. For the Future, whose idea is constitutive of real Time and Reality, is not in itself anything real: there are no real `facts´ other than those passed, and only of them do predications make sense: the rest are not but predictions or computations whose success is always dependent upon what may happen.

VIII

156. Now, after having busied ourselves with the issues of physical or inhuman reality, leaving so many of them unsettled, it may be appropriate to turn to ascertain somewhat how these discoveries impact upon social or personal reality; which, as we anticipated in chapter II, although it is claimed by scientific and philosophic ideation to be secondary or emergent from natural or material reality, is clearly the first, inasmuch as the laws governing the behaviour of supposedly inanimate and unconscious things are there sustaining the laws of governments, subjects and properties, which are the first to be written, so that also, the other way around, an undeceived examination of the latter, more immediate and manifest as they are, may enkindle or inspire somehow the study of so-called physical or natural things.

I do not forget how, in a book I used as a child, physiology, the functions of body organs, was explained to me by a constant metaphor or reference to social realities, industries, governments, factories and army of a well-constituted nation.

157. What we usually say to denunciate the false division between one and another reality, that "Wherever there is one atom, there I am", should be understood with this precision: `one atom´ (being known, I suppose, that the term *individuum* was first used, at least already in Cicero, to translate *átomos*, and only after that it began to be used for social atoms, though slipping away in one and the other use from the negative meaning of `indivisible´ to the positive of `one´ or `unitary entity´) duly alludes to the twofold and contrary condition required by the individual or atom to be real, that of being one (unique, singular, distinct from any other, unrepeatable) and that of being one of a number, that is, of belonging to a class of things where all of them, albeit being each one different and singular, are also the same.

158. The sole difference between the two sorts of individuals would be that the personal ones signal their singular condition by the institution of Proper Nouns,

I, myself, for instance, Agustín García Calvo, with personal identity document no. 11,517,014, am the only one with such designation or, if it is inadequate, the policeman assures me that my fingerprints are absolutely unrepeatable, while, in neat contradiction, the very number of my document is declaring to me that I am one of a number, the same as any other one and only thus

computable as a soul of a number of souls,

while, on the other hand, physical atoms do not seem to know such institution; though I understand that in certain investigations, albeit computing as a whole is done using certain or probable numbers, it is required that the elements be labelled, and already the Axiom of Choice itself is introducing in Sets, which, ultimately, have to account for physical atoms, something resembling the Proper Nouns of personal ones.

Furthermore, the institution of Proper Nouns, place names or personal names (as to which I here refer to the dialogs *Del lenguaje* I and III), is a more "primitive" procedure than that of meaning (and the semantic vocabularies of languages) to fix the identity in defence against motion and change.

159. But that twofold and contradictory condition of the individual or atom refers only, of course, to the real ones: if we proceed to strip ourselves of that garment, in truth,

(as we usually recall of the uncertain child placed by his parents before the mirror to learn to recognise himself and see how good-looking he is, who remained muttering in an undertone "but I am not that one" or "but that one is not me"),

I am not either one and singular nor one of a number, for I depend on the act of being saying or thinking it, and thus no-one can signify, name or count ME, either as an element of a set or as a set of one sole element.

160. Certainly telling is Cartesius' fancy with the "C*ogito, ergo sum"* (or, in a more blatantly realist version, *"ergo, exsisto"*), which would only make sense if thinking or saying it had become as real as what is being said, and then it could no longer give, from outside, any evidence or proof whatsoever of existence or reality; in such a way that what A. Machado jokingly attributed to who knows what philosophiser, "Already one thought / `Cogito ergo nón sum´. / What an exaggeration!", is not an exaggeration at all, but pure, unbridled logic.

161. And it is the case that, as sometimes occurs, scientific research, against its calling of service to Order, cannot help running into the discovery of the plot: thus, the disintegration of the `atom´,

not the traditional atom any more, which was duly disintegrated a century ago, but any successor type of `atom´, of `indivisible´ or `primary element´, such as an `electron´ or other

`corpuscle´, which is forced to face the discovery of its contradiction in having to be alternatively `wave´ and `particle´, `continuous´ and `discontinuous´, up until the `light quantum´ or `photon´, which, for the same reason, has to end up dancing in the doubt of whether to lie at a place or at two places at the same time, at the risk of its entity or its very identity,

is a logical process (of logic invading reality) that should lead to discover and state what I am stating here; and, as far as the individual or personal atom is concerned, it is clear that to the physical disintegration corresponds, in a certain parallel and even contemporariness, the psycho-analysis or art of dissolution of the soul, which, by unveiling to one the contradictory components of his person, turns out to discover, at least in a glimpse (as long as it is not interpreted and tamed in the realist and therapeutic manner), the falsity (owing to its very claim of truth) of individual reality.

162. Furthermore, it will also be appropriate to reason here how what has been discovered for `things´ or physical reality impacts upon one, upon the personal individual, to wit: reality is nothing but what has passed and only thus can it be the object of knowing (knowledge, ideation, theory, realist computation); reality passes through `moments´ and, at the same time, it has to link them together in an (impossible) continuity; reality is (or sees) at each `moment´ a `state´ but, upon considering succeeding `states´, it has to take them as an (impossible) continuity of `change´ to continue being the same one; meanwhile, in truth, now, reality is falling, in a true (inconceivable) continuity, into the endless of its unknowingness, and, contrariwise and in defence from it, it is constantly being realised by acquiring `things´ or `facts´ which were not such until they were realised. Well, then, the consequences of such findings in one cannot help being contrary among each other, some of them from their reality, others from truth, that is, from the discovery of their falsity: so one of us becomes one upon being realised (before that, he was not but ME, which was not anyone, but an endless) and, already as real, moves by moments, though in apparent continuity, to be the same one here and there, and changes to continue being the same one from `state´ to `state´ of reality (from birthday to birthday, for example); he suspects or discovers that none of that is true, that the truth is that he is sinking ceaselessly nowhere he knows; but he has to defend himself (his existence is at stake there), and Reality takes him in her bosom, helps him to be the one he is and have faith in himself (and in her), allots him, in the never-closed set, his own position, and tries and have him accept the necessary contradiction of being unique and being one of a number without realising the inconvenience. And, as far as the matter of Time is concerned, which is the foundation of reality, while he, from

below himself, feels that what's happening is that the endless possibilities are being closed to him in fixed and past realities, from above he believes that, the other way around, he goes in real Time advancing toward the Future: he doesn't want to know what his heart is intimating to him, that the end is the start: that one is realised through his death sentence; which, for `mortals´ (that is, those who know their death), is nothing but the Future, and from the Future one enters real Time, the very institution of reality and, in its purest form, of money. As for ME, on the other hand, not having to exist, I never die.

163. Finally, it may be that some of the readers, very real ones, like myself, wounded by the discovery, turn to ask themselves, as is usually done at such passes, obedient, being real as we are, to the Future: What to do with this? What, then, has to be done? Fortunately, those fatiguing (idiotic, but constitutive) chains of Ethic or Moral or future regulation of one's conduct are clearly and easily enough rid of here in one go with this simple disjunctive:

164. If the point is realising yourself (living your life, achieving your aspirations, succeeding in your loves or businesses, having your needs covered, ensuring your future, enjoying the fair fruit of your labours, being admired or envied by your brethren, saving your soul, or in any other of the thousand manners in which that is customarily said), then the way is straight and clear, and you only have to do as you are told: take care of your health and keep in shape; found a home and bring up your children well; see the State as an equitable and good-willing father, thinking that, if the chains pinch you, things would be worse without them; find a job and earn money, according to your abilities, and consider that Banks have their capital placed in your interests; be ambitious and bold in your undertakings, but either in accordance with the Law or, if necessary, under the more subtle laws there are to get around the Law; if you deem that the State and Capital that were your lot are unfair, exploiting and mean, fight to change them, but always in a positive and realist manner, so that your revolt will turn out to produce, as far as possible, a more satisfactory order and hereafter; enjoy the palaces, yachts and airplanes, or simply the little flat, television and slippers that Fortune allotted you, but don't forget to attend, if not a Church, some sort of spiritual guide that may maintain alive your faith in the ultimate sense of your life and the world's; and, first and foremost, maintain always the faith in yourself, without ever letting the doubts foray you as to what are you doing here or who are you;

165. however, if that is not the point …

IX

166. Finally, if now, from the Person, claimed to be singular, we enter to find out what happens with `people´, with the `commoners´, or likewise with `us´ or with `Man´, and how what is discovered of physical or general reality has to impact upon our ideas on and dealings with `ourselves´, the first thing to do will be to come again on what I had to anticipate already before presenting the discovery, especially in chap. II and § 71: that human reality should not be understood but as yet another case of reality (one of the numberless forms or dialects in which Reality is constituted and defends itself from the revelation of its falsity), if we wish to get rid of the serious handicap of Man's having to be the measure of all things and, hence, incapable, by the very interposition of his own reality, of discovering and saying something true (that is, undeceived) about Reality, save if, by virtue of the imperfection or incongruity of his very constitution, Man (and one of `us´) turns out to slip away from himself and get lost in the common with the other things.

167. Any vision of the `human´ and, hence, any political action cannot help gaining true efficacy and undeception the more distant it is, considering it from the clouds, from the equally fleeing galaxies, and from even more far away, as if entangled and fluctuating in the jungle of things, in such a way that that ill-fated distinction between a humanistic and a scientific vision may forever sink in the garbage dump. And let it well be felt that even `our´ most defining feature, that of being `mortals´, that is, `those who know their death´ (beforehand, of course), cannot but be `our´, peculiar, manner of taking the general war of Reality against the truth where it gets lost.

168. For, otherwise, all that talk about `human´ or `humanistic´ is nothing but a way to say `patriotic´ and is bound to the same servitude and falsity of all patriotisms. And, as I already warned (§ 18), any realist politics, considered to be "within the possible" (as if one had counted the endless possibilities beforehand), cannot help doing but what is already done, that is, contribute to what Reality does in its own defence, which is changing to remain the same. And likewise, the other way around, a realist Science of Reality cannot help contributing to the defence and, therefore, the falsification.

169. For Physics is, by force, Politics: if it is a Physics or Science (or, which is the same for their times, Philosophy or Theology) devoted to explaining and, hence, justifying and defending Reality, and hence, making it progress, it does politics coincident with that of politicians, Money and the State, who will consequently subsidise it unsparingly: if it is not so, at least not entirely so, by researching into and discovering the contradictions of Reality, it also does politics, the contrary one, the one of common sense and nonconforming people.

170. In order to make this clear it seems appropriate to resort to what we found out concerning real Time (§§ 144-155), as to `moments´ and `(momentary) states of reality´. To wit, that the Regime, the one who orders and dominates mortal populations, is the same always (that is, from the start of History and Writing some 10,000 years ago, which is the only we properly and directly know of `us´, of which we are conscious, since it speaks to us through the signs it has left), and the present Regime, the one contemporary of our persons and the only one they in fact suffer and are ruled by, is nothing but the re-presentative of the general Regime, the one corresponding to the last `state´ of reality, which we described in the manner of a map re-presenting all and any regimes and realities as there may have been (for reality is what has passed, and nothing is ever erased entirely), recorded in History chronicles and books or, what is tantamount, in the daily television report on the most recent and almost contemporary facts, that is (for NOW is never reached in reality), those of the immediately preceding `moment´, known and dead as they are just like those of the most remote History.

171. So the present Regime is the only one immediately real but contains in it, as in a vision, “all” prior `epochs´, historically justifying and sustaining this present Regime and, hence, promising to it a Future as historic and known as the Past, while this what’s happening is not in truth any `epoch´ whatsoever, but the Regime has, as a governmental requirement, a need to impose upon its people the idea or faith in that they are, indeed, living in an `epoch´, and that therefore, given that only the dead live in `epochs´, nothing very special is happening.

172. Well, then, this Regime in which “all” are inscribed and known, being the last and the culmination of progress as it is, had to be of the type which, with a very popularised name inherited from the ancient, is called Democracy, a name that reveals already in its composition, by a malicious hap, the falsity of the compromise:

for *krátos*, `force´ or `power´, is exerted over something or someone; and, if `democracy´ is wished to be understood as the `power of the folk´ (with *dêmos* meaning something like `country and people from the country´), a power exerted by the folk, whom is that power or force exerted over?, or will it be that, the governing lot likewise being people, they will turn out to be no other than the governed? While anyone with common sense suspects and feels that terms such as `people´ or `folk´, after looking in vain for a positive definition of their meaning, end up being clearly defined only as `what is not Power´, that is, `what Power is exerted over´.

173. The undeceived truth is that the funny thing that remains about `people´ or `folk´, in spite of all of that, is being undefined pluralities, never to be defined with certainty and, hence, uncountable, irreducible to a certain and fixed number.

The Lat. *populus*, a word strange to the regular formation on a standard Indo-European `root ´ (a strangeness which is well maintained in It. *popolo*, less so in Sp. *pueblo*, with the corresponding Germanic words, Eng. *folk*, Ger. *Volk,* being more assimilated to the rule), sounds for the same reason so persuasively onomatopoetic that I cannot help thinking it is a variant of *poopulus*, the name of poplars, and that it appeared initially to designate the bustle of people upon meeting at some square or field without much subjection to order; as for *puublicus*, which ended up functioning more or less as the corresponding adjective, it must have appeared by conflation of the standard derivate, which appears in arch. Lat. *poplico*, with another one derived from *puubees*, which, far from designating something as indefinite as `people´, meant all of those (males) having reached the `age of consent´ and able, therefore, for the army and vote.

174. As for how may the folk be uncountable, this is understood without more ado by recalling any informal assembly where people are entering and exiting continuously, so that somehow there is an assembly though the attendants are never the same,

like (being also a `human´ example of it) we have shown that Reality itself is a non-closed set, just as the vocabulary of semantic Words in a language, where new elements are constantly entering and altering, in consequence, the meanings of words and `things´.

175. Well, then, there lies precisely the fundamental artifice of democracy: all State or organisation of territory and populations “from above” has to try and reduce the people to closed set and number: the effort made by our old Empires, Egiptian, Chinese, Babylonian or Roman ones, to keep (and write) an exact account of their subjects (like of their head of cattle or the enemies killed or taken in battle) reveals

well such need; but the present Regime of the "first world", democratic as no other, has brought the process to perfection: for, in order to ban once and for all any intimation or whim of undefined folk and obtain (in its illusion or ideal goal) the final reduction of any remains of folk to a precise and recorded number of subjects of each Sate, it had to resort to a Set Theory that starts from `unit´ to understand `number´, and thus it laid down as the fundamental principle or Article of Faith that of the faith in the Individual, and it turns out that we call democracy each one's being free to do as he likes (choose a future, decide, vote, sell, buy, even offend, always within the, likewise defined and counted, possibilities), to such extent that the original folk has ended up becoming Individual (and Set of Individuals), which was precisely the opposite,

in parallel to (and as an example of) how Physics, being in need of accounting for this innumerable shambles of what's happening, cannot but end up finding the `atom´ or `physical individual´, which, after all of its transformations and refinements, is still the necessary point or fulcrum in default of which neither the `cause´ (and real Time) nor the very explanation would have where to stand.

176. Since this is the point: that `private´ or `personal´ is the opposite of `public´ or `common´, while all democracy is founded upon a desire to erase such opposition and establish a fallacious compromise (with the `lion's share´ falling to the `person´) which in truth makes no sense and cannot be done.

I am playing with terms or notions that already interplayed with one another, in a most brilliant way, in Heraclitus' book: *ídios* (`personal´, `private´, `singular´, `own´, though the root hardly allows its being referred to *sw-, whence Sp. `suyo´, `his, hers, theirs´), is the principal term and the one condemned by reason, inasmuch as that is what prevents one from thinking with common sense or reason, each one's failure to see or understand what's happening but having to believe he does (fr. 11, 17 D-K), and thus it is opposed to *xunós* (probably a derivate of the same word as the preposition *xùn* `with´), which is simply `common´ ("common to all is thinking", fr. 2, 113 D-K), but also *koinós* `public, communal´, if only for its being opposed to `private´, may be accepted as meaning `common´: "and therefore the public has to be followed: for common is he who is public; but, reason being common, most live as if they had a private knowledge or thought of their own" (fr. 4, 2 D-K); and note how `*hoi polloí´*, `the majority´, the substitute for `folk´ in Democracy, is made up of private individuals each one of whom believes to know. It is important, finally, to follow the learned derivate *idioota* as it penetrated popular uses, where the `simple individual of a population, with no other distinction, honour or title´ naturally ended up becoming an idiot, thus revealing something of what the folk, from below, feels about this matter. A similar

fate has been, in their passing to popular Spanish usage, that of the learned words `individuo´ (`individual´) and `sujeto ´ (`subject´).

177. It is, therefore, an essential function of Power to confuse and try to reduce the vague notion of `folk´ to an allegedly closed and computable set consisting of nothing but personal individuals, while here, with any remnants we have of folk and common reason, we say that folk is what remains of a population after individuals have been removed,

as someone put it nostalgically "Seville without Sevillians!", or as was reasoned by an Andalusian peasant in reply to some landlord's complaint "Don't you see, Don Jorge, that each one is each one and has to do his eachony?",

giving voice to the denial to knowing who or how many we are, or to anyone's fully knowing who he is or how much he counts. Of course, to use that word, *folk*, in the absence of another one, sometimes we have to supplement it immediately and say `non-existing-folk´ (which there is, for Reality is not all there is, though it does not exist), so as to avoid being entangled by politicians or philosophers and reintegrated into the same confusion.

178. Furthermore, sensitive evidence is readily available, almost in any event one may look at, of how `Regime´ is tirelessly opposed to `folk´ and how the progress of the Regime toward its never-attainable goal or ideal involves impairing and deadening (never in whole or finally) whatever there is of folk among `us´: for instance, the imposition, since more or less a century ago, of Democracy as the only normal type, or realist ideal, of Regime has been coincident with the drying-up and almost death of the flow of traditions of oral, anonymous, song or poetry, only culturally preserved by writing or recording, which happened more or less a century ago. And note how the learned always consider impossible that there may be or have ever been something as a truly anonymous and popular (not "collective" nor "choral" either) creation, and they have to think of individuals, even if "lost in the rabble", whose names only haphazardly failed to be recorded, as the authors of traditional songs, dramas, ballads or epics: to such extent the idea of personal creation (without which the important business of Copyrights could no be maintained), the idea of the `Creator´, has taken hold of the souls.

179. Do not forget at this juncture that reality consists in, and is founded first and foremost (the end being first) upon, the ideation and taming of the time-that-is-not-known as real and linear Time, for which purpose it is necessary to have an empty time where nothing has happened, that is, the faith in Future. And, just like

when dealing with physical reality I talked about the constant realisation of NOW in `moments´, as far as the lives of human atoms are concerned the task is to replace lives with their futures: for the lives that have been lived are something too confusing and embroiled, crowded with indecisions, doubts whether it was or not, and, more than anything else, vague but living memories, so as to be directly capable of rule and order: the procedure will, hence, be to determine and compute the non-lived, the future (easily, since it is a pure ideal line, clean of indecisive emotions or vague memories, hence Faith's proper field, defined only by its end: each one's ever-future death), and only from there establish also a past reduced to mere history (not now anymore real and known in itself, as are all `things´ past, but rather known and real in each one's consciousness and faith), a history as consistent and empty as a future turned the other way around, if Power were ever to attain (never) the death of all memories; and it is on that line, finally, where a point of origin has to be established, one's date of birth, while the truth (that keeps whispering from below) is that one was not born (neither so in any point of real Time) but came to be who he is only by virtue of his end, at the `moment´ of being informed of his death sentence and admitting it.

180. "Our life is time already", as was stated by Antonio Machado, who likewise, rebelling against History, once proclaimed "neither the morrow –nor the yore—is written" with good reason: for only after the future has been written will the past remain written, reduced to mere History. And it is easy to understand how Science, in the service of Reality, has come to recognise more and more that its sole method to know `what's happening´ (in reality what has happened, as nobody can know `what's happening´) consists in succeeding at forecasting what will happen, taking probabilities for certainty; just like, in the end, already the prophets in the service of (and occasionally to reprimand) the kings of Israel founded History (of the `chosen people´), Writing, upon the foresight and threat of the hereafter. And it is thus how, with the customary turning of truth the other way around, we are offered time and again, from schools and books to television news, History, the old `epochs´ or this very morning's events, as a lesson and master for "future life" (that is, death), while, on the contrary, it is the Faith in the Future what turns what was happening unknown into mere, known or believed, History.

181. Well, then, given that reality is grounded upon the future, it is of gross logic that Power, in progressing toward the ideal of total democracy and pure futureness, had to end up coinciding with the progress of Money, which, in its constant yearning for purification and immaterialness, turned out to consist in pure numbers (anything counted with numbers is, in the end, money), in such a way that, "upon the completion of times" (a mere ideal to which, however, the present

`moment´ offers us the maximum approximation), State and Capital, that is, Power or being-in-potency and Money reduced to faith or credit, to pure futureness, had to end up being mixed-up in one and the same.

The identification is such that it is scarcely worth searching for examples to illustrate it: the executives of Government are identical to those of Banks or Business, and the mere thought of a politician's ability to lift a finger that would hamper the doings of Capital in the least (for instance to stop the avalanche of Automobiles or suppress Television from the world) is nothing but dreams for general entertainment.

182. For it is a fact that sensitive and palpable things, just like the impersonal memories of people, are always too vague or ill-defined and rich in impertinent smacks to be capable of being managed them from a Centre and in the high numbers required by Capital; but, if all of them are equally converted into money, which is thing of things and reality of realities, then the management of things (purchase, sale, taxes, budgets and other procedures to change one for the other to remain the same) turns to be extremely straightforward, successful and promising, and together with things, of course, persons, their hours of work and regulated entertainment, their prostitution in diverse terms and markets.

183. Nor is it needed to insist a lot upon showing how things are money, how the sale-and-purchase process, far from transferring them unharmed from hand to hand, gradually converts them with that movement into money or pure `thing´, so that any remains they might have of vague odours and flavours or rumours whispering from below reality (either the bouquet of a wine or the genius of an artist, classic or avant-garde alike) operate now as simple pretexts, "natural" and sensitive, for valuation and exchange, investment and movement of Capital.

184. This reduction of (possible) life to (certain) future in which the current Regime consists does nothing but repeat (progressing it) what Religion used to do by means of the promise of Eternal Glory in the old Regime; against which Don Miguel de Unamuno rebelled in that sonnet I dare to reproduce here with some slight changes, which I trust would be not harshly censured by him but rather taken as an exercise of faithfulness:

Ye, days of yore, that in oblivion's chain
are carrying my treasure to the stars,
will you not join in the celestial choir
that is to sing by my eternal nest?

Oh, Lord of Life, I do not ask
but that the past I'm longing for today
by coming back to me in laugh and cry
may take away my crave for the lost good.

I do not yearn for living a new life
but living once again the one I lived:
toward an endless yore do make me soar

in flight bound not to ever reach the start.
For, Lord, another heaven you don't have
that may fulfil the measure of my lack.

6 I'm longing for today: for which I cry 7 by coming back : once more in laugh and cry : turned voice 8 take away my crave for : give me the solace of 9-10 : I yearn to live again what I once lived and not to live anew another life 11 endless yore : yore eternal 12 soar : start 14 lack : bliss

185. It was always annoying and troublesome for Power, for the fulfilment of its goal and its ideal, to be forced to handle the vague and diffuse lives of people, always bursting with impertinent, popping thoughts, indecisions and doubts, inklings from the subconscious of smacks of undefined folk: but, if lives are turned into futures, that is, into death, and populations are reduced to sets, ideally closed, where each atom is certain of himself, knows who he is and where he is, then everything becomes manageable and computable, a task with no complications other than those that may be solved by a good computer. Thus the Apparatus itself comes to prove right the locution we use habitually to designate the function of the State-Capital: death management.

186. In sum, they have changed our life into existence, a life no-one knows what it was into existence known to be what it is; and that means at the same time that they have changed our thought into faith. It is likewise of gross logic that Power, after having progressively abandoned rougher procedures of domination, such as the killings of youngsters in intertribal wars for the definition or border of each homeland or the aspirations to central censorship to condemn any heretic or nonconforming thought sticking out through the chinks, had to end up, State and Capital teaming together, devoting its attention and principal investments to Culture, that is, the swap of living word for writing, with its trivial image or computer science developments: art and literature for the entertainment and training of the souls, and first and foremost Science, to defend from ever-blooming doubts the faith in reality and, hence, reality itself, which, lacking faith, could not stand for even a moment, and thus, like the old Theology of yore, to convince everybody that they know who they are and what awaits them.

187. Against that, the only thing this what remains of folk in us can say is NO: belie time and again social or personal reality, and the physical one sustaining it; which is what precisely here we have been clumsily saying, that is reasoning, that is doing.

APPENDIX

ON THEORY/REALITY, INFORMATION/PHYSICS, RELATIVITY/QUANTA, MEASUREMENT, PROBABILITIES

1 Paul Benioff "Language is physical" arXiv:quant-ph/0210211 v1 31 Oct. 2002

Attempts and confusions revealing the relationship of language to things.
P. 3 MN: It is seen that *`language´* is the productions (all) of language, and the condition of `abstract´ is suppressed.—From `There is language because there are models "representing" it´ (i.e. there are physical realisations of language, as in the production of rhythmical or tonal patterns)´ the transition is made to `Language is physical´. `Language´'s being also mathematical is a simple reversion of mathematics' being also language (though necessarily written!).

P. 4 MN: It is clearly seen how `language´ consists in the preservation of a sentence at the expense of more or less time (depending on the length of the sentence).

P. 6 MN: Passing from `language´ to "intelligent beings" (thereby implying that atoms do not

speak).

P. 9 MN: But, if there are `mathematical theories´ comparable to `physical theories´, mathematics no longer is the language of Physics.

2 Joy Christian "Why the quantum must yield to gravity" in Craig Callender & Nick Hugett (comp.) *Physics Meet Philosophy at the Planck Scale. Contemporary Theories in Quantum Gravity.* Cambridge 2001.

_____
MN = my note

Pp. 336-37 (concluding remarks): "…reflecting on this domain, I completely share Penrose´s sentiments that ```our present picture of physical reality, particularly in relation to the nature of *time*, is due for a grand shake up´´´ [1989] (Similar sentiments, arrived at from quite a different direction, are also expressed by Shimony, 1998). The incompatibility between the fundamental principles of our two most basic theories -- general relativity and quantum mechanics-- is so severe that the unflinching orthodox view maintaining a *status quo* for quantum superpositions-- including at such a special scale as the Planck scale-- is truly baffling. As brought out in several of the chapters in this book, and elaborated on by myself in Section 143, the conflict between the two fundamental theories has primarily to do with the axiomatically presupposed fixed causal structure underlying quantum dynamics, and the meaninglessness of such a fixed, non dynamical, background causal structure in the general-relativistic picture of the world. "

3 Jean Schneider `Quantum measurement act as a speech-act´ arXiv:quant-ph/0504199 26 Apr. 2005.

P. 490: `1´ versus `quantum´ (with probability calculus, i.e. approximation).

P. 492: "J.-S. Bell was well aware of all these difficulties when he wrote his paper `Against measurement´ (1990) where he proposed to replace observables by `beables´". MN: The hybrid *`be´* and *`-able´* reveals the unbridgeable contradiction of `entities´ (with a set and units) with `probabilities´ (realisation of endless possibilities); `observables´ is linked to `measurement´ (computation) of beings, elements of sets, but it can d e a l w i t h possibilities, with a true infinitude.

P. 493: "… a measurement is thus not a physical interaction (i.e. described by a Hamiltonian) between two systems (described by state vectors), but an```interaction´´´ between language (discourse) and a perception".—"The measurement act has more precisely the

structure of a *declaration.* The question whether this process is of psychological nature or takes place in some mind is not relevant. A semantic process is exterior to any individual, it is existing only as shared by the community of locutors and in this sense is objective. It just takes place in a symbolic universe, the universe of discourse in which all physicists live. /…/ It is not the ```consciousness´´´ of the observer which operates the state vector collapse, as was proposed by London and Bauer. It is the result of an impersonal, non psychological but empirically ascertainable, production of a *signifier* which exists only as shared by the community of physicists".

P. 494: Compares with the creation of `guilty´ in the trial act.—"the result of a measurement has no

other cause than itself, it is its own cause. It is in this respect that there is no quantum causality". —"…*auto-productive* nature of a *signifier*": MN: I.e. the possibility for language to turn back on its own products with no (grammatical) limit.—More on this at pp. 495-97.

MN: What a pity that "symbols" also have to be treated as if they were things. Recall the opposition `acts of language / apparatus´ (of a language).

4 Carlo Rovelli `Incerto tempore, incertisque loci<s>´: Can we compute the exact time at which a quantum measurement happens?´ arXiv:quant-ph/9802020 v3 13 Mar. 1998.

P. 5: "… I think that within most, if not all, interpretations, there is always a point in which we have to jump from the statement that something *may* happen with probability *p*, to the statement that something, in some appropriate sense, *has* happened. Otherwise, what is that distinguishes the (probabilistic) *predications* we *make* from the (non-probabilistic) *data* we *have* about the world, on which those predictions are based?".—In note: "A coherent way of avoiding this problem" (MN: That, even if in QM there is a wish to free the measurement from a "special moment" when it is made, it always appears in interpretations, if only in a hidden manner) "is to

relegate it to a still to be discovered theory of consciousness, as David Mermin [`What is Quantum Mechanics Trying to Tell Us?´ quant-ph/9801057] has recently, coherently, suggested (on a related vein, see S. Saunders [`Time, Quantum Mechanics and Decoherence´ *Synthese* CII, 1995, 235-66]). Short of this noble and courageous declaration of failure, we may purge quantum mech. from the expression `measurement´, pleasing Bell [J.-S. Bell `Against measurement´], but the mystery posed by these `special moments´, whether we call them measurements, quantum events, or otherwise, or we refuse to name them, remains. Talking about their timing, as I have attempted here, is an indirect way of addressing the issue."

MN: Recall `time in which it is spoken/time of which it is spoken´.

5 Wojsciech Hubert Zurek ` Probabilities from entanglement, Born's rule $p_k=|\psi_k|^2$ from envariance´ arXiv:quant-ph/0405161 7 Feb. 2005.

On `ignorance/information´, *`states´* and *`entangled states´*: Probabilities reflect the `system´´s `state´ and do not depend on whether one is more or less ignorant. MN: Attempts to reduce the computation dealing with quantum objects to `real condition´, `object´.

6 Ulrich Mohrhoff `Probabilities from envariance?´ arXiv:quant-ph/0401180 v1 29 Jan. 2004 (on a prior version of W.H. Zurek's proposal)

Discusses Zurek's attempt to derivate Born's rule directly from "an ontological no-collapse interpretation of quantum states" and warns that "…the reason why all attempts to do this have so far failed is that quantum states are fundamentally algorithms for computing correlations between possible measurement outcomes, rather than evolving ontological states."

7 Id. `This elusive objective existence´ arXiv:quant-ph/0401179 v1 29 Jan 2004.

P. 2: "… any statement purporting to address the relation of the mathematical formalism to the physical world is by nature philosophical. "/…/"…quantum mechanics encapsulates correlation laws, and the link between the formalism and the real world in measurement outcomes: they are (1) the correlata required by the formalism and (2) real."

P. 3: Its being “a probability algorithm does not imply that quantum mech. is concerned with states of knowledge rather than states of Nature.” MN: Naturally, the mistake persists of separating `existence (of the thing)´ from `idea (of the thing)´, which occurs not in “Nature” but, indeed, in Reality. However, this is accurate (p. 7): “…treating possible outcomes as actually existing is simply a category mistake. Possibilities just aren’t actualities.” P. 9: “…the distinction that we make between ```inside *V´´´* and ```outside *V´´´* is *a distinction that the electron does not make*.”

8 Elemér E. Rosinger `George Boole and the Bell inequalities´ arXiv:quant-ph/0406004 1 Jun. 2004.

P. 3: “…one can nevertheless obtain the respective inequalities through purely mathematical argument, and *without* any physical considerations involved, yet they turn out even to be testable *empirically*. And in a surprising manner, they fail tests which are of a quantum mechanical nature. And this failure is both on theoretical and empirical level.”

P. 4: `hidden variables´ is what Quant. Theory lacks to be deterministic and causal.

MN to p. 14 *in fine*: The contradiction involved by gravitation with the law of separation of beings, independent in Space, has to be an indication that there are no independent beings in truth, but rather

they owe their independent entity to names, to reality.—The `unique case´ of non-local, not-diminishing-with-distance, effect would rather be the appearance of the not-true-separation of beings in Space and with Time.

9 D.M. Appleby `Facts, values and quanta´ arXiv:quant-ph/0402015 v1 3 Feb. 2004.

`epistemic´ versus `physical probability´.

Against the frequentist interpr.

`facts´ (yes/no) versus probabilities. MN: But also facts are such, `facts´, with more or less probability.—“if it were tossed” / “if it had been tossed” (stated from the end). Finite reality / infinity (MN: Where neither probabilities nor real facts).

MN: Incompatibility of `fact´ with `possibilities´: if it has happened, it is no longer possible.

Argum. predicting `future facts´ / retrodicting the basis for the prediction.

P. 8 `grue´ (mix of *`green´* and *`blue´*) before and after *t*: introduces time into the thing.

P. 9: “…the ensemble qui consists of all the throws”, MN: Ensemble of possibilities, impossible.

P. 11: Quotation from Wittgenstein, who starting from 1930 decided to use *`grammar´* instead of *`logic´*. And note 7: Against the `objective/subjective´ opposition, “potentially very misleading”. MN: Subject and object are realities: the calculation, *lógos,* is not.

P. 17: Probability of probabilities (prob. for the `heads/tails´ probability to be exact. MN: That, for He who knows

all probabilities as realised!)
P. 19: `singular event´, Proper Noun [MN: point at which (any) one becomes one=1, and spoils the

calculation].

P. 21: Alice someone / anyone Alice.

P. 22: Negation and Verb Tense. Note 13 on the trivial case where from the fact that *x* occurred it is deduced that *x was* not impossible, or where from its non-occurrence one deduces that *x was* not certain.

P. 27: Qualities (versus quantities), `a quale´, the case of colours.

10 Michael P. Frank `Energy as Computing´ arXiv:quant-ph/0409056 9 Sep. 2004.

(Sum.) gives definitions "… for the total amount of change along any continuous trajectory of a time-dependent quantum state vector" and "the amount of physical/computational ```effort´´´ required to carry out a given unitary transformation…" "The minimum effort required to carry out various types of quantum and classical logic operations is explored."

Id. "On the Interpretation of Energy as the Rate of Quantum Computation" arXiv:quant-ph/0409056 v4 13 Jul. 2005.

P.1 (of the summary): "…to think about physics itself in computational terms" /…/ "…energy as in fact *being* the speed at which a physical system is ```computing´´´, in some appropriate sense of the word /…/ (Hamiltonian energy, area swept out corresponding to the action of the ham. operator along the trajectory) "we can also consider it to be a measure of the ```amount of computational effort exerted´´´ by the system."

11 Radhakrishnan Srnivasan `Logical analysis of the Bohr Complementary Principle in Afshar´s experiment under the
N(on-Aristotelian)F(initary)L(ogic) interpretation´ arXiv:quant-ph/0504115 v1 15 Apr. 2005.
82

superposed states, photon following two trajectories at the same time, logical (i.e. semantic and syntactic) contradiction of quanta.

12 Karl Svozil `Against contextuality, for context translation´ arXiv:quant-ph/0406014.

That the counterfactual argument is still used time and again, and things such as `contextuality´ arise from the assumption that "elements of physical reality exist independent of their actual measurements" (from the summary). Q measurements need a "single context": otherwise, whether they can be translated to another one is problematic.

Reference to "scholastic speculations about the existence of `infuturabilities´ (or, more profanely, counterfactuals), i.e. to whether the omniscience (comprehensive knowledge) of God extends to events which would have occurred if something had happened which did not happen."

P. 3 MN: Reality is possibilities converted into futures: what is excluded from the computation of eventualities remains outside R. and not even God, with His omniscience, can know it.

P. 5: Knowledge of the singular /…/ counterfactual deduction of all the rest not determined by that singularity.

13 Gordon McCabe `Universe creation on a computer´ arXiv:physics/051116 13 Nov. 2005.

The metaphysical as existent; (series of) universes, `one´ as a brain with its view of its universe.

In face of F.J. Tipler's hypothesis `The omega point as *eschaton*: answers to Pannenberg's question for scientists´ *Zygon* XXIV (1989), *The physics of immortality* London 1995, he believes from it arise

`testable´ assertions, and thus belies the assumption that, our universe being like a digital "computer" operating in another one (and another one…), one could not know if `one´ is in this one, is part of this one.

14 Alexis Grinbaum *Le rôle de l´information dans la théorie quantique* (Ph.D. Dissertation) arXiv:quant-ph/0410071 11 Oct. 2004.

Information – Physical theory; `relations´; problem of measurement; application / interpretation; (suppression of) Time.

P. XII : "toutes les présuppositions ontologiques sont étrangères à la théorie quantique, qui est, en soi, une pure épistémologie. La th.q. comme th. de l´information doit être débarrassée des présupposés réalistes, qui ne doivent leur existence qu´à préjugés et croyances individuelles des physiciens, ... "

P. XIII: "Comment est-ce que cela résout le problème de la mesure ? La réponse est que notre approche ne résout pas, mais dissout le problème" / dissolution, at pp. 17-18/

Pp. 9-10: The public understands better "that at high velocities unusual effects occur or that black holes absorb matter and light"/ (these things come from Relativity)/ "than that the very notions of velocity, position, particle or wave must be questioned".

"Working applications and problems of interpretation"/of Q.T./ "have long been isolated from each other".

P. 35: Quotes Jean Ullmo: in modern physical theory "L'idéal axiomatique, emprunté à la géometrie, revient à définir tous les ```objets´´´ initiaux d´une théorie uniquement par des *relations*, nullement par des qualités substantielles".

P. 101, quoting Rovelli: (according to Heisenberg's stance) "quantum mechanics can be represented as *timeless*" (if one wants to speak about time, it has to "emerge" independently).

And chap. 8 § 5 "Non-fundamental role of spacetime", pp. 146 *et seq.*

15 Tommaso Toffoli `Maxwell´s demon, the Turing machine and Jaynes´ robot´, review of E.T. Jaynes *Probability Theory –The Logic of Science* Cambridge 2003 ArXiv:math.Ho/0410411.

Probabilities – induction/deduction.

16 Armond Dwell `Quantum information does not exist´ *Studies of History and Philosophy of Modern Physics* (Univ. of Pittsburgh) XXXIV (2003) 479-499.

That `quantum information´ is not any different type (from that defined in general by Shannon 1946), but the same `information´ devised by quantum means.

17 Christopher G. Timpson `The grammar of Teleportation´ arXiv:quant-ph/0509048 7 Sept. 2005.

Transmission of `information´ (*teleportation*): the joint sharing of an entangled state by emitter and receiver establishes communication, over which sending two classical bits is enough to guide the receiver among the 4 situations, referring to Bell inequalities: what produces the puzzlement to understand the fact is confusing `information´ (the abstract action of `informing´) with `an information´ (and its measurements).

18 H.D. Zeh `Where has all the information gone?´arXiv:gr-qc/0507051 v1 12 Jul. 2005.

Loss of information (recoverable or not, or useless- or defectively). `Collapse´, and applicability or not of `*quantum concepts´* in general.

Multiple `Everett worlds´. Quantum gravity.

19 Carlo Rovelli *Quantum Gravity* Cambridge 2004 (repr. 2005).

Trying to merge QM and GR into a loop-type computing theory or procedure, a loop quantum gravity, makes considerations on method, the duty to trust prior findings and attribute the difficulty in solving their contradictions to the subsistence of some idea or prejudice preventing it; e.g. (App. C, pp. 416-17) Einstein's respect at the same time for Maxwell's theory, an open vision toward the understanding of light, and Galileo's on inertial systems and relative velocity, is what led to discovering the prejudice that prevented their combination, "which, of course, was that simultaneity could be well defined".

Pp. 420-21 (`On realism´): "What I find incomprehensible is the position of those who grant the solid status of reality to a chair, but not to an electron. The arguments against the reality of the electron apply to the chair as well. /…/ A chair, as well as an electron, is a concept that we use to read, organize and understand the world. They are equally real. They are equally volatile and uncertain." MN: True: no discovery of the falsity of scientific entities can be made without that of the falsity of `things´, ideas or meanings of vulgar dialects; only that the claim of utmost precision and universal validity of the former makes them useful as a means to belie `things´ in general.

20 Simon Saunders `What is Probability?´ arXiv:quant-ph/0412194 v1 24 Dec. 2004.

P.2: "We have two questions: 1. What, physically, is objective probability (chance)? 2. Why should subjective probability track chance?" (principal principle). "…it ought to be facts about physical states of affairs that dictate our subjective expectations of future contingencies. What are those facts?" MN: The discussion shows

that nothing having passed can be `facts´. And that (p. 3) reality cannot be true. And (on the single-case) that one throw (NOW) is incognisable. And s. p. 3 on application of `prob.´ to `world´: prob. of t h i s world among the (infinite) worlds.

Rel. with the issue of `measurement´ in Q.: “When it comes to the problem of measurement physics is not its usual self” (p. 3).

Saunders, after examining interpretations of `probability´, `decoherence´, etc. (in the end, how to link Q.Th. and “tangible”** Reality: MN), considers Everett’s to be the only one able to give a solution: “The arguments we have considered give no hope at all that one can derive the prin. principle on any basis but Everett’s.” (MN: Note “hope” and “can”).

(DIS)CONTINUITY NUMBERS IN PHYSICS GEOMETRY IN PHYSICS POINT SPACE FIELDS MATHEMATICS-LOGIC

21 W. Hugh Woodin `The continuum Hypothesis´ Part I *Notices of the AMS* June-July 2001 and Part II *ib.* August 2001.

Discusses the attempts to account for the `continuum´ in Theory and Sets, and, inter alia, Gödel’s two incompleteness theorems. He believes “there is a solution”.**

22 Norbert Straumann (Institut für Theoretische Physik, Zürich) `Lichquanten und Moleküle: Ein Beitrag zum Annus Mirabilis (Johannes-Kepler-Vorlesung 2005, Tübingen 29 Juni) arXiv:physics/0507118 v2 18 Jul. 2005.

On Einstein’s various concerns and calculations in 1905. MN: It turns out (what is never said) that the interpretation of light as “cut” emissions, Planck’s constant, and the quanta, all mean a rediscovery and confirmation of the `atom´, and those works of Einstein on molecules in suspension, in connection with Avogadro’s number and the size of the molecule, appear founding the new atomic

conviction, i.e. of `indivisible [and, hence, invisible] minima´, which Mach, for instance, resisted. Much would be learned by recalling Epicure’s scheme of relationship between reality and sub-reality (atoms/void). The problem, ultimately, is the need to account for the separation between (macroscopic) `things´, which thus originates a vacuum between things.

23 Erhard Scholz `Philosophy as a cultural resource and medium of Reflection for Hermann Weyl´ arXiv:math.HO/0409596 30 Sept. 2004.

On the relation of `mathematics´ to `philosophy´. It tells about Weyl, among other things, his adherence to Fichte in his youth, his rejection of Jaspers’ or Heidegger’s existentialism.

P. 2: Around the 1920’s, following in part Hilbert as to the foundation of Mathematics: “…and conceded to formal mathematics founded on axiomatic principles a potentiality for the intellectual appropriation of external reality or its

symbolic representation, as Weyl preferred to formulate it."

24 L.E.J. Brouwer `Historical background, principles and method of intuitionism´ in *Collected Works* I, Amsterdam-N.Y.-Oxford 1975 (repr. 1980), pp. 139-146 (orig. publ. 1952).

P. 141: "… intuitionist mathematics is an essentially languageless activity of the mind having its origin in the perception of a move of time, i.e. of the falling apart of a life moment into two distinct things, one of which gives way to the other, but is retained by memory." MN: Seems to attribute to the `mathematical act´ what pertains to the very intuition of R., a splitting or "falling apart" of a moment (of one's life, e.g.) in its `passage´ and `its retention´ (in one's memory or howsoever) in a `state of reality´.

25 Jet Nestruev *Smooth Manifolds and Observables* `Springer´ 2003, `Appendix´ by A.M. Vinogradov `Observability Principle, Set

Theory and the "Foundations of Mathematics´´´, pp. 209-215.
P. 210: (on Boolean algebra) "This means, in particular, that the phenomenon of motion cannot be adequately described and studied in mathematical terms by using only logical notions or, to put it simply, by using everyday language (recall the classical paradoxes in this topic)".

Curious division, attributed to `left/right hemisphere´, of `reasoning, computing, logic / imagination, geometry´. Sets "in the naïve sense" belong to the right hemisphere.

26 James B. Hartle `The Physics of `Now´´ arXiv:gr-qc/0403001 27 Feb. 2004.

"models of information gathering and utilizing systems (IGUSes)" (Sum.): "Past, present and future are not properties of four-dimensional spacetime but notions describing how individual IGUSes process information"/…/ "The present, for instance, is not a moment of time in the sense of a spacelike surface in spacetime. Rather there is a localized notion of present at each point along an IGUS´ world line.

Cap. IV `WHY DON´T WE RECALL THE FUTURE?´: "The fundamental dynamical laws of physics are invariant under time reversal" … (big-bang/expansion)… the asymmetry past/future is established "by convention".

27 Gavriel Segre `On the mathematical structure of Tonal Harmony´ arXiv:math.HO/0402204 12 Feb. 2004.

Diatonic scales and harmonies (octave, perfect fifth, Pythagorean or tempered, and major 3rd), their physical, acoustic and informational foundation . Opposes `sound ´/`signal´.

Tries to apply mathematico-physical terms to music: thus, `frame´-

`scale´, `inertial frame´-`diatonic scale´. On (non)inferability: Can the type of scale be inferred from a production (even from one sole note!)? MN: Maybe the (non)inference of the grammar of a language from the production should be compared: would the need for a common grammar correspond to the need to sustain a `physical tonality´?

28 Gregory Chaitin `How real are real numbers?´ arXiv:math.HO/0411418 v3 23 Nov. 2004.

P. 1: "No physical quantity has ever been measured with more than 15 digits or so of accuracy".

Revises and renews the evidence that real numbers are not denumerable. MN: And therefore they are not `numbers´?

Distinguishes "1. the diagonal and probabilistic proofs that reals are uncountable, and 2. the diag. and prob. proof that there are uncomputable reals". MN: Are/there are. Recall the distinction `categorematic/syncategorematic infinity" in Gregory of Rimini, Buridan and the medieval logicians: "no matter how many they are, there are more / (the real) are more than the countable, i.e. more than the numbers". S. *Contra el Tiempo* 5th attack, pp. 70-71.

29 Pierre Cartier `A mad day's work: from Grothendieck to Connes and Kontsevich. The evolution of concepts of space and symmetry´ *Bulletin (New Series) of the American mathematic society* XXXVIII, 4, pp. 389-408 (Article electronically published on July 12, 2001).

Pp. 393 *et seq.*: From set theory (Bourbaki) to `points´. MN: In pure geometry points are given by shape and it is not required for them to be on a `space´: the figure determines at the same time the points and the space: Physics, quantification, forces points to be substantial (matter) and thus determines a (physical) space.

On Einstein's equation and the statute of *g*. "For Mach and Einstein,

a point then only appears as a label making it possible to identify an event". MN: A label that determines and makes what's happening be, makes it substantial.

The atom "certainly" has shape, and size only provided that it is within the limits of the invisible.

How the `indivisible´= `invisible´ has been transferred to the reduction of `particles´ to `*sets of quarks*´.

P. 394: The issue of `point´ already since Euclid. It is seen that the first are `line´, continued, and `direction/sense´.

P. 399: The issue in "algebraic geometry" of equations without solution, i.e. spaces without points.

Pp. 405 *et seq.* : "Grothendieck's dream", and the last attempts to bring together algebra and geometry.

30 Pierre Cartier `Un pays don't on ne connaîtrait que le nom. Les motifs de Grothendieck´ (Actes du colloque à Cerisy 1999) *Le reel en mathématiques...* `Agalma´ 2004.

P. 21 : «... l´ analyse purement mathématique, par Gelfand, puis par Gr., de la notion de point s´est rencontrée avec una reflexion fondamentale en Physique Mathématique, du statut du point en Physique Quantique. »

« ... Gr. se compare à Einstein pour sa contribution au problème de l´espace. Il a raison, et sa contribution a la même ampleur que celle d´ Einstein. Gr. et E. ont tous deux approfondi une vision de l´espace, où celui-ci n´est pas un réceptacle vide pour les phénomènes, une scène de théâtre, mais l´ acteur principal de la vie du monde et de l´ historie de l´ Univers. »

31 Loren R. Graham `Do Mathematical Equations Display Social

Attributes ?´ *Mathematical Communities* XXII, 3 (2000).

As repercussion of Sokal's denunciation, and following the Soviet physicist V.A. Fock, investigates the appearance of social conditions in the most abstract and "mathematical" formulations. MN: It is vain to distinguish between one and another social constraint; thought is always prevented (imagining a society without religion is illusory) by social and personal needs: truth is not compatible with reality: a free and realist reason is another social lie: reason is free inasmuch as it discovers the lie of R.

32 H. Lebesgue, E. Borel, J. Hadamard *et al.* `Sur les principes de la théorie des esembles´ *Oeuvres de E. Borel* III `CNRS´ Paris 1972.

On early reactions to Sets, non-denumerable infinity, the choice of one (in connection with `to define´, i.e. `to name´, i.e. `to quote one of its properties´), Lebesgue 1258-60; and « ...je n´ attribue pas plus de valeur à la méthode par laquelle on démontre qu ´un ensemble non fini contient un ensemble dénombrable. Bien que je dout fort qu´on nomme jamais un ensemble que ne soit ni fini, ni infini, l´impossibilité d´un tel ensemble ne me paraît pas démontrée » (-61). Discussion of `set of a‴ sets´ in

letters from Hadamard to Borel and replies (1261-65). MN to p. 1267: The *non-dénombrables* as a realification of the logic contradiction. The idea of `transfinite´, obscure, ambiguous, uncommon, as opposed to that of `undefined´, which only incorporates the negation. To 1268: reality in mathematics? (The author) does not want transfinites to do to numbers taken as `things´ what numbers do to common reality!

E. Borel *ib.* IV 2137-50 `L'infini mathématique et la réalité´: MN: Common sense glimpsing the difference between `things´, not any more physical but mathematical ones inasmuch as they are defined and always `denumerable´, as opposed to ideal (meta)mathematical entities that cannot be so: Borel, indirectly, by denying the validity of logically-established mathematical entities such as `point´,

`straight line´, `plane´, save if they maintain some relationship to the vulgar ideas (meanings) of `point´, `straight line´, `plane´, is discovering that the very reality is constituted by itself (not by "us") with ideas; and that, of course, `endless´ (for B., `non-denumerable infinity´) or `continuous´ do not form part of reality, in spite of their appearance to sustain the faith in `things´, i.e., in their ideas.

33 Yu. I. Manin `George Cantor and his heritage´ arXiv :math/0209244 v1 19 Sept. 2002.

P. 2: "Axiom of Choice /…/ essentially postulates that, starting with a set *U*, one can form a new set, whose elements are pairs (V, *v*) where *V* runs over all non-empty subsets of *U*, and *v* is an element of V." MN: The point lies in admitting `all´: the essential problem, taking as done what may eventually be done.

P.7: "Baffling discoveries such as Gödel incompleteness of arithmetics lose some of their mystery once one comes to understand their content as a statement that a certain algebraic structure simply is not finitely generated with respect to the allowed composition laws." MN: The passage of `no´ to positive, →= "is not finitely generated": it is generated, only that not-finitely.—"…the category of ```all´´´ finite sets is equivalent to any category of finite sets in which there is exactly one set of each cardinality 0, 1, 2, 3…".

Pp. 7-8 "openness" of a category; "Church´s thesis can be best understood as a postulate that there is an open category of ```constructive worlds´´´ /…/ such that any infinite object in it is isomorphic to the world of natural numbers…" MN: Note "world": "rebounding" influx of physics on mathematics. "…it turned out that there are meaningful ways of thinking about ```all´´´ objects of a given kind, and to use self-reference creatively instead of banning it completely." MN: It can be seen how the (provisional) infinitude is becoming made by the computing process.

34 Michael Harris `Postmodern at an early age, A view of *Mathematics and the*

Roots of Postmodern Thought by Vladimir Tasi´c´ *Notices of the Am. Math. Soc.* (Aug. 2003) pp. 790-99.

The starting point of Tasi'c' book (a phantastic and learned account of the debates going on over the last centuries among mathematicians, still pressed by foundational or ontological issues, and philosophers) is that, below mathematicians' pretension not to know about the development of their computations, "the ```crisis of foundations´´´, more or less distorted, does continue to matter". In the midst of much speculation (by Tasi'c and Harris), the question is seen to be that of "discontinuity and difference" and, hence, the issue of the `continuum´ and with it that of `identity´, which mathematicians usually take as settled by Zermelo-Fraenkel's axioms.

Final section of the review, `Return to reality´: "… I find all those unknowable real (and complex) numbers an annoying distraction concealing the really interesting ones (periods of algebraic integrals, zeros of the Riemann zeta function) in their mist"; his travel mate, "a well-known string theorist" /…/ "confided his hope that the universe could be modelled by a discrete dynamical system in which the real numbers´ role would be merely anecdotal". MN: Reality (=existence) of the `continuum´, which is strange to reality and can only enter it (contradicting itself) by means of a discrete quantification.

35 Loren Graham & Jean-Michel Kantor `Name Worshippers: Religion, Russian and French Mathematics, 1900-1930´ Prépublications de l´Institut de Mathématiques de Jussieu, no. 365, April 2004.

P. 11: "Mathematical objects cannot be shown, so both religion and mathematics make heavy –but different– use of symbols…" MN: Note the exclusion of the deixis ("shown") in relation (though vague) with "symbols".

P. 16: Realification of the clash `increasing/decreasing´ as a `point´ (→ ← √2). (Speaking about Florenskii) "…could exercise their Free Will and create beings (sets) just naming them".

P. 20: On `mathematical objects´. The opposing stances (Hilbert/Brower) are taken the other way around as to what is `real´.

Iïdem `Russian Religious Mystics and French Rationalists: Mathematics, 1900-1930´ *Bulletin of the American Academy* Spring 2005.

P. 16: "The answer for Florenskii and later for Egorov and Luzin was that the act of naming in itself gave the object existence. Thus naming became the key for both religion and mathematics."

P. 17: "For Cantor the continuum was a reduction of continuous quantities to discrete

entities; for Du Bois-Reymond the continuum had a mystical nature outside of mathematical knowledge".

36 Hrvoje Nikolić `The origin of the difference between space and time´ ("November 23, 2004") arXiv:gr-qc/9901045 15 Jan. 1999.

P. 1 (summary): "All differences between the role of space and time are explained by proposing the principles in which none of the space-time coordinates has an *a priori* special role. Spacetime is treated as a nondynamical manifold…"

P. 19: "Axiom 5 essentially says that for any finite everywhere initial condition the solution is also finite everywhere. /…/ First, there is a possibility that infinities do exist, but almost no one believes that. A much more probable possibility is that nature somehow chooses only those initial conditions that will not lead to infinities. However, such a principle is quite unaesthetical. /…/ The best alternative is probably the assumption that singularities can occur in classical physics as long as quantum physics prevents them. However /…/

quantum physics cannot prevent the existence of states which correspond to the singular behavior at some particular instant of time. The best we can expect from quantum physics is that it is practically impossible to observe such states. One can be satisfied with this, but the Axiom 5, together with Axiom 8, is more satisfying, because it provides that singular states do not exist at all."

37 Milan M. Ćirković `Is quantum suicide painless? On an apparent violation of the principal principle´ (by D. Lewis, 1986) arXiv:quant-ph/0412147 v1 20 Dec. 2004.

Rel. of estimated probs. of occurrence of a thing to the "credence" of the Proposition stating it. Personal identity in rel. with observable `things´.

P. 5: "`Hugh will survive the quantum suicide experiment´. /…/ "we can always find a small temporal interval between the spin measurement and the actual firing/clicking of the gun, and pose our question in that time interval. There are several at least superficially plausible answers" (Hugh exists in all ramifications or in none or in some yes and in others no). In note: "… the difficulties can consist in the implied account of the tensed discourse", and the same as appears (MN) in Cicero's *de Fato*; "H. survives the q.suic.exp." and "H. does not survive the q.suic.exp." are both true, but "H. survives the exp. and H. does not survive the exp." is false.

P. 8: Apparent violation of Lewis' pr. princ. owing to the `Self-Sampling Assumption´: "…that every observer should reason as if they were a random sample drawn from the set of all observers." MN: I.e. the fundamental conflict of `1´ vs. `one of a number´.

38 P. Agnoli & D´Agostini `Why does the meter beat the second?´

arXiv:physics/04012078 v1 14 Dec. 2004 v2 Jan. 2005.

How, during and after the French Revolution, the French Academy preferred to establish the “meter” as unit, with the voyages for the

measurement of the meridian, versus choosing the `second´, which had been offered before for that purpose by observing the regularity of the pendulum.

MN: “Natural” that the first to be measured be Time, and that, if a `unit of length´ has to be established it depends on `what the deviation from the vertical takes to go back to upright position´, and that if (the double of) this is `1 second´, where it coincides, in view of common usage among humans, with the division of the `day´ (again “natural” and `rotation´) by `:24:60:60´, the corresponding pendulum length be the `meter´, `1 meter´.—The ascent of the Fr. Rev. to a `state´, with the patriotic aspiration to measure the ¼ of the meridian, followed by (quasi)universal success, spoils that yearning for “naturalness”.—However, the waiver of the claim for the measure to be a `convention´ (after the platinum metre was presented in 1799, all relations to “nature” are irrelevant) and the eagerness to have Nature provide its measures, show well a faith in that “ho theòs arithmētízei”, renewed in the end with Planck’s constant (while he himself said that the point was only to give it a conventional numeric value) and the velocity of light, also used, by the way, to redefine, by 1/2,999… …, more exactly the `metre´.

39 Dionyssios Lappas & Panayotis Spyrou `Embodied Cognition and the Origins of Geometry: A Model Approach of Embodied Mathematics Through Geometric Considerations´ arXiv:math.HO/0308003 v1 1 Aug. 2003.

Mathematics incorporated, according to Nunez et al. (1999) and Kakoff & Nunez (2000) , not any more into the “present individual bodily experience”, but historically for the formation and development of Geometry. P. 1: “…verticality, horizontality, similarity /…/ Inasmuch as these are of a qualitative nature, it was required that they be expressed in a quantitative way in order to be objectified.” MN: The need for quantif. on the idea as foundation of reality; the passage from Geometry to Physics already there.

40 Peter Lynds `Time and Classical and Quantum Mechanics: Indeterminacy vs. Discontinuity´ *Foundations of Physics Letters* XVI, 4 (2003).

`Zenos´s Paradoxes: A Timely Solution´ philsci-archive.pitt.edu/00001197 (2003).

`Subjective Perception of Time and a Progressive Present Moment: The Neurobiological key to Unlocking Consciousness´. E-mail: PeterLynds@xtra.co.nz

The turmoil widespread around 2003-04 due to Lynds' communications (s., e.g., Eric Engle `Zenos's Paradox: A response to Mr Lynds´ philsci-archive.pitt.edu/00001333; Stephen Paul King `Re: [mirai] Definition of a Fixed Point –as applied to concept "I"´ www.metasciences-academy.org/mirai/2003308/0160; replies by Lynds `Notes´ www./peterlynds.net.nz/notes.html; Brooke Jones `Time, Mechanics and Zeno Undergo Major Revision´ www.spacedaily.com/news/time-03a.html) should not have died down: at least it showed the live condition of the issue below physical theories, which, rather than settling it, dodge it. Certainly, Lynds' solution (which, as he himself noted, is partly similar to Aristotle's) does not close the wound; but there is in his attempt a precision that enables me precisely to turn it around here: he rejects perception (and computation) of discontinuous time, and its series of "presents", as something "without actual physical foundation in nature", and ends up referring it to a "subjective conscious experience and the neurological processes underlying it" (thereby losing, at the same time, the appearance of the "point" `I´, which became visible in St.P. King's debate with his friends, and which is not subjective at all), while the real and natural would be continuity, thus avoiding the need for the mobile to ĩĩe at a place and time; and so it is, but the other way around: reality, which is nothing without an idea and computation (hence, discontinuity), is what is attributed to the subjective (`reality´ and `thing´, when they become

visible in the theories, are always skipping vainly from `nature´ to `subject´), while continuity is the "natural", i.e. unknown, that remains outside reality and things with their movements, but, as an unreal ideal, acts upon reality to sustain it and prevent the mobile from falling into the abyss that would otherwise open between the real moments which it goes through and it is counting.

PARTICLE NON(LOCALITY) INDIVIDVVM—LABEL (MATHEMATICS) LOGIC – MATTER TIME—RHYTHM COSMOLOGY

41 Adonai S. Sant´ Anna `Individuality as an illusion´ arXiv:quant-ph/0409025 v2 3 Sep. 2004.

P. 1 (summary): "Elementary particles in QM are indistinguishable when sharing the same intrinsic properties and the same quantum state". Non-individuality is not a consequence of the formalism ("since the entanglement of states forbids any labelling process"), but rather "…even in classical particle mechanics it is possible to consider the existence of non-individual particles." His attempt is "…to show how to derive the apparent individuality of classical particles from the assumption that all physical objects are non-individuals."

P. 2 MN: Any set prevents from labelling the elements: Proper Nouns do not form part of the semantics of a language (not even a mathematical one).

42 Mariano Galvagno & Gaston Giribet `The particles problem in classical gravity. A Historical note on 1941´ arXiv:physics/0411042 v1 4 Nov. 2004.

Studying doubts and development of Einstein's thought starting from the paper published in the *Revista…de Tucumán* in 1941.

On the relationship `matter´-`fields´, (exclusion of) singularities, identification of `gravitation´ with `electromagnetic (charge)´.

43 Sheldon Goldstein & James Taylor & Roderich Tumulka & Nino Zanghi `Are all particles real?´ arXiv:quant-ph/0404134 23 Apr. 2004.

P. 1 (summary): After referring to the questions that can be asked to particles in a "Bohmian mechanics": "Another question that has a clear meaning is whether particles are intrinsically distinguishable, i.e. whether particle world lines have labels indicating the species. We discuss the intriguing possibility that the answer is no, and particles are p̈öı̈n̈ẗs --just points."

P. 2 MN: The condition can be translated as "If in a common name *(type*) there are equal and different specimens *(tokens)*".

P. 3: "The choice of $^{N}R^{3}$ as configuration space corresponds to the notion that a configuration of N particles is a set of N points in physical space, with the points labelled in no way, neither by numbers 1…….N, nor in the sense that there could be intrinsically different kinds of points in the world, such as electron points…"

Pp. 5-6: They pass to `ruling out of possibilities´, as being, though experimentally irrefutable, "implausible" or the like (MN: They will be logically contradictory in themselves, that is against common sense), and from there they backslide to something like that the only objective is the subjective.

P. 7: In view of the dilemma there arisen, it is seen that `point´ is metaphysical.— MN: "intrinsically" means `different from one another within the same class´.

The question would be better termed as follows: "does `particle´, with its meaning, have ```extension´´´, i.e. real examples?"

Iid. arXiv:quant-ph/0405039 8 May 2004.

P. 1 (summary): The "mathematical core" (independent from the dynamic discussion) is "that the configuration space for N particles, even N ```distinguishable particles´´´,

is the set of all N-point subsets of physical 3-space."

P. 2 MN: All atoms are the same one inasmuch as all are `atoms´ (this is true), and distinctions of properties and distance from locality are the result of the cropping out of the pure concept into reality.

P. 3: On identity as a result of events (MN: rhythm!) in the environment. And the passage from `anyone´ to `one´ (MN: i.e. `not-another´). And they recall, for the identity assumption, the "Beables for quantum field theory" of Bell, who inspires this study.

P. 6: How is it that two particles end up being differentiated o‹n›l‹y› by the position they occupy at a certain moment.

44 Daniele Colosi & Carlo Rovelli `Global particles, local particles´ arXiv:gr-qc/0409054 14 Sep. 2004.

P. 1 (summary): Difficulty with the notion of `particle´ because, for instance, "… Q(antum)F(ield)T(heory)´s particle states are intrinsically nonlocal, while experiments are localized." They distinguish "globally defined *n*-particle Fock states and *local particle states*". Since they notice that both things converge when the "particle detector" is relatively big, they try to reconcile them in a definition that would be inalterable even if "global states" are not well defined. "This definition could play an important role in quantum gravity, when asymptotic regions may not be available".

45 Jeffrey Bub `Why the quantum?´ *Studies in History and Philosophy of Modern Physics* XXX (2004) 241-266.

P. 241 (summary): "…a quantum theory is best understood as a

theory about the possibilities and impossibilities of information transfer, as opposed to a theory about the mechanics of nonclassical waves and particles…"

P. 259: Quotations from Poincaré , 1912, "…atoms are no longer a useful fiction; things seem to us in favour of saying that we see them since we know how to count them /…/ The atom of the chemist is now a reality", and another one from Einstein.

46 Sofia Wechsler `What was in the apparatus before the click?´ arXiv:quant-ph/0411039 4 Nov. 2004.

P. 1: "…nothing is more unconceivable to our classical-oriented mind than the idea that what we call `particle´ doesn´t have a well-determined position at a given

moment, that it doesn´t fly along a single path."

That deciding that, from the various paths given in the apparatus, only one is "populated" but not the others, leads to contradiction. Opposes the idea that the "wave function" is only a "statistical tool" and does not describe "single quantum systems".

47 S.J. Van Enk `On cloning, the universal NOT, and conservation laws´ arXiv:quant-ph/0503140 15 May 2005.

Antía Lamas-Linares & Christoph Simon & John C. Howell & Dik Bouwmeester `Experimental Quantum Cloning of Single Photons´ arXiv:quant-ph/0205149 v1 21 May 2002.

MN: `Perfect cloning´ of a singular is a limit (ideal, unrealisable) of the perpetual approximation to "cloning", i.e. to the realisation of the ideal (in real specimens).

48 Giuseppe Giuliani `On Realism and Quantum Mechanics´ arXiv:quant-ph/0507028 v1 4 Jul. 2005.

P. 1 (summary): Proposes a "tempered realism": "…statements belonging to `orthodox´ interpretations of QM, are realist in a stronger sense because they insert ontological statements –like those about the *existence* of the `superposition´ state or of the `entangled´ state— in the postulates of the theory" /…"descriptions containing only statements about state vectors and experiment outputs are the most suitable for QM" /…/ "no conclusion about realism (or any other philosophical position) can be drawn, since experiments deal always with theories and these are never logical consequences of philosophical positions."

P. 3: "…we can *say* that in the World there is a *quid* that corresponds to our theoretical entity `electron´…" (the *quid* has properties corresponding to what the theory attributes to `electron´, and behaves according to the laws attributed to it by the theory), and "…the statement `the electron exists in the World´ is *simply and only* a *shorthand* of the previous one."

Ib., contraposing `theory´, ideal (mathematical) / `reality´, approximative ("possibilities").

P. 4: (in the formula of a 2-state system *S*) "the factor $1/\sqrt{2}$ implies that the two states are equally probable" (I emphasise: can two probabilities equal each other exactly?)

P. 12: (defending a certain causality): "It is claimed that, while probabilistic theories of classical physics reflect our ignorance about phenomena, the probabilistic nature

of QM reflects the undeterministic nature of quantum phenomena". MN: But attributing traits of the theory to the World is "*strong* realist".

P. 11 in note, a quotation from Herz (*Electric Waves* 1893): "…we still regard the attraction between the bodies as a kind of spiritual influence of each one upon the other".

49 Vladimir H. Ignatovich `Uncertainty Relations (UR) have nothing to do with Quantum Mechanics (QM)´ arXiv:quant-ph/0403038 4 Mar. 2004.

`position´ as `matter of definition´ equally for `things´ in general and for a Qfield.

Interference of the screen with the `field´ explains the appearance of 2 trajectories through 2 slits.

`momentum´ and `position´ are simultaneously determinable.

50 Robert Rynasiewicz `Definition, Convention, and Simultaneity: Malament´s Result and Its Alleged Refutation by Sarkar and Stachel´ Philsci-archive pitt.edu./archive/00000350.

P. 1 (summary): The question whether distant simultaneity (relativized to an inertial frame) has a factual or a conventional status in special relativity has long been disputed and remains in contention today…". (Einstein's 1905 statements on "events at different locations", with the crossing and reflection of light rays from one clock to another).

MN: The question of `simultaneity of the separate´ (which are taken to be such from the start) requires a convention on the *v* of light: if what is questioned is the very separation (implying challenging the `space´), such convention (just like any `spatial Time´) is unnecessary.

51 A.R.D. Mathias `The Ignorance of Bourbaki´ *Math. Intelligencer* XIV (1992) pp. 4-13.

On how is it that the group of mathematicians called Bourbaki, while maintaining the faith in a logical foundation of mathematics (rather according to Zermelo's axiomatics, and with decisions in respect of `truth´, `demonstration´ `(in)demonstrability´) providing

freedom from "obscurities" around `infinitude´, should however
remain apparently unaware of Gödel's discoveries, well known by that time.

A.R.D. Mathias `Logic and terror´ ("read to the Perne club of Petersbourg on February 12th 1987 and subsequently revised"). *Jahrb. Kurt-Goedel-Ges* 1990, pp. 117-130; longer version in *Riv. Internaz. Storia Sci.* (N.S.) XXVIII (1991).

On `logic´ versus `dialectic´ in their relations to Reality (with the plague of Authority against thought in Bolshevist Russia, and Stalin's intervention on `language´).

P. 7: A quotation from Lenin *Conspectus of Hegel´s lectures on the History of Philosophy*: "It is that characterisation of motion which correctly expresses the continuity of time and space, whereas the concept of motion as the presence of a body in one place at one time, in another place at another time describes only the result of motion and does not contain an explanation of motion itself."

52 Carl E. Dolby `Simultaneity and the concept of `particle´´ arXiv:gr-qc/0305097 v1 27 May 2003.

P. 1 (sum.): "…the possible connection between our notion of particle and our notion of simultaneity".

Pp. 2-3: Review of difficulties: "…an operational particle concept, which directly incorporates the observers motion" is proposed; but "…a detector only counts particles on its trajectory /…/ Provided a particle detector is anything that detects particles, a particle cannot also be ```anything detected by a particle detector´´´. To resolve them, Dolby resorts to the notion of `radar time´.

53 Diego Meschini `Planck-scale physics: facts and beliefs´ arXiv:gr-qc/0601097 23 Jan. 2006.

P. 4: "is there any physical significance to these natural units beyond Planck's original intentions of providing a less human-oriented set of reference units for length, time, and mass?" Dimensional analysis ("a surprisingly powerful method capable of providing great insight into physical situations without needing to work out or know the detailed principles underlying the problem" p. 1) is not an adequate basis to sustain the faith in *G, h* and *c* as units of a "physical reality". Neither is any more security obtained by relating, for example, `gravity´ to `black holes at the Plank scale´ (p. 10). P. 7: "…the meaning of constants appearing in physical equations can be learnt from their very appearance in them. However, this takes all charm away from dimensional analysis itself, since such equations are not provided by it but become available only after well-understood physical theories containing them are known; i.e. after the content of the equations is related to actual observations." MN: Science needs for the definition of its objects an exact quantification of `mass´, `size´, `*v* of light´ and `gravity´ that the mere "touch of nature" cannot provide.

54 Basarab Nicolescu `Heisenberg and the Levels of Reality´ arXiv:physics/0601156

20 Jan. 2006.

Starts from a failure to understand (p. 2) “from where was coming the resistance to the unification between the relativity theory and the quantum mechanics”. P. 4: “The true question is the incompatibility between the classical realism and the quantum one”. Non-locality is inherent in the “quantum object” and “a constitutive part of reality itself”. “The so-called *quantum paradoxes* (as, for example, the famous paradox of `Schrödinger´s cat´) are false paradoxes, because they point out contradictions exclusively in correlation with the natural, ordinary language, which is that of the classical realism; these end to be paradoxes when the language appropriate to the quantum mechanics is used.” MN: Those `levels of reality´ are not such, but the difference between the mere `ideation´ required for the constitution of (any) `things´ and the need for `ideals´ that are unrealisable (also those of physical science) to sustain the faith in reality, always threatened by indefinitude and doubt.

55 G. Bard Ermentrout in *Notices of the AMS* LI, 3 (March 2004), review of the book by Steve Strogatz *The Emerging Science of Spontaneous Order* 2003.

P. 313: “The term `sync´ is short for `synchrony´, by which Strogatz means the emergence of order in time.” MN: can there something be glimpsed in the sense of `rhythm´ as the elementary in the constitution of Reality?

P. 312 MN: That is, that a certain order arises from utmost disorder.

P. 315: “This elegant calculation is the mathematics which underlies Strogatz´s statement that `syn´ is inevitable.´

Experiments on time in isolated subjects, sleep rhythm, oscillations of the Tacoma Narrows Bridge with the flow of crowds, increase and cessation of applause by an audience…

56 Gordon McCabe “The structure and interpretation of cosmology. Part II – The concept of creation in inflation and quantum cosmology´ arXiv:gr-qc/0503029 7 March 2005.

Discussion of various theories debating `universe´, `boundary´, etc.

P. 6: On the hypothesis of creation of the Universe from (the) nothingness. “the instability of nothingness” would be the `creative force´. (MN: That old idea or phantasm of the boredom of *chaos*, of nothingness, of being nothing).

P. 7: That an `empty space´ can be imagined (by the mathematical representation of “fields on a manifold”).

Pp. 10-11: “…space-times which exist for an infinite time before

reaching (∑, γ,) would contribute to the probability of creating (∑, γ,) f rom nothing!" /…/ "…space-times with no past boundary" (one can say it is "empty, 0", but not take it for a type of `boundary´).

P. 15: "…if spacetime is indeed finite but without boundary or edge…" (MN: Quotation from Hawking. The boundary of the Universe consists in the lack of boundary!).—That `point´, `single point´, does not admit either a "zero-three geometry" or any geometry.

P. 24: On the separation between `origin of he Universe´ and `origin of time´.

Pp. 29-30: criticism of the position of Vilenkin, Linde and Hartle-Hawking: "…a probabilistic propensity for a system to make a transition from one side of a potential barrier to the other…": what if the probability turned out to be a change in position?

P. 35: "However, the `null topological sector´ is just the empty set, and there is no reason to think of it as sharing a boundary with a non-empty set of geometries" /…/ "a wavefunction satisfying the tunnelling boundary condition cannot be interpreted as describing creation from nothing."

57 Franz Wilczek `The Universe is a Strange Place´ ("Public lecture given at Lepton-Photon 2005, Uppsale, Sweden, July 2005. Earlier I used the same title for a quite different talk, astro-ph/0401347").

(Summary) "Our understanding of ordinary matter is remarkably accurate and complete, but it is based on principles that are very strange and unfamiliar. /…/ we´ve come to understand matter to be a Music of the Void, in a remarkably literal sense.

Much on the progresses of formalisation during these 100 years, gluons, etc.-- P. 3: "A major reason that physicists were able to make rapid progress in atomic physics, once Shrödinger found his

equation, is that they were able to borrow techniques that had already been used to analyze problems in sound production and music. Ironically, despite his well-known love of music, Einstein himself never accepted modern quantum mechanics." /…/ "After the consolidation of atomic physics in the early 1930s, the inner boundary of physics shrank by a factor of a hundred thousand" (down to the nucleus, where almost all matter lies) /…/ "The nuclei could only hold together by some new force, which came to be called the strong force, since gravity is much too feeble and electrical forces are both too feeble and of the wrong sign to do the job (being repulsive, not attractive)".

58 Louis Marchildon `Bohmian trajectories and the ether. Where does the analogy fail?´ arXiv:quant-ph/0502049 v1 Feb. 2005 v2 Sep. 2005.

P. 7: "…to define a preferred frame and transmit the electric and magnetic forces. But as the ether was discarded, the electromagnetic field acquired by itself an independent reality. " (emphasis added).

P. 11: "Since Maxwell´s equations have solutions corresponding to vanishing charge and current densities, the field can exist, in principle, even in the complete absence of matter. This is not the case with information. To exist, it needs some kind of material (or other) support." MN: Note the mysterious "or other".

P. 12: Answering criticism from Bub, 2004, on `quantum measurements´ and `hidden variables´: "Should one argue that the atomic structure is not to be taken literally, he should be prepared to specify at what scale ought the analysis of matter stop, or the reality of objects dissolve."

P. 13: "Objects are not made of information." MN: Not in what there may be, yes in what they are.

MATTER WAVE/CORPUSCLE SPACE-TIME GRAVITATION CAUSALITY

59 Erhard Scholz `The changing concept of matter in H. Weyl´s thought, 1918-1930´ arXiv:math.HO/0409576 v1 29 Sep. 2004.

P. 4: "H. Weyl and F. Klein were not convinced that Hilbert´s attempted ```synthesis ´´´ of Mie and Einstein" (consideration of gravitation and electromagnetism as equal, whereby "the riddle of the grainy structure of matter should be solvable") "was acceptable as a physical theory." `matter´/`field´.

P. 9: (MN: Reduction of Reality to geometry, which is nothing but the ideal of R.) quotation from W. : "…nicht die Geometrie ist zur Physik, sondern die Physik ist zur Geometrie geworden."

P. 11, quotation from W.: "…I no longer accept field physics as the key to reality. The field, the ether, appears to me only as a *transmitter* of effects." MN: The problem is overcome with IT IS THE VOID WHAT MOVES THE ATOMS.—And to p. 12: But if it is nothingness, if it does not exist, then it becomes active.—The two senses (physical/logical) of `cause/explanation´.—Possibilities reduced to probabilities.

P. 13: MN: The singularities defining the `particle´ are the evidence of the clash between `ideal´ and `endless´.

P. 14: Again `explanation/causation´. MN: The truth of Reality, as an abyss that

opens between the ideal and the endless.

60 Trevor W. Marshall `Are atoms waves or particles?´ arXiv:quant-ph/0409203 28 Sep. 2004.

That the legacy of the atomic vision should not be lost.

Two interpretations of Kapiza-Dirac's experiment according to Gold:

either the atom "spreads out" or it is exchanged with radiation by a "scattering". "I propose to reject the first interpretation and accept the second", subject to the reservation that he remains "within a classical (or prequantum) world view".

"There is fair amount of evidence that Max Planck, who discovered the quantum discontinuity in absortion and emission of light, never accepted that the light field itself had to be quantized" (s. in a 1907 letter to Einstein).

61 U. Major & T. Sauer `Hilbert´s "World Equations" and His Vision of a Unified Science´ arXiv:physics/0405110 20 May 2004.

On three lectures delivered by Hilbert in 1923.

P. 2: After recalling Einstein's "obsession" with a "unified field": "The problem of a u.f. theory /…/ can be seen in a more specific sense as the problem of finding a consistent and satisfactory mathematical unification of the gravitational and electromagnetic fields, be it by modified field equations, by a modification of the space-time geometry, or by increasing the number of space-time dimensions", but "contemporary scientists perceived the technical problem of unification in the wider context of a unified corpus of human knowledge and understanding. In this respect, Hilbert…"

P. 7: H. believes electromagnetic field equations are "implicit" in the gravitational field equation, and that this solves "the problem of the connection between gravitation and light".

P. 15: "…the equations, being differential equations with respect to some time coordinate, would only predict the future from the past, but would they also teach us something about the present which after all, as H. argues, is what we really want? If the answer is no, then we are in need of ```accessorial´´´ *laws*" for that purpose; but H. sees that there are no such laws, for "that which we want to capture

with such laws" either is inconsistent with "the world equation" or is already contained in it. MN: It is seen how the irreversibility of the process consists only in choosing a `state´ as initial.

And the issue appears that particle classes already “are derived” (MN: I.e. that they are not fundamental, they do not “belong to Nature”?) from field equations and laws of motion (MN: which do belong to Nature?).

`Present´ there means `what is neither past nor future´, alien to transformations and hence being able to be the fundamental “shape” (MN: Cf. Parmenides nûn éstin homoû pân).

P. 18: The 3rd level, of “totally objective knowledge “: it is seen to be so, yes or no (to vulgar and scientific experience alike).— Desire of an “emancipation of the anthropomorphic point of view”.

P. 18, quotation in note to H.’s lecture: “Ein in Koordinaten ausgedrückter Satz über die Natur ist nur dann eine Aussage über die Gegenstände in der Natur wenn er von den Koordinaten unabhängig einen Inhalt hat.” MN: I.e. (it seems) that the formula or sentence truly speaks about Nature as to its syntax (the latter having an “Inhalt”, i.e. a `sense´), leaving aside the `meaning´ of the terms.

P.19, another quotation from H.: “Wenn nun diese Weltgleichungen und damit das Fachwerk vollständing vorläge, und wir wüssten, *dass es* auf die Wirklichkeit in ihrer Gesamtheit passt [und,] dann bedarf es tatsächlich nur des *Denkens* d.h. der begrifflichen *Deduktion* um alles phys. Wissen zu gewinnen.” And another one: “… behaupte ich, dass gerade die Weltgesetze auf keine andere Weise zu gewinnen sind, als aus der Erfahrung. Mögen bei der Konstruktion des Fachwerkes der phys. [der Begriffe?] mannigfache spekulative Gesichtspunkte mitwirken: *ob* die aufgestellten Axiome und das aus ihnen aufgebaute logische Fachwerk stimmt, das zu *entscheiden*, ist allein die Erfahrung im Stande.” MN: It seems that a logical system would be the one saying all the truth; but that

experience decides whether it is well done or not, i.e. that truth is abandoned to the experimentation event.

62 Olaf Dreyer `Relational Physics and Quantum Space´ arXiv:gr-qc/0404054 13 Apr. 2004.

(Summary) “In a purely relational theory there exists a tension between the relational character of the theory and the existence of quantities like distance and duration” (MN: Which are the appearances necessary to sustain Reality).

P. 5: In view of what is done today of setting a unit to the *v* of light, in general “A length is then defined to be the amount the excitation has travelled in a certain time interval”.

And p. 7: “To define a notion of distance in a relational way it was necessary to have

access to the dynamics of the theory." MN: If `space (-time)´ is derived from, or founded upon, *v*, then would it be *s* what introduces or reveals the systems´ dynamics?

63 Harvey R. Brown & Oliver Pooley `Minkowski space-time: a glorious non-entity´ arXiv:physics/0403088 17 March 2004.

Pp. 1-2: To the chp. `Einstein and the space-time explanation of inertia´, MN, translating physical terms into linguistic ones: "I.e. that `substantive´ is defined by the ability to be "subject" and "object" of a Verb, but the "Locative", the location of the thing, is nothing but a Predicate of the "Subject-Object", it cannot be a thing (Cf. *Contra el Tiempo,* 5th attack pp. 62-63, 2nd attack pp. 13-15, and on Sextus Empiricus' view); when the space mutates under the influx of things (`matter´), it means that it has become a thing (and stopped being place!), and thus space-time has `shapes´, like things.

P. 4: The mystery of "free choice": MN: The trajectory is a property of the thing (one of Epicurus' *akólutha*), and it keeps being so from elementary particles to the most complex beings that keep on

"acting by instinct": that is broken when `consciousness´ and `will appear (the `form of acting´ that corresponds to `us´, as to anything its own, but which is the first one appearing to `us´), and it is this condition of us what takes the problem back to animals and even to photons.

P. 5: Quotation from Einstein, 1907 paper: "The principle of relativity, or, more exactly, the princ. of rel. together with the princ. of the constancy of velocity of light, is not to be conceived as a ```complete system´´´, in fact, not as a system at all, but merely as a heuristic principle…"

P. 6 MN: "principle-theory" would be a logical one and "constructive theory" would refer to reality?

P. 7: How the issue of "length contraction" transfers a physical (i.e. real, of things) phenomenon to the ł¶o¶c¶a¶t¶i¶o¶n of such phenomenon and hence makes that location real (physical, thing): and how "length contraction" "is derived from" (i.e. is due to) the postulate of invariance of *c*, and the other way around.

64 Sergei M. Kopeikin `The Speed of Gravity in General Relativity and Theoretical Interpretation of the Jovian Deflection Experiment´ arXiv:gr-qc/0310059 v3 1 Jun. 2004 (*Class. Quantum Grav.* XXI, 2004, 32-51-3286).

Of Einstein's equation, the left-hand side, geometric / the right, material. The curvature of gravity is produced by the influence of `matter´, and there *c* is

assimilated to `speed of light´?

65 Lucien Hardy `Probability Theories with Dynamical Causal Structure: a New Framework for Quantum Gravity´ arXiv:gr-qc/0509120 v1 29 Sep. 2005.

A `mathematical framework´ (which implies a `theory´?) comprising GR and QT, where both can be "reduced" when the effects of one

and the other, e.g., `matter dependent curvature of space-time´ and`superposition´ respectively, are negligible, and where a `quantum gravity´ can be accounted for. `Dynamical causal structure´ is taken from GR and `not fixed causal structure´ from QT; `probabilistic´ is taken from QT and `not deterministic´ from GR.

P. 1 (summary): "Quantum theory is a probabilistic theory with fixed causal structure. General Relativity is a deterministic theory but where the causal structure is dynamic. It is reasonable to expect that quantum gravity will be a probabilistic theory with dynamical causal structure. The purpose of this paper is to present a framework for such a probabilistic calculus. We define an operational notion of space-time, this being composed of elementary regions. Central to this formalism is an object we call the *causaloid*. This object captures information about causal structure implicit in the data by quantifying the way in which the number of measurements required to establish a state for a composite region is reduced when there is a causal connection between the component regions."

66 John Stachel `Structure, Individuality and Quantum Gravity´ arXivgr-qc/0507078 18 Jul. 2005.

With the revision of the notions of `structure´ and `field´, and of `quantum gravity´, again the dialectic `things/relations´ and `processes/states´.

67 Letter from Cavalieri to Galileo, 1625, in *Le opere di G. Galilei* Firenze 1904, v. XIV.

(Rome 21 March) "...arrivato poi a provar che il mobile, che ha da passar dalla quiete a qualche grado di velocità, debe passar per gli intermedii, non ritrovo ragione che mi aquieti, quantunque in universale me pare che sia così."

68 Kurakin P.V. `Hidden variables and hidden time in quantum theory´ arXiv:quantum-ph/0504089.

P. 1 (summary): "Bell´s theorem proves only that hidden variables evolving in true physical time can´t exist; still the theorem´s meaning is usually interpreted untolerably wide. The concept of hidden time (and, in general, hidden space-time) is introduced. Such concept provides a whole new class of physical theories, fully

compatible with current knowledge, but giving new tremendous possibilities. Those theories do not violate Bell´s theorem."

P. 3: "In my opinion, main omission of the theorem is implicit usage of intuitive notion of physical time as some abstract and uniform flow of ```something´´´, which contains all physical events. I pose that this implicit assumption is in contradiction to special relativity and quantum nature of elementary events." Distances are measured by a "ruler", but time?: Einstein's "clock" is ill-defined.

69 Herbert Lichtenegger & Bahram Mashhoon. Chapter 1: `Mach´s Principle´. arXiv:physics/0407078 v1 14 Jul. 2004.

On the separation of different entities: space within the body and between bodies; localisation. On Time and "free" movement of a body. Relativity in the sense that each thing depends on any others whatsoever as may be in a `universe´. On centrifugal motion: the `thing´ wants to be kept in itself / run away from itself. That GR still contains absolutes. On `gravitomagnetism´, and gravitation velocity = *v* of light. A time below real Times.

P. 15: "Mach identified the essential epistemological shortcoming of the Newtonian foundations of physics, namely, that the intrinsic state of a particle in Newtonian mechanics, i.e. its mass, has no immediate connection with its extrinsic state in space and time, i.e. its position and velocity."

70 Hitoshi Kitada *Quantum Mechanics* (Preface 15 Dec. 2003 Tokyo) *Lectures in Mathematical Sciences* XXIII (2005) arXiv:quant-ph/0410061 v3 21 Jul. 2005.

That, with its notions of `time´ (versus `space´ and *v* as a ratio from one to the other) QM is contradictory: to release it from such condition, he proposes taking `momentum´ and `position´ as primitives, so that from there Time may be secondarily deduced.

P. 5: "No stable eigenstates can be observed as eigenstates /…/ Even if we can observe eigenstates, they are necessarily destroyed and become unstable scattered states. We thus observe just the scattering states or processes. We define time as the evolution of these scattering states." MN: Note the `we´.

Chp. 10 `Inconsistency of Mathematics?´ pp. 131 *et seq.*, judgement on `set theory´ and `1st uncountable´; formulations of Gödel's proof.

Chp. 11 `Stationary Universe´; p. 137: "By nature what is called the universe must be a closed universe, within which is all. We will characterize it by a certain quantum-mechanical condition." MN: `universe´= Reality (total). Real time as threading momentary sates of Reality.

71 S.D. Agashe `Einstein´s "Zur Elektrodynamik…" (1905) revisited, with some consequences´ arXiv:physics/0601154 20 Jan. 2006.

P. 1: "Einstein in his `Zur Elektrodynamik bewegter Körper´, gave a physical (operational) meaning to `time´ of a remote event in describing `motion´ by introducing the concept of `synchronous stationary clocks located at different places´. But with regard to `place´ in describing motion, he assumed without analysis the concept of a system of co-ordinates. In the present paper, we propose a way of giving physical (operational) meaning to the concept of `place´ and `co-ordinate system´, and show how the observer can define both the place and time of a remote event."

MN: What or who speaks of realities is for that very reason outside reality: if he is turned, as usual, into `the observer´ and thus becomes real, enters reality, it cannot be seen how can he give a true physical "meaning" to the `things´ (among which he is) and their `motion´, with its `space´ and `time´: any theory may be more and more clear and fine to account for the relations of `the observer´ (and "us") to (other) `things´, not to describe what in truth ("in pure objectiveness") is happening with them (and with him).

72 John Earman & John Norton `What Price Spacetime Substantivalism?´ *Britt.J.Phil.Sci.* XXXIII (1987) pp. 515-525.

P. 515 (summary): "Spacetime subst. leads to a radical indeterminism within a very broad class of spacetime theories which include our best spacet. th., general relativity. Extending an argument from Einstein, we show that spacet. substantivalists are committed to very many more distinct physical states than these theories´ equations can determine, even with the most extensive boundary conditions."

Against substantivalists: "unobservable spatial and temporal properties of matter (e.g. `is at position *x´*) are not reducible" (from a substantiv. position) "to observable relational properties of matter (e.g. coincidence, betweenness)". MN: But indeed `is at *x´* is not a `property´ (of a body): recall Euler's rationale: the `place´ is obtained precisely by suppression of the `body´ (with all its `properties´).

P. 521: `independent existence´, against all `field´ theories postulating a field for each `point´ in `Spacetime´.-- "…each model is a physically possible world", (MN: Note how the possibilities are introduced into Reality) `one of them being our world." -- "If everything in the world were reflected East to West (or better, translated 3 feet East) retaining all the relations between bodies, would we have a different world?"

P. 522: Substantivalists will have to deny Leibniz's equivalence principle: "Diffeomorphic models represent the same physical situation." They should either

"accept that there are distinct states of affairs which are observationally indistinguishable" or abandon their substantivalism.

P. 523: Proof according to the case for a matter-free `hole´ in Einstein.

P. 524 (note): But "we have not concluded here that spacetime is relational" /…/ "Relationism is not established if it implies that all motion is the relative motion of bodies, as Leibniz apparently held." MN: But any other `motion´ implies believing in `space´.

73 Diego Meschini & Markku Lehto `Is empty space a physical thing?´ arXiv:gr-qc/0506068 11 Jun. 2005 v2 24 Oct. 2005.

On `void´ (≠nothing, ≠does not exist), ether-fields-points, geometry (realisation of ideals), dipheomorphism, difference (→ distance) – identity, reality in itself (`thing´) and ("deictic") localisation, things-relations-motion, gravitation.

74 Diego Meschini & Markku Lehto & Johanna Piilonen `Geometry, pregeometry and beyond´ arXiv:gr-qc/0411053 11 Nov. 2004.

Find that `pregeometries´ are always imbued with the `geometric view´: search for (summary) "a sounder comprehension of the physical meaning of empty spacetime."

P. 4: Stages in the process: 1st things "idealised" by shape; 2nd enter the "geometric magnitudes". MN: Cf. *De los números*, 5th disimplication.

P. 6: In Dirac's notation and the "inner product" the need is seen for entities and relations in a field, MN: As in the `world of which´ (/`world in which´).

P. 7: Two theories, for the big (→ ∞) and for the small (→ 1/∞); quoting Ashtekar 2004: "we can happily maintain a schizophrenic attitude and use the precise, geometric picture of reality offered by general relativity while dealing with cosmological and astrophysical phenomena, and the quantum-mechanical world of chance and intrinsic uncertainties while dealing with atomic and subatomic particles."

Pp. 9-10: Gravitation determining the picture of GR; singularities, as impossible as necessary.

Pp. 11-12: "Quantum-mechanical correlations" and the "existence" of `spacetime´. On that 2 distant parts of a QM system know of each other more than "local, realistic premises allow". Quotation from Einstein *Relativity* (15th ed. 1952): if the $g_{ik}$ functions are removed from the `gravitational field´, it is not a space à la Minkowski what remains, but nothing: "There is no such thing as an empty space, i.e. a space

without field. Space-time does not claim existence on its own, but only as a structural quality of the field."

P. 12: In Quantum Theory "--so far the only branch of natural science forced to confront directly the problem of physical existence--" the problem of the existence of `space-time´ "was not taken into account."

P. 14: Option for "discrete" (space-time) owing to the rejection of "continuous"; but (p. 21) "the use of real and complex numbers in Qm presupposes that space is a continuum".

Pp. 25-27: On `relations´ rather than `things´.

Pp. 35-36: On language and thought.

75 D.H. Coule `Avoiding paradox with infinite space´ arXiv:gr-qc/0311022 v1 7 Nov. 2003.

P. 1 (summary): "We argue that whether the universe is infinite or finite is less important than often supposed. Paradoxes of repeating behaviour in the infinite, or eternal inflationary, universe can be alleviated by a realistic definition of differing lives: not simply permutations of various quantum states. We also critically question the notion that our universe could simply be a simulation in somebody else's computer."

P. 2 MN: No-repeat law? But that is the foundation of reality and computation! It may be that infinity, taken seriously, implies that each universe (or individual) cannot be the same (as himself) and hence never the same as anyone else. The logic of the rep. of oneself (already so in Lucretius' `universes as this one´) is a logic submissive to (the imagination of) Reality.

P. 3 MN: Only approximation → "infinity", that is, endless appr.: not to the `end´, not to `infinitude´.

"Paradoxes" are the consequence of speaking about `universe(s)´ (ever-realistic imagination or theory), so as not to speak of Reality itself.

76 Simon Saunders `Complementarity and Scientific Rationality´ arXiv:quant-ph/0412195 v1 24 Dec. 2004.

That Bohr's interpr. of QM was not founded upon a philosophy and remained firmly in accordance with the principle of compl. "The principle of complementarity is itself best read as a conjecture of unusually wide scope, on the nature and future course of explanations in the sciences /…/ If it must be judged a

failure today, it is not because of any internal inconsistency."

At the outset, quotation from Einstein: "Despite the expenditure of much effort, I have been unable to obtain a clear understanding of Bohr´s principle of complementarity", and de Wheeler: "Bohr´s point --and the central point of quantum mechanics-- is that no

elementary phenomenon is a phenomenon until it is a registered (observed) phenomenon". MN: There is below that an acknowledgment of the need for an idea (meaning) for `thing´ in general, though it shows more forcefully in the `elements´ (in the end, ideas for the explanation of R.).

77 Holger Lyre `C.F. von Weizsäcker´s Reconstruction of Physics: Yesterday, Today, Tomorrow´ arXiv:quant-ph/0309183 v1 24 Sep. 2003.

Quotation from Veiz, in motto: "…Meine Vermutung war: Symmtrie bedeutet die Trennbarkeit des jeweils untersuchten Gegenstandes vom Rest der Welt…"

How physical phenom. end up being `information´, and how Inf. acquires a sort of "substance". MN: But keeps using `universe´ (p. 4, whether `Ur-´ or elementary symmetry is in one or the other half of the un.), not `reality´. P. 7: "Does information exist without an observer or information-gathering system?" "…even space or spacetime is reconstructed here as a mere device to represent information." "The information content of a particle /…/ actually is the entropy difference of a universe with or without such a particle…/" P. 8: On overcoming the op. `matter/shape´, P. 9: "…the ur as a qubit represents potential information. Measurements must be understood as transitions from potential to actual information."

78 William R. Wharton `Understanding Time and Causality is the Key to Understanding Quantum Mechanics´ arXiv:quant-ph/0310131

P. 1 (summary): "…the strange features and paradoxes of quantum mechanics come from the backward causation, in which future events can change the past."

"The success of the formalism of quantum mech. in describing and predicting properties of nature is unmatched by any other theory.

Nevertheless every interpretation of QM is fraught with incompleteness, complexities, ugliness, and/or contradictions." MN: Rather firm restoration of `common sense´. Replaces `time´ with a causation `flow´. But appeals to the `human ´.

79 Ulrich Mohrhoff `Is the end in sight for theoretical pseudophysics?´ arXiv:quant-ph/0305095 v1 17 May 2003.

P. 1 (summary): “The question of what ontological message (if any) is encoded in the formalism of contemporary physics is, to say the least, controversial. The reasons for this state of affairs are psychological and neurobiological. /…/ “…we are in a position to see why our fundamental physical theory is a probability algorithm, and to solve the remaining interpretational problems.” MN: O.k., but resorting to psychology or neurobiology does not lead very far away, those being also theories on realities.

80 Julian Barbour `Dynamics of pure shape, relativity and the problem of time´ arXiv:gr-qc/0309089 18 Sep. 2003.

P. 1 (summary): “The only kinematics presupposed is the spatial geometry needed to define configuration spaces in purely relational terms. A new formulation of the relativity principle based on Poincaré´s analysis of the problem of absolute and relative motion (Mach´s principle) is given. The entire dynamics is based on shape and nothing else.”

MN: The attempt is to replace Time with geometric relations. Forgets that below this one lies another, more elementary problem: that of quantification: the quanta introduce Time inadvertently: quantification is Time, i.e. conversion of inconceivable time into numbers (no quantification, measure, is anything but computation), and that is precisely what founds Reality. A pure geometry… is the pure idea R. makes of itself, but it is not R.: R. is a lie, in need of the quantification of `shapes´, and that is Time.—Furthermore, Geometry has no `space´ other than relations between `shapes´, but it is its application to R. that creates a `space´. 121

81 Eberhard Knobloch `Galileo and Leibniz: Different Approaches to Infinity´ *Arch.Hist.Exact Sci.* LIV (1999) 87-99.

MN: Precisions to differentiate and analyse the confusion between `indivisible´/`infinitely small´, `quantity´/`number´, `limit of the series´/`terms of the series´, `(in)finite´/`(un)ended´, `issue of sizes, measure´/`issue of (un)definition´.

P. 94: “…if we assume the existence of an actually infinite number…”, for Leibniz “identified with nothing, i.e. with zero”, for Galileo with `1´, MN but indeed `1´ already was a denial of `number´.

Pp. 94-95: On Leibniz `Accessio ad arithmeticam infinitorum´: “…defined ```lines´´´, that is linear indivisibles as infinitely small rectangles, that is as variable quantities: his starting point was a quantification of the notion of indivisibles” (MN: `quantif. of notion´). “…the procedure /…/ can be continued to such a degree that they differ from each other of from curves by a quantity (```quantitate´´´) which is smaller than any given quantity” (MN: “given”: It is he who calculates who introduces the (“any”) quantity, and hence the `<´ of the comparison).

82 Hubert C. Kennedy `Karl Marx and the foundations of differential calculus´ *Historia Mathematica* IV (1977) 303-318.

MN: For the "mystery" surrounding how the operation of adding and removing something which is equalled to `0´ may give results in real computations, and do so with "adequate exactness".

83 Alain Aspect `Bell´s Theorem: the naive view of an experimentalist´ *Quantum [Un] spekables – From Bell to Quantum information* (comp. Betlman & Zeilinger) 2002.

The difficulties of the `Einstein-Podolsky-Rosen´ paradox, the

impossibility of evaluating separately two photons in "entangled state(s)", the violation of Bell's theorem and inequalities derived from a QM theory, are resolved with the requirement for `supplementary parameters´, eliminating `non-locality´ and recovering a "picture" in which the principles of `locality´ (and `causality´) apply for any level of reality.

P. 2: "…the Locality Condition may be considered a *consequence of Einstein´s Causality*, preventing faster-than-light interactions".

P. 5: ```Difficulty of an image derived from the formalism of Quantum Mechanics´´´.

P. 14: Bell demanded a "time experiment" in which the "settings" of the apparatus would be changed d̳u̳r̳i̳n̳g the experiment: in such a scheme, "Bell´s theorem establishes a contradiction between QM and a description of the world in the spirit of Einstein´s ideas."

P. 30: "It may be concluded that QM has some non-locality in it, and that this non-local character is vindicated by experiments. It is very important however to note that such a non-locality has a very subtle nature, and in particular that it cannot be used for faster than light telegraphy. It is indeed simple to show that in a scheme where one tries to use EPR correlations to send a message, it is necessary to send a complementary information (about the orientation of a polarizer) via a normal channel, which of course does not violate causality."

P. 31: "We must be grateful to John Bell for having shown us that philosophical questions about the nature of reality could be translated into a problem for physicists, where naive experimentalists can contribute."

84 C.S. Unnikrishnan `Einstein was right: Proof of absence of spooky state reduction in quantum mechanics´ arXiv:quant-ph/0206175.

Against “nonlocality and state reduction at space-like separated points during measurements on entangled systems”.

85 Richard A. Campos `Still Shrouded in Mystery: The Photon in 1925´ arXiv:physics/0401044 15 Feb. 2004.

Publ. in Eng. translation of the letter from Einstein to the Brasilian Academy of Sciences: still struggling with possible experimental demonstrations of light quanta. End: “If this [the `statistical dependency´ and, hence, the corpuscular condition, by Geiger and Bothe’s unfinished experiment] is confirmed, then there is a new important argument for the reality [Realität] of light quanta”.

86 V.A. Kuz’menko `Coherency is the ether of XXI century´ arXiv:physics/0401051 v1 13 Jan. 2004.

From the field of optics and laser, dispute between theorists and experimentalists: The notion of `coherency´ has ended up being the “orthodox” view as a means to explain `nonlinear effects´ that are destroyed by `collisions´; sets out the defects of such notion (i.a., its failure to correspond to a “physical base”), and proposes a “time invariance violation”, which would be a (p. 2) “very good foundation for explanation of physical origin of nonlinear effects.”

INFORMATION LOGIC-PHYSICS (IR)REVERSIBILITY

87 O.J.E. Maroney `The (absence of) relationship between thermodynamic and logical reversibility´ *Studies in History and Philosophy of Modern Physics* XXXVI (2005) 355-374=arXiv:physics/0406137 v1 27 Jun. 2004.

That the relation between thermodynamics and “logic” (*information processing=logical computation)* does not imply a correspondence *per se* of (ir)reversibility of thermodynamic (heat absorption) and computational (loss of data bits) processes, as has been believed: “information and entropy are not the same thing.”

P. 2*:* “When properly understood, it will be shown that information processing is unnecessary for resolving Maxwell´s demon and that the strong connection between information and thermodynamic entropy is broken.”

An interplay (with graphs) between the motion of suppression/addition of information and thermodynamic (and gas mechanics) processes, involving the need for “heat” to perform the logical processes.

88 Elias P. Gyftopoulos & Gian Paolo Beretta `What is the second law of

thermodynamics and are there any limits to its validity?´ (“Preprint submitted to Elsevier Science, 19 Jul. 2005”) arXiv:quant-ph/0507187.

P. 4: “We call this set of instantaneous values the *state* of the system at the given instant in time, provided the results of measurement on the system are not correlated with measurements on any other system on its environment.” MN: `momentary state´ of an isolated `body´.

P. 6: “The existence of stable equilibrium states is not self-evident. /…/ Within mechanics, the stability analysis yields that among all the allowed states of a system with fixed values of amounts of constituents and parameters, the only stable equilibrium state is that of lowest energy. In contrast, the second law avers the existence of a globally stable equilibrium state for each value of the energy. As a result, for every system the second law implies the existence of a broad class of states in addition to the states contemplated by mechanics. MN: “one state exists” (…which only ideally exists) is a manner of saying that “it does not happen”, and that therefore it can only go in one sense (otherwise, there would be another unique equilibrium state).

P. 9: “The entropy created as a system proceeds from one state to another is called *entropy generated by irreversibility*. It is positive. The entropy non-decrease is a time-dependent result.”

P. 28: “At the end of the conference” (San Diego CA 2002) “an informal vote was taken on the assertion “The second law is inviolable´, and the results of the vote Yes:No:Maybe:Abstain/Absent were roughly 25:25:25:45.”

P. 29: They reject (another author’s statement whereby) “Thomson´s formulation of the second law --no work can be extracted from a system coupled to a bath through a cyclic process-- is believed to be a fundamental principle of nature.”

Pp. 30-31: They criticise the position saying that “Certain eminent physicists solve the problem by simply denying it (for Einstein irreversibility is a human illusion)”, and warn: “Moreover, Einstein did not ever say that `irreversibility is a h.il.´. What he said was: ```For us physicists this separation between past, present and future holds only an illusion, tenacious as it may be´´´. In view of Einstein´s remarks, and the observation that laws of physics (either Thermodynamics or Quantum Thermodynamics) do not dictate that phenomena must be irreversible, we conclude that there is no arrow of time. Time is a dimension along which phenomena evolve either forward or backward.” MN: The illusion of real Time implies that of its 2 senses.

P. 33: (criticising a study on plasma) “Upon reaching mutual stable equilibrium” (between `system´ and `reservoir´) “no work can be done because that would be a

P(erpetuum)M(obile)M2, a machine that violates both the laws and theorems of the thermodynamics, and the laws and theorems of nonstatistical quantum thermodynamics." MN: For G. & B. `entropy´ is a physical property of the bodies.

P. 34: "…the correct thermodynamic statement of the third law is:

`for each given set of values of the amounts of constituents and the parameters, there are" [emphasis added] "one stable equilibrium state with zero temperature (if the system has no upper bound on energy) and two stable eq. st. with zero temp. (if the syst. has an up. b. on en., such as a one spin system)".

P. 37: On Maxwell's demon: "We show that despite his omnipotence and omniscience the demon cannot accomplish his task, namely extract only energy from the system or, equivalently, have the system do work at no energy (work) cost whatsoever to himself, because under the specified conditions there exist no states with energy lower than the initial energy of the system. Said differently, there exists no state that has identical values of all the properties as the initial thermodynamic equilibrium state except lower energy" (MN: *lowest?* I.e. "There exists only 1").

MAN CONSCIOUSNESS WORLD THINGS

89 Stefano Bettini `Anthropic Reasoning in Cosmology: A Historical Perspective´ arXiv:physics/04010144.

On Man's (never enough) off-centering.

James B. Hartle `Anthopic Reasoning and Quantum Cosmology´ arXiv:gr-qc/0406104 25 Jun. 2004.

P. 3: Q Theory equations … are useful for certain types of phenomena, not for most of the things that affect us most immediately.

P. 4: On the "inclusion" required by "anthropic reasoning", MN: `we´, enclosed in Reality, yes (but not ME, for i am alien to R.).

P. 5: On new specific conditions, more certainty (and less complexity), MN: I.e., that the less we are `we´, the more (probabilities of) truth.

91 Milan M Ćirković & Vesna Milošvić-Zdjalar `Three´s a crowd: on causes, entropy and physical eschatology´ arXiv:physics/0407045 (*Foundations of Science* IX, 2004, pp. 1-24).

P. 2: Quotation from Boltzmann (1964): “Is the apparent irreversibility of all known natural processes consistent with the idea that all natural events are possible without restriction?”. MN: possibilities, outside Reality.

P. 4: According to Bostrom (2003), relation of theory to order in possible universes; that “ours” is atypical: the others have no observers, and they cannot be observed.

P. 8: “Acausal-Anthropic-guided theory, on the other side, would include specific properties of intelligent observers and would have to explain the link of entropy gradient to the functioning of the mind.”

P. 18, on universes “recollapsing” or not: “We have all reasons to believe that the universe will expand forever, in an accelerating pace, while the matter will gradually decay (through GUT proton decay) or annihilate (as electron-positron pairs) or be swallowed by black holes…”

P. 19: “Future behaviour of the universe is rapidly becoming a recognized and legitimate target for ```everyday´´´ scientific work”.

91 Bernard d´ Espagat `Consciousness and the Wigner´s friend problem´ arXiv:quant-ph/0402121 18 Feb. 2004 v2 11 Jan. 2006.

P. 1 (summary): “…a possible clue, consisting in assuming that even very simple systems may have some sort of a proto-consciousness, but that their ```internal states of consciousness´´´ are not predictive /…/ if we imagine the systems get larger, in virtue of decoherence their internal states of consciousness progressively gain in

predictive value”. MN: Recall J. Requejo’s theory on `consciousness´ as a retardation of response? MN: What quantum measurement does with sub-real entities, when it is applied to real (macroscopic) ones, makes them break the rule `one thing in one place ´: to come out of the trouble, it is said (`decoherence´) that this does not affect sub-real entities, for, if it affects real ones, it is because they are tangled up with environmental, not Q-measurable, quantities.

Much more on speculations about Reality, called universe, whether it is blind to all knowledge or has in itself (and in its separate `things´) its own knowledge, etc.

92 Gordon McCabe `Possible physical universes´ arXiv:gr-qc/0601073 18 Jan. 2006.

P. 1: “…is there only one logically possible physical universe?” (translating Einstein’s remark, “what really interests me is whether God had any choice in the creation of the world”). A “structural realism”: “…in mathematical physics at least, the physical domain of a true theory is an instance of a mathematical structure”. MN: Note “domain”, “instance” and “true”.

And thence (pp. 11 *et seq.*): “The multiverse of all solutions to the Einstein field equations”. MN: “All” may, with the terms well defined, refer to a computation and mathematical structure: for Reality, `all´ is an unrealisable ideal.

93 Russell K. Standish `The importance of the observer in science´ arXiv:physics/0508123 18 Aug. 2005.

The notion of `complexity´, reduced sometimes to `(less) probability´ (MN: and hence more “information power”): the confusions are due (p. 1, summary) to “science ´s tradition of removing the observer from the description in order to guarantee *objectivity*”. From there to the need for a “theory of consciousness”.
MN: Making the `subject´ object of the observation (and theory)

“objectivity” is no doubt increased, while the question “Who is the one observing it and saying it?” opens time and again endlessly.

MN: I give up here referring to many other studies I have read about `Man´ and `anthropic´ theories or philosophies, as well as visions of `the world´ or `universe(s)´. The stubborn humanisation of what was imposed (upon the physicist) as `observer´ or (upon the philosopher) as `subject´, and the consequent reduction of `consciousness´ (and even `language´) to `(human) brain(s)´, is the consequence of a sort of patriotism (of Mankind), which makes i or REASON or LANGUAGE OF THINGS real, which they are not; correspondingly, dealing with `world´ or `universe(s)´ is constantly diverting thought and preventing it from dealing with Reality itself.