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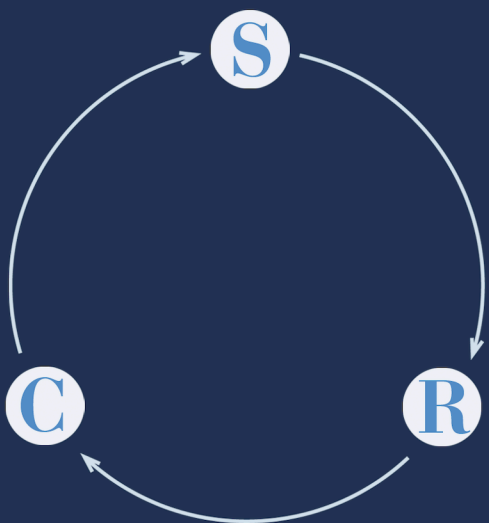

Science Reality Consciousness

English edition

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WARNING

The pages of a book, whether paper or electronic, possess a peculiar property: they are able to accept whatever variety of letters, words, phrases and illustrations, without ever expressing a criticism, or disapproval. It is important to be aware of this fact when we go through a text, so that the lantern of our discernment can always accompany our reading. To explore new possibilities, we must remain open-minded, but it is equally important not to succumb to the temptation to uncritically absorb everything we read. In other words, the warning is to always subject the content of our reading to the scrutiny of our critical sense and personal experience.

The author can in no way be held responsible for the consequences of a possible paradigm shift induced by the reading of the words contained in this volume.

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EDITORIAL

This seventh volume of *AutoRicerca* contains a unique monographic article written by *Massimiliano Sassoli de Bianchi*. The article was originally published in two parts, in English and Portuguese, in the *Journal of Conscientiology*,[1] and more specifically in volume 9, number 36 (April 2007) and volume 10, number 37 (July 2007).

The article was subsequently proposed as a short monograph published in 2010 on behalf of the author. It is today[2] offered as an open access "English edition" accompanying Issue 7 of AutoRicerca, which was initially proposed only in Italian.

I wish you an enjoyable reading.

The Editor

[1] The *Journal of Conscientiology*, today renamed *Journal of Consciousness* (JofC), publishes research papers and articles related to the study of consciousness, with the aim of deepening our understanding of the topic. The JofC is published by the *International Academy of Consciousness* (www.iacworld.org).

[2] Although the present volume is presented with the same publication year of its Italian edition, it was actually only published in 2019.

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ABOUT THE AUTHOR

Massimiliano Sassoli de Bianchi received the Ph.D. degree in physics from the Federal Institute of Technology in Lausanne (EPFL) in 1995, with a study on temporal processes in quantum mechanics. His current research activities are focused on the foundations of physical theories, quantum mechanics, consciousness studies and quantum cognition. He carries forward interests in the field of inner research (self-research), promoting a multidimensional view of human evolution. He has written essays, popular science books, children's stories, and has published numerous research articles in international journals. He is the editor of the Italian journal *AutoRicerca* and currently the director of the *Laboratorio di Autoricerca di Base* (LAB), in Lugano, Switzerland. He is also a research fellow at the *Center Leo Apostel for Interdisciplinary Studies* (CLEA), at the *Vrije Universiteit Brussel* (VUB), in Belgium. For more information, refer to the author's personal website: *www.massimilianosassolidebianchi.ch*.

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SCIENCE, REALITY AND CONSCIOUSNESS
A SOCRATIC DIALOGUE

Massimiliano Sassoli de Bianchi

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FOREWORD

Many of the ideas presented in this volume originate from the findings of the so-called Geneva-Brussel school of quantum mechanics, particularly from the work of some of its most distinctive members, like *Joseph Maria Jauch*, *Constantin Piron* and *Diederik Aerts* (see the references).

The main fertile idea behind the work of this school is the observation that the usual methodology adopted by the majority of physicists, consisting in first developing a mathematical structure, then trying to find out what would be its interpretation, is not suitable if one wants to fully clarify the conceptual difficulties inherent to our description of reality.

A better methodology is to first identify and elucidate what are the relevant concepts, understand them on a solid operational base, and only then use them to build a meaningful and intelligible scientific theory of reality.

Following this more natural approach, researchers of the *Geneva-Brussel school* (and more particularly D. Aerts) succeeded in deriving a powerful conceptual and mathematical language, capable of properly describing the different entities populating our physical reality with a great level of generality, thus discovering new and more general structures, extending beyond the previously known classical and quantum ones.

In this way, they also succeeded clarifying many (if not all) of the paradoxes and conceptual ambiguities present in the standard interpretations of quantum physics, and developed a very general approach (still under development) with which they were able to describe physical as well as non-physical entities (like for instance cultural artefacts, concepts, minds, etcetera).

A presentation of the mathematical formalism of the Geneva-Brussels school is far beyond the scope of the present writing and the general audience it aims to reach. However, in the Socratic dialogue presented below, I will tentatively introduce

the reader, in simple and non-mathematical terms, to some of the central concepts and ideas of this language.

In doing so, I will also freely and creatively entangle these ideas with a number of considerations and reflections that extend from physics to multidimensionality and the evolution of the consciousness. For this reason, it should be emphasized that by no means is the present essay to be considered as an "approved" review of some of the ideas of the Geneva-Brussels' school, although the reader can certainly make good use of it as a first elementary introduction to these topics.

FIRST PART

ABSTRACT. Following a brief introductory discussion about the main characterizing ingredients of a scientific approach to reality, the reader is introduced to a number of important, but unexpectedly puzzling, concepts, which are at the roots of our scientific language. More specifically, using a number of simple examples, this first part of the dialogue explores the meaning of concepts such as: *experimental test, property, attribute, actuality* and *potentiality, entity, state, certainty, identity, evolution, classical* and *quantum probabilities, energy, space* and *non-locality,* and many others as well. The old questions of determinism and dualism will also be addressed, and the role played by the participatory consciousnesses in our operational understanding of reality considered.

PREAMBLE

At the end of the 1st module of the Consciousness Development Program[1], a STUDENT remains in the classroom, having a peek at the books on the shelves. The LECTURER approaches him and asks:

LECTURER. So, how was this first module?

STUDENT. Interesting… interesting and challenging. But now I have a number of questions that "torment" me.

LECTURER. This is very positive. Scientific research is all about finding the good questions.

STUDENT. And the answers?

LECTURER. They are also important, of course. But you see, you need to find questions that are sufficiently easy that you might be able to answer them and, at the same time, sufficiently difficult so that the answers will be interesting enough.

STUDENT. Well, I think that all the questions I have are of the kind "too difficult to be answered!" By the way, can I share some of them with you?

LECTURER. Look, I was thinking about taking a short break and going for a cup of tea. If you'd like, we can discuss a bit together.

STUDENT. Yes, that would be great!

[1] The Consciousness Development Program (CDP) corresponds to the IAC – International Academy of Consciousness' basic curricular course (see: *www.iacworld.org*). One can of course imagine a dialogue similar to the present one involving a student and a lecturer from any another school or discipline affirming and validating the spiritual reality, like for instance, just to cite one, transpersonal psychology.

PARADIGM

LECTURER. (*Sitting in a tearoom, in front of a tasty cup of tea*) Tell me, what's "tormenting" you?

STUDENT. First of all, it's about the Consciential Paradigm[2] (CP). I wanted to be sure: is this something really scientific?

LECTURER. Do you know what a paradigm is?

STUDENT. I believe it is something like a frame of reference, which is assumed to be true.

LECTURER. Yes, a system of reference, or a general *worldview*, in which you can organize all your understandings about reality. In other terms: a general model, or theory, about reality. A model that you can use to *explain, evaluate* and *predict* phenomena, to *orient* yourself and to *act* accordingly [AVV, 1999].

STUDENT. Then my question is: is the CP a scientific theory of reality?

LECTURER. Let me ask you in return: do you believe it is possible to describe all of reality in scientific terms?

STUDENT. I don't know. Probably the best way to answer such a question would be trying to work out a scientific model of reality as a whole. If one succeeds, then the answer would be affirmative.

LECTURER. You mean, constructing a scientific theory of all reality in all details?

[2] The Consciential Paradigm considers that the consciousness is an intelligent principle, manifesting through an energetic multivehicle, in a multidimensional environment and multiexistential cycle. At the basis of the Consciential Paradigm, there is also the idea of self-experimentation: the researcher must become part of the very object of its research, naturally combining his/her more subjective and personal experiences with those obtained using the more conventional scientific methods.

STUDENT. As a first step, I would be quite happy if I could just obtain the basic elements of such a theory.

LECTURER. Yes, I agree with you. But don't you think then that this is exactly what the CP is all about?

SCIENTIFIC THEORY

STUDENT. Ok, then again, my question is: is the CP a scientific theory?

LECTURER. Well, I guess this depends on your definition of what is and what is not scientific.

STUDENT. I'd like to hear your definition.

LECTURER. All right. First of all, I think it's important to emphasize that a number of well-known philosophers of science have reached today the conclusion that an unambiguous distinction between science and non-science in terms of scientific criterions is in fact inconceivable. This is because in general the qualities and criterions for which a particular discipline will be considered as scientific necessarily vary with culture, time and the evolutionary level of the involved consciousnesses, and are therefore arbitrary in a sense. In that respect, scientists should not obey any authority or tradition in their research, but instead select their methods and argumentations solely based on a principle of general *usefulness*. This is so because it is science that must adhere to reality and not the other way around. So, one can say that the primary role of science should be the acceptance of the obligation to acknowledge and describe all of reality, all that exists. In other words: at its best, science should be completely open and exclude nothing; it should have no "entrance requirements" [M, 1969].

STUDENT. In other words, are you saying that science is a sort of *all-inclusive* discipline and that a priori any methodology can be applied to achieve a better comprehension of its object of study, which is all of reality?

LECTURER. Yes, that's the point: a comprehensive and all-inclusive discipline whose methodology is to be founded only on a principle of general usefulness.

STUDENT. But do you nevertheless agree that in our era and Western culture there are a number of criteria a theory needs to exhibit to merit the epithet of scientific?

LECTURER. That's correct. But the point about these criteria is not the awarding of the scientific label to a given theory, since any theory is in a sense *potentially scientific*. The point is that these criteria have proved so far their usefulness as guiding principles in the construction of more advanced models.

STUDENT. Can you please remind me what these criteria are?

LECTURER. One is *consistency*. It means that the theory must not give rise to internal logical contradictions. Another one is *compatibility*, which means that the theory must be in accordance with all known experimental facts. If this would not be the case, the theory would be *falsified* by those facts. And this also means that the theory must be exposable to experimental and rational refutations (falsifiability). Another important criterion is the *explicative power*, meaning that the theory must increase our understanding of reality through the explanations it provides. And let us not forget *objectivity*: the theory must be such that it can be reasonably adopted, at least in principle, by any sufficiently evolved and lucid consciential participator of reality.

STUDENT. Do you mean that a scientific theory must be based on *consensus*?

LECTURER. Yes, consensus is a key ingredient. We, as individual consciousnesses, only have a subjective, personal experience of reality, and therefore any scientific more objective description of reality must accommodate the subjective views experienced by all the different individual consciousnesses into a unique inter-subjective coherent scheme, that can be shared by all of them.

STUDENT. So, to summarize all this, being the CP consistent,

compatible with the today known experimental facts – physical and extraphysical – in principle falsifiable and based on a consensus, then we can say it is scientific according to the current adopted criteria of scientific quality.

LECTURER. No doubt. And on top of that you can also add that, similarly to conventional sciences, researchers in conscientiology thoroughly employ and promote *argumentations* and *rational criticisms* in their working method.

OPERATIONALISM

STUDENT. Do you have in mind any other important ingredient characterizing a scientific theory?

LECTURER. Yes, in my opinion a very important one is *operationalism*. It means that the concepts forming the building blocks of the theory should be *operationally defined*.

STUDENT. What does it mean?

LECTURER. It means that the definition of these concepts should be based on *experimental tests*.

STUDENT. Why?

LECTURER. Because all we know about reality is derived from our *experience* of it, and therefore it is reasonable to ask that all important concepts of the theory are to be based on our experience or, equivalently, on experimental tests. The idea of operationalism is that there must be an intimate correspondence between a concept and a set of *experimental operations* we can attach to that concept, so that these operations can be used to provide a sound definition of the concept itself, which can then be shared and consensually accepted. Of course, since we want to include all of reality in our investigations, we must here intend the terms "experience", "experimental operations" and "experimental tests" in a very broad sense, always considering the *subjective experiences* of the consciousnesses as our primary data, so that the so-called *objective experiences* are

simply to be considered as "shared private experiences which are consensually recognized as being sufficiently similar". Also, of course, subjective experiences must not be limited to those arising from our restricted physical senses, but must include *parasensorial experiences* as well as higher *mental experiences*, in a sort of radical empiricism à la William James [H, 1994].

STUDENT. Yes, I think I understand what you mean. Could you however be a bit more explicit?

LECTURER. Ok, I'll try. Roughly speaking, I can say that my reality is the collection of all that happens to me or, if you prefer, the collection of all phenomena I can experience. Now, if I want to understand the functioning of such a reality, I need to focus my attention on some of these happenings, or phenomena, neglecting some others. I will start identifying phenomena which, according to my perceptions and paraperceptions, stand out and, so to say, "affect my sight and parasight". And to these phenomena that *emerge* from the others, I will attribute *properties* and give them specific names. In other words, as a scientist investigating reality, I will use my *analytical skills* to separate parts of reality having a specific set of properties, that I will call *systems* or *entities*. Conventional scientists, like physicists, only describe *physical entities*, but we know, thanks to our personal multidimensional experience of reality, that entities need not to be only physical, but can also be extraphysical and mental.

ENTITIES

STUDENT. Can you make some explicit examples of these portions of reality you call entities?

LECTURER. Sure: the chair on which you are sitting, the table in front of us, the air we are breathing, the rain outside, falling on the pavement, my *holochakra* which is presently receiving an energetic shower as a consequence of this very exciting discussion, your *psychosoma* that in this moment I cannot see, and your physical body that I can clearly watch using my

physical eyes, and so on.

STUDENT. If I understand correctly, anything bearing a name in our language is an entity.

LECTURER. Definitely. When we have enough knowledge about an entity, we usually give a name to it. But let us choose one in particular and try to go a bit deeper in our analysis. Let us consider for instance your body.

STUDENT. You mean me?

LECTURER. Not you, but that portion of your holosoma called the physical human body, or soma, that you are presently using for sipping a cup of tea and listening to me. Let us give your soma a name. If you agree, for commodity we shall simply call it *entity S.*

STUDENT. It sounds good. I'm entity *S*.

LECTURER. No, you are not entity *S,* you are just using entity *S* to manifest yourself in this dense physical dimension.

STUDENT. Yes of course, sorry.

LECTURER. No problem. Now, giving a name to the entity under investigation is just the beginning. The second step is to determine what are the relevant *properties* characterizing it, and it is here of course that operationalism comes into play.

PROPERTIES

STUDENT. What exactly is a property?

LECTURER. We can say that a property is something that the entity *has* independently of the type of context the entity is confronted with. For instance, your soma is taller than 1,5 meters, am I correct?

STUDENT. Yes, I am… hem, I wanted to say… my soma certainly is, taller than 1,5 meters.

LECTURER. Good. So, you'll certainly agree with me if I say that entity *S* has the property of "being taller than 1,5 meters."

STUDENT. I agree. But tell me please: is this property operationally defined?

LECTURER. Sure, and let me explain why. Every time you want to know if an entity has or has not a given property, all you have to do is to ask a *question*.

STUDENT. What question?

LECTURER. Simply the question of whether the entity has that property or not. And the answer to such a question can either be "yes," the entity has the property, or "no," the entity does not have the property." Do you agree?

STUDENT. Yes, that's obvious.

LECTURER. And do you agree that if the question is *operationally defined*, then also the property, consequently, will be operationally defined?

OPERATIONAL QUESTIONS

STUDENT. I think I agree. But what does it mean that a question is operationally defined?

LECTURER. It means that the question comes with an experiment that can be performed on the entity, to determine whether or not it has the property under consideration.

STUDENT. Could you be more specific?

LECTURER. Ok, let us consider the specific example of the property of "being taller than 1,5 meters." Could you please describe to me an experiment that I could perform to determine if *S* has such a property or not?

STUDENT. That's easy. For instance, you can take a measuring tape and use it to measure the height of the entity; if the result is beyond 1,5 meters, the answer to the question is "yes," the entity has the property of being taller than 1,5 meters, otherwise the answer is "no."

LECTURER. Very well. What you have just done is to define an

experimental project, by specifying the measuring apparatus to be used (the tape), the operations to be performed, and the rule to be used to interpret the results of the experiment in terms of "yes" and "no" alternatives. Such an *experimental project*, or *test*, is precisely what I had in mind when I was mentioning an *operationally defined question.*

STUDENT. If I have correctly understood, an operationally defined question is a *yes-no-experimental test,* allowing one to define a property in operational terms.

LECTURER. Correct. If you ask me what a given property is*,* I can answer you in operational terms, saying that it is something that an entity possesses if, should one decide to perform a given test, the answer "yes" would come out *with certainty*.

STUDENT. In other words, the test is what defines the property.

LECTURER. Exactly, although you better keep in mind that in general there is always an infinity of different tests one can equivalently use to operationally define a same property. For instance, as an alternative to your previous test, I can define the following procedure: take 25 Projectiology's books of Dr. Vieira, pile them up and place the entity by the pile. If the entity surpasses the pile the answer is "yes," otherwise the answer is "no."

STUDENT. I imagine that your test and my test are equivalent because the entity called "Dr. Vieira's Projectiology book" has the property of being 6 centimeters thick, so that a pile of 25 books is 1.5 meters tall.

LECTURER. Good deduction.

STUDENT. So, if I got it correctly, generally speaking a property is defined in operational terms by means of an entire collection of equivalent tests.

LECTURER. Yes, and all these equivalent tests belong, by definition, to a same *equivalence class of tests*, which is in a one-to-one correspondence with the property it defines.

ACTUALITY AND POTENTIALITY

STUDENT. Then, when one wants to verify if an entity has a given property or not, one simply has to pick one of the available equivalent tests in the corresponding class and use it to perform the experiment. Right?

LECTURER. Yes. If the answer is "no", you can be certain that the hypothesis regarding the property is false, and in this case one usually says that the property is only *potential.*

STUDENT. But if the answer is "yes", then the hypothesis is proved, isn't it?

LECTURER. Not proved, just *confirmed*.

STUDENT. I don't understand. If you take the measuring tape and measure my soma's height, and if the result is beyond 1,5 meters, then, in my opinion, the hypothesis that my soma is taller than 1,5 meters is not just confirmed, but really proved.

LECTURER. Yes, in that specific case you might be correct. But this is not a consequence of the fact that you have performed the test and found the answer "yes," since this will only confirm the hypothesis, not prove it.

STUDENT. I'm confused. What am I missing?

LECTURER. To prove a hypothesis about an entity, it is not sufficient to perform a test corresponding to it, and find the answer "yes." It is only when you can *predict with certainty* that the test would yield the outcome "yes," without the need to perform it, that you can say that the property is proved. Only in that circumstance one can affirm that the entity *has* said property in *actuality* or, more simply speaking, that the property is *actual.*

STUDENT. This sounds very subtle to me. How can you know the answer if you don't perform the experiment?

LECTURER. To help you clarifying this point, let me consider the example of the property of "being burnable," which as you certainly know is the capacity of a physical substance,

under certain conditions, of combining with oxygen and producing heat.

STUDENT. Can you operationally define such a property of "being burnable"?

LECTURER. Yes. My test is as follows: put the entity in a cremation furnace, allow the furnace to reach high temperatures, wait a couple of hours, then check if the entity has been efficiently disintegrated. If this is the case, the answer is "yes," otherwise the answer is "no." What do you think: does your entity *S* have the property of "being burnable"?

STUDENT. Yes, of course.

LECTURER. How do you know it? I haven't yet performed the test on your soma.

STUDENT. And you will not!

LECTURER. Are you telling me that you know in advance that the answer to my test is "yes."

LECTURER. Definitely.

LECTURER. How can you be so sure?

STUDENT. By experience. Countless entities practically identical to my entity *S* have passed through your test, and as far as I know, the answer has always been "yes." Consequently, I think I can conclude with reasonable certainty that entity *S* actually has the property of "being burnable", without any need to perform the test.

LECTURER. Yes, and if you can conclude that the property is *actual*, this is precisely because you know the result of the experience before even doing it.

STUDENT. What you are saying is that once an experimenter has done for a number of times the same test, or equivalent tests, on the same kind of entity, and has discovered that the answer is always the same, then he (or she) can reasonably affirm that, should he decide to perform the test again, on a same kind of entity, the same answer would come out with certainty.

LECTURER. Yes, exactly.

STUDENT. This is good news, given that now I can affirm with certainty that my soma is burnable, without any need to destroy it!

LECTURER. Yes, that's definitely safer. So, let me briefly resume our findings so far. Systems, or entities, are portions of reality that we can characterize by means of properties. Properties, on the other hand, are defined in operational terms by means of classes of equivalent experimental projects, or tests. A property is said to be *actual* if and only if should one decide to perform a test corresponding to that property, the expected result would be certain. This means that the entity *has* the property *before* the test is done, and even before one has decided to do it. And this also means that the property corresponds to an *element of reality* existing independently from our observation.[3] On the other hand, if one cannot state in advance with certainty what would be the result of the test, but needs to perform it on the entity, and finds the "yes" answer, then all one can say is that the property has been confirmed, but not proved. Finally, if the outcome is different from the expected result (the "no" answer) one knows with certainty that the entity *hasn't* the property in actuality, and that the property is only *potential.* Do you agree with all this?

RELATIVE CERTAINTY

STUDENT. I agree, yes. However, I don't think that one can ever be absolutely certain about anything. Even in the case of my soma, I cannot logically exclude that, maybe, I have some powers of invulnerability that I'm not aware of, so that strictly

[3] This is exactly the definition historically given by Einstein, Podolsky and Rosen (Einstein et al., 1935), in their celebrated paper of 1935, of an *element of reality*: "If without in any way disturbing a system, we can predict with certainty the value of a physical quantity, then there exists an element of reality corresponding to this physical quantity."

speaking I cannot be absolutely certain that my entity *S* is truly burnable.

LECTURER. This is a good remark and you are correct. If you prefer, we may replace the term *certainty* with the term *relative certainty*, or *temporary certainty.* Indeed, we cannot exclude that in future we may encounter *anomalies*, like for instance a non-burnable human physical body. However, the discovery of anomalies of this kind would deeply affect our entire description of reality and impose a deep modification of the leading-edge theory we are currently employing to understand it. Our present reality is made of what we think we know with certainty about it, given the evidences that are available to us and given the best corroborated theories we dispose of at the moment.

STUDENT. Do you mean that we are allowed to be certain about something, provided we keep in mind that our certainty of today may not correspond to our certainty of tomorrow?

LECTURER. That's the idea.

STUDENT. I remember that during the CDP course the concept of *leading-edge relative truth* was mentioned. Is this related to what you are saying?

LECTURER. Sure. Certainty and truth are absolute concepts that are evidently related one to the other. Therefore, similarly to the concept of leading-edge relative truth, we can also define a concept of *leading-edge relative certainty*. A leading-edge relative certainty is a certainty we can derive from our best understanding of reality.

STUDENT. I see. And our best understanding of reality is the understanding we obtain from the best corroborated theory of reality available to us at that moment, or leading-edge theory of reality.

LECTURER. Precisely. A leading-edge theory is by definition a theory that has been submitted to the more severe and decisive experimental tests, as well as to rational criticisms, and has survived them, whereas its rival theories have not.

STUDENT. So, as I said before, all we have to do is to keep in mind that what we believe is true and certain today may not be any more true and certain tomorrow, because reality is constantly changing and because we, consciousnesses, are evolving and thus constantly increasing our knowledge about the reality in which we participate. For all these reasons, we cannot pretend that our today truths and certainties are to remain permanently valid.

LECTURER. Yes, well said. What we believe is real today may not be considered as real tomorrow. But take care that even this is not certain and necessarily true. Concepts like relative-truth and relative-certainty are also relative. Otherwise, the claim that all truths and certainties are forcedly relative would constitute an absolute truth, hence contradicting itself.

STUDENT. Now I'm confused. How do I have then to understand these concepts?

LECTURER. Simply as being both absolute and relative: they are absolute concepts with a contextual validity, their absolute character being only relative to a specific domain, which could be spatial, temporal, evolutionary, or whatever.

IDENTITY

STUDENT. All right, I think I got the point. But now I was wondering: all the properties we have so far considered in association with my entity *S,* they are always actual. However, I believe that in general properties should also change with time, so that those which were only potential in the past may become actual in the present, and vice versa.

LECTURER. This is again a very pertinent observation. Indeed, so far in our discussion we have only considered actual properties of entity *S,* which are not changing with time.

STUDENT. Undeniably, for as long as my soma will exist, and provided no unforeseen anomalies manifest, it will be burnable and taller than 1.5 meters.

LECTURER. Yes, and properties like this, which are always actual, are said to be *intrinsic properties* of an entity. Intrinsic properties are *attributes* that can be used to define and characterize an entity. In other words, they are part of the entity's *identity*. However, not all properties are of this kind. In general, properties can change, being either actual or potential. Let us consider as an example the property of "having the eyes open." Tests corresponding to that property are very simple and consist in observing the eyes of the entity to determine if they are open or closed. Needless to say, the property is meaningless if the entity is not equipped with at least one eye. Now, since you frequently blink your eyes, the status of this property is rapidly alternating from actual to potential, as time passes by. And of course, there are countless other properties of this kind one can associate with your entity *S*, that are also changing from being actual to being potential, and the other way around. This observation allows us to introduce a very important concept, which we can now define in a precise manner: the concept of *state.* As you are probably aware, nearly every scientific theory or discipline utilizes, more or less explicitly, the notion of state of a system, or entity. Before the quantum revolution, it was generally believed that all information about an entity, as well as about all possible outcomes of experimental measures on it, would be perfectly determined once one would know its state and how such state changes with time, according to some given dynamical laws. But tell me: what do you think would be a sound definition for the state of an entity?

STATE

STUDENT. Let me think… If I'm correct, in its common sense, the word "state" refers to the condition of something.

LECTURER. Yes, and what characterizes the condition of an entity?

STUDENT. Well, I think that the condition of an entity can be characterized by what one can say about the entity… I mean, what one can say about its condition. Hmm, it sounds

tautological.

LECTURER. Not really. Do you mean: what one can say about the condition of the entity that is known to be true?

STUDENT. Oh, now I see: the state of an entity corresponds to what the entity is… I mean, what an entity is with certainty, independently from its context.

LECTURER. Exactly. And using a more precise language, this can be reformulated as follows: *the state of an entity is, by definition, the set of all its actual properties*.

STUDENT. I see… that's clarifying. So, the different states an entity can assume, its different *modes of being*, correspond to what an entity can have in terms of actual properties.

LECTURER. Yes, and therefore, in some very general sense, we are allowed to say that *we are what we have.* Which is so true, at any level. For instance: to be financially rich, I need to have money; to be intelligent, I need to possess the attribute of intelligence; to be intraphysically lucid, I need to have a sufficient number of *cons*; to be lovable, I need to have enough love to share, and so on. *To be is to have*.

STUDENT. Yes, it's logical.

LECTURER. So, being understood that a state is the collection of all properties that are actual for an entity in a given moment, it is also clear, following our discussion, that once you know the state of an entity you know all it can be said with certainty about it. And since with time some actual properties become potential, whereas some other potential properties become actual, this also means that the state of an entity, in general, will change with time. In other words, what one can state about S now is different from what one can state about S in, say, a couple of hours, according to the fact that the states of all the entities composing reality are constantly changing, as a consequence of that mega process we usually call *evolution*.

STUDENT. Tell me: is it possible to determine in advance the future evolution of an entity?

LECTURER. This is the very old question of *determinism*. To answer this question, we need to distinguish two cases. The first case corresponds to the situation where your knowledge of the state of the entity, as well as your knowledge of the nature of the interactions between the entity and its environment, is not complete. For instance, this may be so because your experience about the entity is not complete and you haven't yet discovered all its *stronger properties*.

ATOMIC PROPERTIES

STUDENT. What do you mean by *stronger* properties?

LECTURER. Consider again the property of entity *S* of "being taller than 1.5 meters," and let us call it, for commodity, property *a*. If you remember, property *a* can be operationally defined in terms of a test using a measuring tape.

STUDENT. Yes, if the height measured by the tape is above 1.5 meters, the answer is "yes," and "no" otherwise.

LECTURER. Exactly. For simplicity, let us call such a test α (alpha). Now, in addition to test α you can also consider a new test α' (alpha prime), which is the same as α with the only difference that now the answer is "yes" if the tape measures a height above 1.75 meters. Of course, to test α' you can associate a new property *a'*, which is the property of "being taller than 1.75 meters." Property *a'* is said to be *stronger* than property *a*, because when *a'* is actual then also *a* must be actual. And this is so because when the question α' is true then also question α must be true.

STUDENT. So, generally speaking, one can order tests and properties according to their relative strength.

LECTURER. Right. There is in fact some interesting mathematical structure behind this order, but this would bring us too far in our discussion. The important point to understand here is that there are properties which are more fundamental than other properties, in the sense of being stronger than other

properties.

STUDENT. But then, necessarily, there should also be properties which are, in some sense, the strongest.

LECTURER. Correct. These are the properties whose actuality is not deducible from the actuality of other properties, and are usually called the *atomic properties* of an entity.

STUDENT. So, if I understand properly, to have a complete knowledge of the different possible states of an entity, I need to have access to all its atomic properties.

LECTURER. Exactly. And this is why the atomic properties are also called *state-properties*. In fact, each atomic property is in a one-to-one correspondence with a state of the entity, and vice versa.

STUDENT. Now I'm a bit lost. Why is it so?

LACK OF KNOWLEDGE

LECTURER. Let us first finish our discussion in relation to determinism, and we shall come back to this point in a few minutes. If my knowledge of the state of an entity, and of the laws governing its evolution, is incomplete, I will clearly not be in a position to predict with certainty its future states. In this situation, because of my *lack of knowledge*, the best I can do is to formulate a probabilistic prediction.

STUDENT. Why probabilistic?

LECTURER. Because probabilities are the best (mathematical) language a scientist can use to express in precise terms his or her lack of knowledge about something.

STUDENT. I'm puzzled. Recently I have read a popular book about quantum mechanics.[4] I remember that the author

[4] Choose any one of the countless popular books of quantum physics standing on the shelves of your favorite bookstore, or simply enter "quantum" in www.amzon.com.

explained that quantum systems are really unpredictable, and that quantum theory can only determine the outcomes of experimental tests in terms of probabilities. According to the author, these quantum probabilities are not the result of a lack of knowledge about the entity, but instead the unavoidable elements of the fabric of reality.

LECTURER. Yes, this is a common view within a number of quantum physicists. But it's just a view. Let me explain. In quantum mechanics one can, at least in principle, describe the state of a physical entity in complete terms. In other words, physicists consider today that they have identified all the atomic properties of simple physical entities, like for instance the elementary particles. But in spite of this, the best their theory can do is to deliver probabilistic results, and not certain results. And since, apparently, this probabilistic indeterminacy is not of an *epistemic* nature, being not related to a situation of lack of knowledge, many quantum physicists pretend that quantum probabilities are of an *ontological* nature, that is: unavoidable and irreducible ingredients of reality itself.

STUDENT. And do you agree?

LECTURER. Well, personally I cannot understand what a *probability* would mean if I cannot relate it to a situation of *lack of knowledge*. In that respect, you may like to know that in recent years some physicists, trying to understand what the possible mechanisms are that can explain the mysteries of quantum probabilities, succeeded in developing very interesting models of quantum machines [AD, 1994]. These surprising machines are conventional macroscopic mechanical objects, like those we encounter in our everyday life, exhibiting pure quantum mechanical behaviors.

STUDENT. Macroscopic machines with a quantum behavior, how is it possible?

LECTURER. It is possible because the difference between a quantum entity and a classical (non-quantum) entity, relies only in the structural difference of our possibilities of actively experimenting with these entities.

STUDENT. I'm lost.

QUANTUM PROBABILITIES

LECTURER. Sorry, I understand that this may sound a bit technical. To really understand the difference between a classical probability and a quantum one, one would need to go into some mathematical details. By the way, do you have any knowledge about probability theory?

STUDENT. Hem, very little.

LECTURER. Have you ever seen in a textbook of statistics a discussion about the possible influences a measuring apparatus can have on a system?

STUDENT. I don't think so. This seems to be more a problem of physics than one of statistics.

LECTURER. Indeed, and this is why the type of probabilities appearing in quantum mechanics have never been discussed in textbooks of statistical theories. These probabilities do not arise because of our lack of knowledge about the state of the system, but because of our *lack of knowledge about the interaction between the measurement apparatus and the entity*. This however is not an exotic situation we only encounter when dealing with microscopic physical systems, like elementary particles. It is in fact a common situation we also encounter in our everyday life.

STUDENT. An example, please.

LECTURER. Assume you have just bought a packet of elastic bands, and that you want to test their property of "being left handed".

STUDENT. A left-handed elastic band? It sounds weird.

LECTURER. I agree, but let me tell you what is the experimental project I have in mind, allowing me to define in precise operational terms the property of an elastic band of "being left-handed." It's very simple: take an elastic band and stretch it until it breaks. If the longest fragment remains in your left hand,

then the answer is "yes," otherwise "no."

STUDENT. This test reminds me of your previous test of "being burnable." After the test, the entity is not any more the same as before the test. These are invasive tests, destroying the entity.

LECTURER. Correct. The test deeply affects the entity. If it destroys it, or it creates new entities, this is just a matter of point of views. Considering my left-hand-test with the elastic band, of course it presumes that all elastic bands in your packet have the intrinsic property of "being breakable." If you take an elastic band and stretches it strongly enough, it will certainly break. And since you can predict in advance that it will break, you know that "being breakable" is a stable intrinsic property, or attribute, of any of the elastic bands in your packet. However, you must not commit the mistake to confuse a "breakable" elastic band with a "broken" elastic band!

STUDENT. Why?

LECTURER. Because a breakable elastic band can be broken, whereas a broken elastic band is not any more (easily) breakable.

STUDENT. Oh, I see what you mean.

LECTURER. Good. Then let me ask you now to do something: take all your elastic bands out from your packet and make of them two different lots. A left lot and a right lot. In the left lot put all the breakable, but not broken, left-handed elastic bands, whereas in the right lot put all the others, those who are not broken and not left-handed. Can you do it?

STUDENT. That's impossible. I cannot determine in advance if an elastic band is left-handed or not.

LECTURER. Why?

STUDENT. Because only the test can reveal the left-handedness of an elastic band.

LECTURER. And tell me: is this so because you are lacking some important and specific information about the mechanical properties of the elastic bands in your packet? In other words, is

your impossibility to determine in advance the left-handedness of an elastic band a result of your lack of knowledge about the specific state of the elastic-band-entity?

STUDENT. No, even if I would know everything about all the properties and states of an elastic band, I think this would not help me to determine in advance if it is or it isn't left-handed.

LECTURER. I agree. If this would be the case, it would mean you could identify some hidden attributes of the elastic bands that are strongly correlated to their propensity of being left-handed. And then, you could a priori separate the elastic bands in the mentioned lots. Also, you could count the number of elastic bands in the left-handed-lot and divide this number by the total number of elastic bands, thus obtaining an a priori probability of picking a left-handed elastic band from the packet; and such a probability would be a typical classical (non-quantum) probability.

STUDENT. But this I cannot do. Does it mean that a probability calculus is not possible in this case?

LECTURER. No, it only means that the probabilities you can derive from your experiments are of a different nature than the usual classical probabilities. They are quantum-like probabilities.

STUDENT. Quantum probabilities with elastic bands? How can it be?

CREATING AND DISCOVERING

LECTURER. Look, classical probabilities express our lack of knowledge about properties that were already present before doing or even deciding to do the experiment. In other words, classical probabilities are about our possibility to *discover something that is already there*. Quantum probabilities, on the other hand, express our lack of knowledge about *properties that did not exist before the experiment*, but are literally *created* during the experiment. The distinction between left-handed and non-left-handed elastic bands is created by the test itself. Do you understand?

STUDENT. I see. So, the distinction between classical and quantum probabilities is just a distinction between *discovering* what is already there and *creating* what is still not there, by means of an experiment.

LECTURER. Yes, you got the point, exactly. But this doesn't mean that quantum probabilities are of an *ontological* nature. They are always related to a situation of lack of knowledge, but of a *contextual* nature: they are the result of our ignorance of how the context, the environment, influences the state of an entity during its evolution, and in particular during an experimental test. In the case of the elastic bands, it is very clear that our lack of knowledge corresponds to our ignorance of the exact points where the elastic band will break during the experiment.

STUDENT. But, if I repeat the experiment many times, and assume that the elastic bands have all been manufactured in a similar way, I presume I can still work out an experimental probability for an elastic band of being left-handed.

LECTURER. Sure. In fact, in this very simple situation, you can also theoretically deduce such a probability, by a simple symmetry argument. Indeed, being that the magnitude of the forces applied by your hands on the two sides of the elastic bands are necessarily the same (because of *Newton's action-reaction third law*), when you break them you cannot favor, in whatever way, one side or the other, so that on average you'll end up with the same quantity of left and right handed elastic bands. In other words, your experimental quantum-like probability will necessarily tend towards the value of one-half.

WAVE FUNCTION

STUDENT. And what about the so-called *wave function*?

LECTURER. What do you mean?

STUDENT. In that popular book of quantum mechanics, I have read, the author explained about a mathematical object in the

theory, called the wave function.[5] According to him, the wave function describes the state of the entity, and if one takes a sort of square of this wave function, one obtains all the relevant quantum probabilities. So, I imagine that if I could calculate the wave functions of my elastic bands, I would then succeed deriving from them all the probabilities I'd like, for instance the one of being breakable, which should be equal to one, or the one of being left-handed, which should be equal to one-half, according to our previous argument. Am I correct?

LECTURER. Not exactly. Structurally speaking an entity like an elastic band is very different from an entity like, for instance, an electron, which is usually described in terms of a mathematical wave function obeying dynamical equations like those of Schrödinger or Dirac. By this I mean that, mathematically speaking, the elastic-band-entity cannot suitably be described by a wave function, but by a rather different mathematical object. The reason for this is that quantum mechanics, in its standard formulation, is an incomplete theory that cannot accommodate for the description of all the different structures we encounter in reality, like for instance entities that can divide into separated fragments.

STUDENT. And do we know how to describe these more complex structures?

LECTURER. Yes, and this is a field still under intense investigation. These more general structures are called *quantum-like structures*. They are neither classical nor purely quantum, but constitute a sort of more general intermediate picture. These are however rather advanced topics to be discussed and would bring us too far away from the scope of our present conversation.

[5] The present and next sections may appear a little more difficult to grasp for those readers having little or no knowledge at all about physics and quantum mechanics. However, the advice is not to turn off from the text, but just follow the general sense of the discussion, without being too concerned about the exact meaning of some of the technical terms.

STUDENT. If I understand correctly, the wave function is a suitable mathematical object only to describe pure quantum entities, as for example elementary particles like electrons.

LECTURER. Exactly, and for those entities you can suitably use the wave function to determine, for instance, the probability of finding an electron in a specific region of space.

STUDENT. Then, what really is the wave function? Is it something related to our best knowledge of the locations possibly occupied by the electron-entity?

NON-LOCALITY

LECTURER. Certainly not. The wave function doesn't represent our best knowledge about where the electron is: it precisely describes its real physical state.

STUDENT. But since the wave function delivers the probabilities of finding the electron in different spatial regions, doesn't this mean that it expresses, in a mathematically precise form, our knowledge about where the particle is located?

LECTURER. If this would be correct, it would mean that by acquiring more knowledge we would be in a position to state exactly where the electron actually is, even before checking its position by means of a suitable experimental apparatus. But this one cannot do. There is no extra knowledge one can acquire about the state of the electron, in addition to that already contained in its quantum wave function.

STUDENT. Does it mean that I cannot know in advance where the electron is located, but just tentatively localize it by means of an experiment?

LECTURER. Yes, exactly the same way you cannot know in advance if an elastic band is left-handed or not.

STUDENT. Are you saying that before the experiment an electron doesn't have any specific position in space?

LECTURER. Precisely. Having a position, or more generally

being localized in some spatial region, is a property. For instance, you can consider an empty box and ask: is the electron inside the box? Of course, to make this question operationally defined, you need to conceive a suitable experimental apparatus, sensitive enough to detect the possible presence of the electron inside the box. Then, you can verify if you can predict whether the electron is or isn't inside the box, before switching on the detecting apparatus. By experience, you'll learn that apart from some rather special circumstances, predictions of this kind are impossible and that the best you can do is to formulate probabilistic predictions. In other words, the experiments will show you that microphysical entities like electrons are *non-local entities*.

STUDENT. Does it mean that electrons are more like waves, spreading all over space?

LECTURER. This is a common image, but very misleading because these waves are not physical waves but mathematical waves giving the probabilities (in fact the probability amplitudes) of finding the electron in specific spatial regions. This may suggest that the electron is somewhere in space, but in a location we can only discover when we try to detect it. This kind of reasoning, however, is incorrect, because the property "being somewhere in space" is in general not an actual property of the electron, and this is not because of our lack of knowledge about its real state.

STUDENT. Do you mean that the property of "being somewhere in space" doesn't even exist before I try to detect the electron, since the property is created during the experiment?

LECTURER. That's the point. The spatial position of an electron is literally created during the detection process, so that prior to the detection process the electron wasn't at all present inside space!

STUDENT. And where was it located?

LECTURER. Outside that dimension that we usually call physical space, although certainly not very "far away" from it.

STUDENT. Does it mean that an electron is a multidimensional entity?

LECTURER. I think this is an indisputable conclusion, although I cannot say in what kind of dimension an electron would usually stay, when not present in our physical space.

STUDENT. It's difficult to imagine the behavior of such an evanescent multidimensional entity.

LECTURER. I agree, but consider as an example the entity called "English language." Where is this entity usually located? We can say of course that the "English language" is always present in the mental dimension. But what can we say about its presence in our physical space?

STUDENT. Oh, I see. If nobody is speaking, and if all English writings have been burned by a mad scientist, then the English-language-entity is not any longer localized inside our physical space.

LECTURER. Indeed. But as soon as a detecting apparatus called "Anglo-Saxon intraphysical human being" pronounces or writes an English word, a magic thing happens: a spatial localization for the entity "English language" is created, somehow similarly to the way a spatial localization for the electron is created by a measuring device.

STUDENT. That's amazing. So, the so-called quantum non-locality is not to be understood as a phenomenon of delocalization, but really as an *absence of spatiality*.

LECTURER. Yes, strictly speaking we cannot say that an electron is a non-local entity in the sense of being a delocalized object like a physical wave. Indeed, although physical waves, like sound waves, can spread all over space, and thus delocalize, they are nonetheless objects that remain located inside space. But the wave function describing the electron is not a physical wave: it is just a mathematical object describing the state of the particle-entity, from which one can derive the probabilities of capturing the particle inside specific spatial regions, using standard detecting devices.

STUDENT. But I have read that, in many experiments, physicists have truly demonstrated that a particle, be it massive like an electron or a neutron, or non-massive like a photon, can really behave as a delocalized spatial entity, in the sense of being somehow simultaneously present in different spatial regions, which can even be separated by many kilometers.

LECTURER. Yes, these experiments have been truly and successfully performed. But your interpretation of them is not entirely correct. When a particle is detected, this always happens in a single, unique place. Particles are not ubiquitous in the sense of being simultaneously detectable in different places. Otherwise, from a single electron one could obtain many electrons, thus violating the mass-energy conservation law. In other words, we cannot say that for instance a neutron is simultaneously bi-located inside two separated spatial regions. The only thing we can say is that the particle has, in the same instant, a non-zero probability of being dragged inside different separated places.

STUDENT. But this is not surprising: I'm also potentially present in different places at the same time. In fact, in this moment the property of "being in this tearoom" is an actual property for me, and consequently the property of "being in whatever other place different from this tearoom" is a potential property. What distinguishes the potentiality of my macroscopic soma from that of an elementary particle?

LECTURER. There is a big difference. Your entity *S*, or soma, is a macroscopic entity *permanently localized* inside space. Now, being that entity *S* is already localized somewhere inside space, it cannot simultaneously be localized in another place. In other words, the probability for your entity *S* of being somewhere else than here, in this present moment, is equal to zero.[6]

[6] One may think that the (controversial) phenomenon of *parateleportation*, consisting in the dematerialisation and rematerialisation of an intraphysical consciousness (or of any other physical entity) in a different and possibly distant spatial location, contradicts this affirmation. However, one should remember that, as far as it is known, the process is not

STUDENT. And why would the situation be different for an elementary particle?

LECTURER. Because the elementary particle, for most of its time, is not located inside space. Therefore, it has a non-zero probability, or tendency, of being in different places in the same instant.

STUDENT. Ok, I think I understand now: if I'm outside of a swimming pool, I can potentially dive in any direction and immerge in any place of it, whereas if I'm already swimming inside, I already have a specific place in the swimming pool and can only swim from that place to acquire a new one.

LECTURER. That's a nice metaphor.

SPACE

STUDENT. Maybe it's a nice metaphor, but it doesn't help me to understand the strange behavior of a particle staying most of its time outside our physical space, being nevertheless strongly affected by all that happens inside of it.

LECTURER. I see what you mean. The physical space and this other "space" where the elementary particles usually stay must be, in some sense, superposed on one another.

STUDENT. I was asking myself: what is space after all?

LECTURER. Just a dimension, where entities having common properties can establish specific relations. Or, if you prefer, a space is a substance made of entities that can relate together in some specific ways.

STUDENT. Are you saying that it is the entities interacting inside a space that are forming the space itself, which is then a sort of substance made of interacting entities?

LECTURER. Yes, precisely. But you must here understand the

instantaneous but develops on a finite time interval, however brief it may be.

concept of *substance* in a very broad sense. *Albert Einstein* used to say that substances define relations, whereas for *Niels Bohr* it was somehow the contrary that was true: relations define substances. Probably, both views are valid: entities made of similar substances can interact together, and therefore relate; but also, because of the relational properties they can establish, interacting entities are precisely the constituents giving rise to an emerging substance.

STUDENT. I see, and according to the properties they have and the relations they can establish, they generate a dimension instead of another.

LECTURER. Correct. For instance, we could say that the physical space is that dimension, or substance, composed of all entities that, among other things, have the property of being *local*, in the sense that they form a sort of *whole* that cannot be separated into different pieces without losing their identity [A, 1990].

STUDENT. I'm not sure I understand what you mean by this.

LECTURER. What I mean is that our physical space, as we are used to perceive it, can be understood as a dimension made of entities having the property of *macroscopic wholeness*. This means that if an entity is simultaneously present inside two different macroscopically separated regions of space, then it must also be present somewhere between these two regions. Because if this would not be the case, it would mean that the entity would be made of two fragments separated by a distance, and therefore it would not form a compact connected whole. In other words, the entity would not be an entity, but two different separated entities.

STUDENT. And since, on the other hand, an electron is capable of separating into fragments without losing its connectedness, this may explain why in general it cannot lie inside physical space.

LECTURER. Exactly. And it is only when all its fragments are recombined into a single piece, while captured by a macroscopic detection apparatus, that the electron can temporarily reenter the physical space.

STUDENT. An entity that can be broken into separated pieces, without losing its integrity… difficult to imagine.

LECTURER. Not necessarily. Take for instance a one-dollar note, tear it in two separate pieces; then place each of the two half notes inside a separate box, and ask yourself: where is the dollar now? Strictly speaking, in each box there is no more a dollar, but at best a potential dollar. In other words, the dollar has disappeared from our physical space. However, when you recombine the content of the two boxes, by means of a suitable experiment, a spatial location for the dollar is recreated again.[7]

STUDENT. That's really an amazing example. Tell me: don't you think that all the different physical and extraphysical dimensions are somehow present altogether, and that it is just our way of selecting a part of reality that creates the impression of being inside a dimension instead of another? If, for instance, we filter out all non-local entities, we get the physical space and the so-called macroscopic physical dimension. On the other hand, if we filter out local entities, we can access a much ampler dimension, which, maybe, is nothing but the *mental* one. And also, we could speculate that the *extraphysical dimension*, situated somewhere between the physical and the mental, is by some means a sort of intermediate dimension, in which entities are neither completely local nor perfectly non-local.

LECTURER. A challenging idea. Consciousnesses would then "construct" the different dimensions simply by filtering reality by means of their different vehicles. But what do you think if we come back now to our previous discussion about determinism, which we haven't yet completed?

STUDENT. Yes of course. What were our conclusions so far?

UNPREDICTABILITY

LECTURER. What we have concluded so far is that quantum

[7] This was one of the favorite examples of *Constantin Piron*, when teaching his *cours de mécanique quantique* in Geneva [P, 1990]

physics is not demonstrating any intrinsic, ontological indeterminism within reality. What quantum mechanics teaches us is that not only our knowledge of the state of an entity is important to formulate accurate predictions, but also our knowledge about how fluctuations in the experimental apparatus (the context) will affect the entity, by *creating new elements of reality*. Therefore, there is no incompatibility between quantum mechanics and the deterministic hypothesis, since probabilities appearing in quantum theories can be understood in terms of our ignorance of the interaction between the entity and the experimental apparatus. Therefore, similarly to classical probabilities, they are also of an epistemic nature.

STUDENT. Are you saying that, at least in principle, the world is completely deterministic?

LECTURER. What I'm saying is that modern physical theories, like quantum mechanics, have not demonstrated so far the presence of any irreducible indeterminism in our physical reality. Of course, in practical terms, we are constantly in a situation of lack of knowledge, so that indeterminism is almost everywhere in our practical experiences of reality. But it is only an indeterminism of an epistemic nature: by acquiring more knowledge and a better capacity of control, part of it at least could be eliminated.

STUDENT. And what's your personal position? Do you believe that there is some level of ontological indeterminacy inside of our reality?

LECTURER. According to my understanding of reality, I think that the answer is affirmative. But I believe this is due to the fact that the consciousnesses are participators of reality.

STUDENT. Do you mean that the consciousnesses are unpredictable?

LECTURER. Yes and no. Most consciousnesses are very predictable, especially if their evolutionary level is not very high. As you know, not very evolved (intraphysical or extraphysical) consciousnesses manifest a great deal of robotic behaviors during their existence. And robotic, mechanical

behaviors, are not difficult to predict if one knows enough about human or sub-human nature. But the more a consciousness evolves, the better it can access and use its fundamental attribute of *free will*, which is its capacity of operating *free choices* and put them into action. If you accept the hypothesis that choice is an intrinsic property, or attribute, of the consciousness, then you must also accept that reality, in which the consciousnesses manifest, has some level of ontological indeterminism.

STUDENT. Because we cannot predict in a given situation what the choice of a consciousness will be?

LECTURER. If choice exists, and is not a mere illusion, then it must be free, and therefore, at some level at least, it must be fully unpredictable. This also means that choice cannot be accounted for by the presently known physical laws, and by the unknown extraphysical ones as well.

STUDENT. So, according to what you are telling me, the more a consciousness is evolved, the more it has freed itself from mechanical, robotic behaviors, and the more it can manifest its ability of operating free choices and put them into action. And since by definition true choices are unconditioned, the evolution of a sufficiently evolved consciousness is forcedly unpredictable and beyond the determination of physical and extraphysical laws.

LECTURER. That's correct. But let me also emphasize that the more a consciousness evolves, the more it becomes predictable as well.

STUDENT. Now you are contradicting yourself.

LECTURER. Not really. What I want to say is that unpredictability doesn't mean irrationality, or total randomness. When an evolved consciousness expresses its free will, it doesn't become unpredictable because it loses coherence and logic in the way it behaves. On the contrary, the more it evolves and the more it manifests rationality, logic and coherence. Accordingly, its behavior becomes more and more meaningful, understandable, and consequently predictable, being fully

determined by who the consciousness really is, at its highest level of reality.

STUDENT. A nice evolutionary paradox!

LECTURER. Yes, but of course the paradox is only apparent. Probably, the best way to understand the unpredictability inherent in every consciousness is their intrinsic and fundamental ability of being *purely creative*.

STUDENT. Summarizing your reasoning, since reality is also made of consciousnesses, and since we can reasonably hypothesize that the consciousnesses have free will, then, at some very deep level, reality is purely unpredictable, in the sense of being purely creative.

LECTURER. Yes, nicely put. In general terms, we cannot pretend to know everything about all the entities composing reality. This should be clear since we are evolving consciousnesses, and our evolutionary process may also be understood as a process of growth of our knowledge. This means that, as we evolve, we become more able and efficient in predicting the future behavior of all entities, including ourselves. But also, on the other hand, we become more and more creative, and discover that there are entire domains of reality that are purely unpredictable, although perfectly understandable. Therefore, if free will is really an intrinsic property defining the core identity of the consciousnesses, then, strictly speaking, their evolution cannot be predetermined, even by an omniscient being. But let me also emphasize that free will and unpredictability are two different concepts. The former implies the latter, but the converse is in general not true. Because the attribute of free will is also related to our ability to autonomously determine our personal future, who we are and who we want to become, independently from the exterior conditionings and influences of whatever kind.

STUDENT. Do you mean that free will is also a synonym for *self-determination*?

LECTURER. Maybe not a synonym, though the two concepts are certainly strongly correlated. What is nonetheless clear is that

an unpredictable behavior cannot be a sufficient condition for self-determination.

STUDENT. I understand what you mean.

LECTURER. Let me now ask you something. Following what we have so far discussed, what do you think: is the outcome of whatever experimental test something that in general can be said to be certain in advance?

STUDENT. Of course not. If I remember well, only when a property is actual, the result of an experiment can be known with certainty in advance, at least in principle.

PREDETERMINATION

LECTURER. Yes, but this is not exactly what I am asking you. I'm not pretending that you know the answer of the test in advance, which can be either "yes" or "no." What I'm asking you is if the result, whether it will be "yes" or "no," is *a priori* certain.

STUDENT. Are you asking me if I believe that the outcome is in itself *predetermined*, although I may not have enough knowledge to predict it?

LECTURER. Exactly.

STUDENT. Well, since, as we discussed, the consciousnesses are also participators of reality, and since we can reasonably assume that the consciousnesses can manifest an unpredictable volition, the answer should be no.

LECTURER. Logically correct. But what if the entity you are investigating is not related, at least not in any direct and noticeable way, to a consciousness. What if the entity is one of the elastic bands in your hypothetical packet?

STUDENT. Hmm… then, in this case, I would say that the result should be somehow predetermined, although I may not know in advance what the outcome is, because of my general lack of knowledge.

LECTURER. Yes, as we have previously discussed, we have to distinguish two kinds of lack of knowledge. The first one is related to our possible incomplete knowledge of the state of the entity, whereas the second one, much more subtle and difficult to overcome, is related to our ignorance about the specific interactions arising between the entity and its context, and in particular the experimental testing apparatus. Every time we are in one of these two situations of lack of knowledge, or both, we cannot predict with certainty the outcome of an experiment. However, it seems reasonable to believe, according to the principle of determinism, that at least for simple entities like an elastic band, the result of the experiment, be it "yes" or "no," should be a priori determined.[8]

STUDENT. Yes, that's clear to me.

LECTURER. All right. Let us see if it is as clear as you pretend. Let me consider two different properties of your elastic bands. The first one is the one of "being breakable." Do you agree that this is an actual property of the elastic bands?

STUDENT. Yes, since I know in advance that, should I decide to perform the test of strongly stretching an elastic band with my two hands, I would certainly succeed breaking it, so that the "yes" answer would be certain.

LECTURER. Perfect. And what about the property of your elastic bands of "being burnable"?

STUDENT. Well, if I define such property using your cremation-furnace-test, then for sure "being burnable" is an actual property of any of the elastic-band-entities inside of my packet.

MEET PROPERTIES

LECTURER. Consequently, don't you agree that I can also affirm

[8] Assuming for instance that the test is carried out by a purely mechanical, automatic and fully controllable experimental apparatus of very high precision, instead of a rather unpredictable human consciousness.

that your elastic-band-entities have in actuality the property of being *at once* "breakable *and* burnable"?

STUDENT. Obviously.

LECTURER. Tell me: how can you be so sure?

STUDENT. I'm sure because if I would do the corresponding test, the "yes" result would be certain.

LECTURER. And what would be your experimental project for testing the *property* of being "breakable *and* burnable"?

STUDENT. Well, I simply need to test both properties and get on both of them the answer "yes".

LECTURER. Then try, please.

STUDENT. …

LECTURER. What happens?

STUDENT. I'm in trouble. If I burn the elastic band, then it is not any more breakable, as a burned elastic band is not any more a breakable elastic band. But also, if I break the elastic band, then I obtain two or even more pieces of an elastic band, so that the entity, in some sense, has already been disintegrated, and I'm not even sure I can appropriately apply your test for the property of being burnable. That's amazing.

LECTURER. Yes, the two properties *are not experimentally compatible*.

STUDENT. I'm confused. Does it mean that an elastic band doesn't have the property of being "breakable *and* burnable"?

LECTURER. How could we affirm something like this? We all know that elastic bands simultaneously possess both of these two properties. No doubts about that.

STUDENT. Then now is my turn to ask: how can you be so sure?

LECTURER. Because, should I decide to perform the corresponding test, the expected result would be certain.

STUDENT. And what is this magic test of yours?

LECTURER. When I say that an entity simultaneously possesses two properties, it means that both properties must be simultaneously actual. Therefore, should I decide to test anyone of these two properties, the positive result must occur with certainty. The subtle point here is that I don't need to practically perform both tests. I simply need to perform one of them, chosen in an *unpredictable* way.

STUDENT. But then this means that you are just testing one property, not both of them.

LECTURER. No, in fact I'm testing both. Let me be more explicit. Consider two generic properties, a and b, and their corresponding experimental tests, that we shall denote α and β, respectively. You can think of a and b as the properties of "being breakable" and "being burnable," or whatever else you like. The problem is: how can I construct a test for property c = "*a and b*"? Let me call χ the experimental test associated to property c. The question is: how can I define test χ in terms of the individual tests α and β (or tests that are equivalent to them)? The answer is very simple: the measuring apparatus for test χ is the same as the measuring apparatus for tests α and β, and the experimental procedure for χ consists of choosing in a *non-predictable* way either test α or test β and perform it; finally, the obtained answer is attributed to χ.

STUDENT. I maintain what I have said: you are just testing one of the two properties, not both of them.

LECTURER. All right. Tell me then: what is the only situation guaranteeing me that, should I perform test χ, as just defined, the "yes" answer would be certain?

STUDENT. Let me think. Since you are choosing test α or β in a non-predictable way, if you want to be certain about the outcome then you must be certain that both a and b are simultaneously actual properties. Hey, but this means that χ, necessarily, is simultaneously testing both properties, a and b!

LECTURER. Exactly. You see how simple, and at the same time how subtle, is this point? For your knowledge, a composite test

like χ, which is simultaneously testing both properties *a* and *b*, is called the *product test* of α and β, and is noted $\alpha \cdot \beta$ On the other hand, the corresponding composite property of the form "*a and b*" is called the *meet property* of *a* and *b*. But let me now come back to my question: do you still think that, generally speaking, the outcome of a test is something predetermined in advance?

STUDENT. Now I understand where you were going with this. If we are testing a meet property of the form "*a and b*," then necessarily the corresponding experimental test is a *product test* of the form $\alpha \cdot \beta$. And since a product test involves an act of *choice*, something which is by definition unpredictable, then also the outcome of the test will have an intrinsic level of unpredictability. Consequently, I was wrong: also in the case of simple macroscopic entities, like for instance an elastic band, one can always find experimental tests manifesting some degree of unpredictability, independently of one's knowledge of the state of the entity and of the details of its possible interactions with the experimental apparatus.

LECTURER. Exactly. The crucial point to understand here is that only in the situation such that both the entity and the apparatus are given, the deterministic principle can apply (provided of course the entity under investigation is not itself a vehicle of manifestation of a consciousness). However, in the general situation where we are testing a meet property of the form "*a* and *b*," the deterministic principle doesn't permit us in general to conclude, since the measuring apparatus in this case is not even given, but depends on a subsequent unpredictable choice of the experimenter.

STUDENT. But in the specific case you have considered, given that "being breakable" and "being burnable" are both actual properties of an elastic band, then also the meet property "being breakable and burnable" is actual and the outcome of the corresponding product test is certain in advance, independently from what will be the unpredictable choice of the experimenter.

LECTURER. This is true. However, consider instead of the

property $a =$ "being breakable", the property $\bar{a} =$ "being *un*breakable", which is defined by the *inverse test* $\bar{\alpha}$ obtained by interchanging the terms of the alternative (i.e., exchanging the roles of "yes" and "no") in the α test. Then, the meet property "$\bar{a}$ and b" is a (non-actual) property defined by a product test $\bar{\chi} = \bar{\alpha} \cdot \beta$, whose outcomes are purely unpredictable (if the experimenter chooses $\bar{\alpha}$ the answer is "yes", if he/she chooses β the answer is "no").

FREE CHOICE

STUDENT. I see. Since the choice of the experimenter cannot be predetermined, in fact, strictly speaking, we are not in a situation of lack of knowledge, but of impossibility of knowledge.

LECTURER. Correct. And all this is a direct consequence of the way we, consciousnesses, assign properties to entities.

STUDENT. What do you mean?

LECTURER. As you know, the way we construct reality is such that an entity can have more than a single property.

STUDENT. Yes, we can assign to an entity an arbitrary number of properties *at once*.

LECTURER. Precisely, like with your soma, which is for instance both burnable and taller than 1.5 meters. By the way: do you remember the definition of the state of an entity?

STUDENT. Yes: the state of an entity is the set of all its actual properties.

LECTURER. Right. Let us then denote by *a, b, c,…* all these actual properties characterizing the state *s* of an entity, at some given instant. Am I correct if I say that when the entity is in the state *s*, then the meet property "*a and b and c*…" is also one of the actual properties of the entity?

STUDENT. Do you mean the property of having all the individual properties *a, b, c,…* actual *at once*, that would be

tested by a *product of tests* of the form $\alpha \cdot \beta \cdot \chi \cdots$?

LECTURER. Yes, precisely that property.

STUDENT. Then yes, following our previous discussion, by definition the meet property "*a and b and c*…" is certainly actual if the entity is in the state *s*. Now that I'm saying this, I'm realizing that it must be the strongest property the entity can have, when in the state *s*.

LECTURER. Yes, you are correct: property "*a and b and c*…" is what we have called an atomic property of the entity, fully characterizing its state *s*, and vice versa.

STUDENT. Now I understand why in the foregoing you have said that atomic properties are also called *state-properties*, and that every atomic property is in a one-to-one correspondence with one of the states of the entity.

LECTURER. Yes, an atomic property entirely characterizes the state of an entity, in the sense that an entity *is* in a given state if and only if it *has* a given atomic property.

STUDENT. Another way to say that we are what we have.

LECTURER. Or that we have what we are… Hey, you are looking very thoughtful.

STUDENT. I'm not sure about this, but having understood everything we have discussed so far, if the state of an entity at some given instant is fully characterized by one of its atomic properties, composed by all the single properties that are actual at once, then if I want to test the state of an entity I must make use of a product test; and this means that I have to make a *choice*, a choice of an unpredictable nature, and I was thinking how strange it is that "hard science" concepts like "properties" and "states" are so intimately related to the existence of free choice.

LECTURER. I agree with you. We, consciousnesses, have the ability to assign many properties at once to the many entities we encounter in our investigation of reality. And if we want to make sense of these entities in general operational terms, basing our description on the experiences we can possibly have with

them, then *free choice* seems to be a necessary attribute we must have to design meaningful experimental tests. And I agree with you that such a connection is somehow unexpected and a bit mysterious.

HEISENBERG'S PRINCIPLE

STUDENT. Tell me: how can we understand the famous *Heisenberg uncertainty principle*, in the light of what you have explained? If I remember well, the principle says that the more precisely the position of a particle is determined, at some given instant, the less precisely its velocity[9] is known, in that same instant, and vice versa.

LECTURER. Yes, that's the usual statement. In fact, you have an uncertainty-like relation between all couples of observables derived from properties that are mutually experimentally incompatible, like those we have discussed in relation with your elastic bands. If you agree with our previous conclusions that many of the properties we usually assign to entities are literally created, or partially created, during a measuring process, then it must also be clear that there are as well properties that, on the contrary, are destroyed, or partially destroyed, during a measuring process. When two properties of an entity are experimentally incompatible, this means that when we test one, we may partially destroy the other, and vice versa. And this is exactly what happens when, for instance, we perform a test for determining the spatial-localization and the velocity-localization of a particle like an electron.

STUDENT. You mean that when we create a spatial position for the electron, by means of a detection instrument, we destroy its property of having a specific velocity?

LECTURER. Exactly. But you have to understand that

[9] In fact, the observable intervening in Heisenberg's relations is not the velocity, but the momentum of the particle, which in the simple case where there are no magnetic fields is just given by the mass of the particle times its velocity.

Heisenberg's uncertainty principle is the result of two basic ingredients. The first ingredient is that the principle refers to properties that are created during specific experiments, like for instance that of having a spatial position.

STUDENT. But what about the velocity? Is it also created during an experiment?

LECTURER. Absolutely.

STUDENT. But if the electron doesn't have a specific velocity prior to the measurement, what does it mean?

LECTURER. It is difficult to imagine. But you can use an analogy with the position. As we have a physical position-space, which is our usual 3-dimensional space, we also have a 3-dimensional velocity-space. Therefore, the fact that an electron doesn't possess a defined velocity prior to the measurement, means that it lies outside such a velocity-space.

STUDENT. Yes, that's very abstract, but I think I can understand. And what is the second ingredient?

LECTURER. The second ingredient is that the two properties intervening in Heisenberg's principle are experimentally incompatible, in the sense that the more precisely you create for an electron a spatial-localization, at some given instant, the more you also destroy its velocity-localization in that same instant, and vice versa. And this explains why you cannot simultaneously create a spatial and a velocity localization for a particle, in the same way you cannot simultaneously measure (test) the breakability and left-handedness of an elastic band.

STUDENT. You know, following your explanations, I believe that Heisenberg's principle is now, in a sense, much less mysterious, but in another sense even more mysterious than before.

LECTURER. In fact, Heisenberg's principle is telling us much more than what we have just outlined. It tells us that there are aspects of our reality that are complementary, and that this complementarity cannot be avoided. Therefore, one needs always to combine and integrate mutually incompatible perspectives to succeed constructing a global view of reality

[AAS, 2005]. But of course, incompatible perspectives do not mean contradictory perspectives.

MORPHOTHOSENES

STUDENT. If you don't mind, I'd like to come back for a moment to the concept of entity. My question is: do you consider that a *thosene*[10] is an entity?

LECTURER. The concept of entity is certainly closely associated to what in *conscientiology* is called a *morphothosene*. Indeed, you can always characterize the "morpho" of a morphothosene in terms of a set of properties: those properties which are precisely characteristic of its structure. Some of these properties will remain stably actual in time, and therefore characterize its identity, whereas others will change, according to the different states the morphothosene can assume. Now, the idea behind the concept of *thosene* is that any morphothosene is in fact a sort of undivided triad, so that, at least in principle, when you describe the set of properties characterizing a morphothosene you can distinguish an energetic "morpho," describable in terms of purely energetic properties, an emotional (or sentimental) "morpho," definable in terms of pure emotional properties, and a mental "morpho," associated with pure mental properties. The hypothesis is that these three distinguishable parts of a morphothosene are not separable, but something like the three different faces of a coin. And let me remind you that a coin has indeed three faces: two are flat, while the third is the curved face, which joins the two flat ones.

STUDENT. I never really noticed that in fact coins have three faces. Ok, so a morphothosene is an entity with a triadic structure. But what about a single thosene: is it an entity as well?

LECTURER. But what is a thosene, really? One has to admit that

[10] A *thosene* is defined in *coscientiology* as the practical unit of manifestation of the consciousness, that considers *tho*-ught or idea (conception), *sen*-timent or emotion, and consciential *e*-nergy as being three inseparable elements.

its definition remains rather vague in conscientiology. A possibility is to define a thosene as a limiting case of a morphothosene having some sort of minimal structure (the information contained in the "morpho" is minimal). In this limit, one would be left, at least in principle, with a pure element of immanent energy: a sort of basic elementary constituent of the manifest reality, made of only three attributes: a certain (unknown) amount of energy, of emotion and of mind. I'm reasoning here by analogy with an elementary particle like an electron, which is characterized by the three inseparable attributes of having a certain amount of mass, charge and spin. But even in the case of an electron, its individuality is not at all certain, as you can consider the electron as an emerging property of a greater *quantum field*. Similarly, maybe that there are no thosenic units in the strict sense of elementary atomic units of reality (thosenions) that would interact and aggregate to form more complex morphothosenes. For the time being, unfortunately, we are in the same situation as Greek philosophers like Aristotle and Democritus, when approximately 2.400 years ago they were attempting to understand the very basic nature of physical matter (and the debate they have originated is still open today). In other words, according to our present knowledge, it is rather difficult to determine what would be the elementary properties characterizing the hypothetical elementary unit we call a thosene. Also, we cannot exclude that maybe there are different kinds of elementary thosenes: thosenes of type *A, B, C*, and so on, exactly in the same way there are different elementary material particles, like leptons, mesons, quarks, etc…

STUDENT. But assuming for a moment that thosenes truly exist as elementary constituents of reality, do you believe they can have an exact location in space?

LECTURER. Let me first consider your question in relation to morphothosenes. And let me consider a specific morphothosene: a physical flower. Clearly, a flower is a morphothosene that is stably localized inside the physical space. But the flower I can see with my physical eyes is just an aspect (the purely matter-energetic one) of a multidimensional

morphothosenic object. So, the question arises: is the flower, as a morphothosene, integrally localized inside space, or only partially? And also: what are the mental and emotional aspects associated to the flower. Besides that, and in more general terms, how localizable are emotions and thoughts inside our physical space? Our experience is that, in general, an emotion is not localized inside space, but can be localized when it interacts with an intraphysical being, like for instance our holosoma in its intraphysical configuration. Then, by touching and "paratouching" the flower, we can perceive an emotion, which we can approximately localize somewhere inside of our soma or psychosoma. Similarly to an electron, the emotion would be momentarily attracted inside our physical space, and the same would hold true for what concerns thoughts. So, I think it is reasonable to say that morphothosenes are in general not localized inside space, but that in the case of physical entities they are at least partially localized inside space. Furthermore, in some particular circumstances a better and possibly even complete localization can momentarily be created, by means of an interaction with a specific intraphysical psychomentalsomatic measuring apparatus, called intraphysical consciousness.

STUDENT. And I imagine that the same reasoning applies to the hypothetical single thosenes.

LECTURER. Correct, although thosenes, if they really exist as single units, are probably much more difficult to localize stably in physical space than morphothosenes, as it is the case for physical elementary particle in comparison to the macroscopic objects of our everyday intraphysical experience.

DUALISTIC PARADIGM

STUDENT. I'd like to ask you about another aspect of the CP that I'm not convinced to have properly understood.

LECTURER. Tell me.

STUDENT. During the classes, I learned that according to the conventional scientific paradigm, only matter and energy exist.

On the other hand, according to the CP, there is not only matter and energy, but also the consciousness, with its ability to process neutral immanent energies into more structured consciential energies, by adding consciential information.

LECTURER. Yes, that's correct.

STUDENT. But then, if the consciousness is really something distinct from energy, what distinguishes one from the other? And, more specifically, what distinguishes a consciousness from the consciential energies it uses to manifest? Can we say that the consciousness is more real than its consciential energies? And what would it mean to be more real? How can we properly define reality? Do both the consciousness and energy exist in the same way? And how can we define existence? Finally, is the CP defending a sort of dualistic view of a reality made of two radically distinct aspects: consciousness and energy?

LECTURER. Wow, these are very deep and difficult questions!

STUDENT. I told you that all my questions were of the kind "too difficult to be answered!"

LECTURER. Well, certainly, we shall not succeed getting final answers to these questions, but nothing impedes us to investigate them a bit further, and possibly gain a deeper insight into them. As you probably know, in Western philosophy one usually distinguishes between three theories of reality: *materialism*, *dualism* and *idealism*. Roughly speaking, for materialism minds are unreal and there are only bodies; for dualism there exist both bodies and minds, distinct from one another, but linked together in some way; for idealism the bodies are unreal and there are only minds. Now, according to conscientiological research,[11] the materialistic paradigm is known to be incorrect: lucid *projections*, or out-of-body experiences, demonstrate to the projector the existence of

[11] By "conscientological research" we intend here the entire corpus of experimental (self-research and hetero-research) evidences that have been provided by the countless consciousnesses having visited and sojourned on this planet during the last millennia of its history.

objective psychosomatic and mentalsomatic minds, truly independent of the material body. Thus, mind, or minds, cannot be considered as an emerging property of physical matter, even though this may be partially true for the "physical mind," resulting from the sole neural activity of the physical brain. Furthermore, conscientiological research imposes a reformulation of the dualistic and idealistic paradigms, to take into due account the extraphysical dimensions. The usual *mind-body problem* is then to be understood as a much wider problem, which we can call the *consciousness-holosoma problem* or, equivalently, the *consciousness-energy problem*. We are thus left with only two significant paradigms: a "conscientialistic" one, asserting that only the consciousness truly exists, and a dualistic one, for which both consciousness and matter-energy exist, distinct from one another, yet linked together in some way.

ENERGY

STUDENT. This nicely sums up the situation. But please, before pursuing this discussion, let me make a little digression and ask you something: during the CDP classes everybody was enjoying speaking all the time about *energy*. But in the end, what is energy really about?

LECTURER. That's a very good question and I think nobody really knows the answer. Consider that also modern physicists are ignorant about what energy really is. The only thing they know is how to calculate it and that, as far as they can judge, it behaves as a conserved quantity.

STUDENT. What about the famous Einstein's equation $E = mc^2$. Doesn't it mean that matter can be transformed into energy?

LECTURER. Not exactly. Einstein's equation is just telling us how to *calculate* the amount of energy contained in the inertial mass of an object. That's all.

STUDENT. I thought that the equation was demonstrating that matter can be transformed into pure energy.

LECTURER. And what would this pure energy be?

STUDENT. The light I believe.

LECTURER. Ok, then you are correct: a massive particle, under certain conditions, can be transformed into particles of light, called photons.

STUDENT. What are these conditions?

LECTURER. You must not break other conservation laws. For instance, an electron cannot transform into a photon by itself, because the electric charge would then not be conserved during the process.[12] But tell me: why do you think that a photon would be a purest form of energy if compared for instance to an electron?

STUDENT. Well, in fact I don't know.

LECTURER. Massive particles, like electrons, protons, neutrons, quarks, etc, are as physical, pure and energetic as the non-massive ones, like for instance photons. All that Einstein's famous equation is telling us is that there is energy associated to the inertial mass of massive entities. And since there are no conservation laws for the mass, this energy can be used and converted, under appropriate conditions, to create new physical entities, like for instance massless photons.

STUDENT. Then, what does it mean when people in conscientiology say that all the phenomena we experience are just energy?

LECTURER. This is only a shortcut expression to say that the reality with which we all interact, and of which we are all participators, is made of different *energetic substances* that, under certain appropriate conditions, can transform into one another. In conscientiology we don't limit our considerations to the sole physical domain, but consider the entire multidimensional reality, made of physical and extraphysical entities. Although extraphysical substances are perceptively less dense than the physical ones, they are nonetheless very energetic, and under certain conditions, they can exchange energy with the

[12] A photon has no electric charge.

denser entities pertaining to the physical dimension.

STUDENT. Are you saying that there exists a sort of general multidimensional law of energy conservation?

LECTURER. Apparently yes, even though we don't know the exact domain of validity of such a law.

STUDENT. What do you mean?

LECTURER. I mean that the energetic reality is out there, in front of our eyes and paraeyes. If we assume it has been created, then this is a flagrant violation of the energy conservation law.

STUDENT. Oh, I see. Tell me please: if all these different energetic substances can interact and transform into one another, don't you think that they cannot be so different after all?

TOTAL ISOLATION

LECTURER. You are perfectly correct. All these different energetic substances do in fact share the same attribute of "being energetic" or "having energy." And since they share a common intrinsic property, they participate in a same identity, and we can reasonably consider all these substances as the different manifestations of a more fundamental energetic substance, that we can for simplicity just call *energy*.

STUDENT. And what about energy and the consciousness? Do they share some common intrinsic attributes? According to the dualistic paradigm, this should not be the case.

LECTURER. There is, I think, an insurmountable problem with the dualistic paradigm. From a logical standpoint, if two radically distinct entities can interact together, in whatever way, then, because of the very fact that they can interact, they cannot be radically distinct. And in that sense, the dualistic paradigm, in its radical form,[13] is a self-contradictory paradigm and must

[13] It is worth emphasizing that the term "radical" is sometimes used in the consciousness studies literature in a much weaker sense than that employed here.

be abandoned.

STUDENT. Are you not just playing with words: why after all would two radically distinct things not be allowed to interact together?

LECTURER. I think that the best way to answer your objection is to ask yourself what would be an operational definition of the relational property of "being radically distinct". By "radically distinct" we do not mean here distinction in some relative or formal sense, like for instance two different persons, or two different particles, but in a much more essential, fundamental and substantial sense. Now, if you put some thoughts into that question, you will probably come out with a definition close to the following one: two entities are said to be radically distinct if they remain totally and permanently isolated from one another, so that they cannot interact together in whatever possible way, in whatever possible time.

STUDENT. But then, contrary to the basic statement of the dualistic paradigm, if two entities are radically distinct, no links of whatever kind can ever be established between them.

LECTURER. Yes. In other words, they would belong to radically distinct realities, that had never and will never interact together, directly or indirectly. A straightforward consequence of this is that any operational definition of our reality must necessarily exclude considerations regarding other realities that would be totally and permanently isolated from it. Indeed, all we know about our reality comes from our (actual or potential) experience of it, and we can only experience and be affected by what is in the range of our possible past and future interactions, be they direct or indirect.

UNITY

STUDENT. Yes, this sounds perfectly logic and, in some sense, even trivial I would say.

LECTURER. I agree. But what maybe is less trivial is that because of this, our reality cannot contain totally and permanently isolated

sub-realities, and therefore necessarily possesses a structure of minimal *unity*, in the sense that all parts of our reality are allowed to interact with one another, at least in principle.

STUDENT. You mean directly?

LECTURER. Not necessarily. The interaction can also be indirect, in the sense of being mediated.

STUDENT. Can you give me an example?

LECTURER. Do you remember the structure of your *holosoma*?

STUDENT. Yes, when I'm in my intraphysical state, I possess three intelligent bodies, a *soma*, a *psychosoma* (also called emotional body, astral body, or soul), and a *mentalsoma* (also called mental body or spirit).

LECTURER. To be more precise, you possess *at least* three intelligent bodies. In fact, we don't know if more sophisticated energetic vehicles do also exist, beyond our mentalsoma.

STUDENT. Some sort of beyond-the-mind vehicles?

LECTURER. Yes, something like this. But having three or thirty-three energetic intelligent vehicles is not going to change the logic of our discussion. How does the psychosoma interact with the soma?

STUDENT. Through the *holochakra*?

LECTURER. Correct. So, the psychosoma doesn't interact directly with the soma, but only indirectly, through an *interface*, also called *energosoma*, aetheric body, or silver cord, when in its stretched configuration, during an OBE.

STUDENT. And is this true for the mentalsoma with respect to the psychosoma as well?

HOLOSOMA

LECTURER. Apparently yes. Ok, let me briefly summarize what we know so far concerning the structure of our holosoma. We know that the consciousness has the ability to manifest by

means of a set of different interconnected energetic vehicles, that we call as a whole the *holosoma*. Three different vehicles and two interfaces have been so far distinguished: the physical body, or *soma*, connected to the *psychosoma* via an *interface* called *holochakra*, and the *mentalsoma*, connected to the psychosoma via an interface called the *golden cord*. As you know, the consciousness uses different vehicles in specific existential dimensions. In physical life, it uses the soma; in non-physical life, when projected outside the body, or during the intermissive periods between lives, it uses the psychosoma or the mentalsoma. We also know that there are critical processes called *desoma*. The so-called *first desoma* is the death of the soma, during which the holochakra's connections binding the consciousness to dense, physical and biological matter, are ruptured. The holochakra-interface then loses its connection with the soma but still maintains a connection with the psychosoma, allowing the consciousness to still interact with physical and quasiphysical energies. The *second desoma* is the subsequent liberation of this residual interface with all the corresponding human consciential energies still attached to the psychosoma. After the second desoma, the consciousness completely loses its holochakra and, consequently, its capacity to strongly interact with the physical and denser energetic dimensions. Finally, on a much larger time scale, there is also a *third desoma*, which is the deactivation of the psychosoma and the initiation of the so-called *mentalsomatic cycle*, the evolutionary course of the consciousness who then lives exclusively with its mentalsoma, existing (at least for a very long while!) as a *free consciousness*.

STUDENT. And then?

LECTURER. Then we don't know. At our current level of knowledge, we don't even have a reliable information regarding the true nature of the golden cord, whose existence is so far only hypothesized.

STUDENT. Anyway, this was a nice holosomatic overview.

LECTURER. Thanks. What is important to remark is that the structure of our holosoma is a succession of vehicles and

interfaces.

STUDENT. Yes, the holochakra binds to the soma, the psychosoma binds to the holochakra, the golden cord binds to the psychosoma, the mentalsoma binds to the golden cord, and the consciousness, in some unspecified way, binds to the mentalsoma.

LECTURER. That's the idea.

INTERFACES

STUDENT. What is an interface, exactly?

LECTURER. It's an entity, or element of reality, possessing a characteristic set of properties.

STUDENT. What kind of properties?

LECTURER. An interface is a *communication boundary*, permitting an indirect interaction between two distinct entities that, otherwise, could not directly interact or communicate. As you know, two entities *A* and *C* can efficaciously directly interact together only if they are sufficiently similar.

STUDENT. For example?

LECTURER. For example, they must have similar densities and be located in the same dimension. This means that *A* must share with *C* some common properties. If this is not the case, then they cannot directly interact together. However, there may exist an entity *B* sharing some properties with both *A* and *C,* so that by interacting with them *B* can establish a sort of bridge, or communication boundary.

STUDENT. But then, practically everything is a potential interface.

LECTURER. You are correct. If an entity A can connect with an entity B, and if B can connect with another entity C, then B can work as an interface for A and C. However, two entities will not necessarily need a third mediator entity to efficaciously interact and communicate together. But of course, the existence of an

interface is a minimal requisite for two entities to belong to the same reality, seeing that the contrary would mean that they would be totally and permanently isolated from one another.

STUDENT. And thus, they would not belong to the same reality, but to two radically distinct (totally and permanently isolated) realities.

LECTURER. You got the point. By the way, I think it is worth noticing that we can also consider our entire holosoma as a multidimensional interface for our consciousness, allowing us to interact efficiently with the different existential dimensions composing our reality.

STUDENT. I must confess that all this sounds very abstract to me. Is it reasonable to even think about realities that would be totally and permanently isolated from ours?

STRUCTURE

LECTURER. We certainly need not to bother about realities that would be totally and permanently isolated from our reality. Nevertheless, what I think is important to emphasize is that from an operational standpoint, any reality, like our reality, is an entity having necessarily some *minimal unitary structure*: no radical divisions are possible inside of it. It may look surprising that we have succeeded deriving this structural property with no efforts. But for this, we had to impose to our description of reality the *constraint* of *being operational* i.e., of being based on all possible experiences we can have of it, be they direct or indirect, physical or extraphysical.

STUDENT. Are you saying that our entire reality is an *operational entity*?

LECTURER. That's the point. By imposing the constraint of operationalism, we induce the emergence of a minimal structure of unity.

STUDENT. Is it correct to say that every time we impose constraints, we obtain some structure?

LECTURER. Yes, and that's a very clever observation on which perhaps we shall have the occasion to come back, later on in our conversation. The imposition of constraints, in the sense of *limiting the possibilities*, is indeed a key ingredient for the emergence of structures.

STUDENT. A fascinating idea…

SECOND PART

ABSTRACT. In this second part, the reader is introduced to concepts such as: *separation, existence, possibility, personal reality* and *personal experience, creation* and *discovery, time, change* and *permanence, structure* and *complexity, distinction* and *connection*, and many others as well. The role played by these concepts in our understanding of reality and the consciousness is explored.

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MOTHER SUBSTANCE

In the first part of the dialogue, towards the end of their conversation, the two interlocutors were in the process of investigating questions related to dualism and idealism. This led them to a large detour, where the discussion was about the meaning of energy and the idea of a necessary minimal unity of reality, when the constraint of operationalism is imposed to its description. This second part of the dialogue continues with the student addressing again the issue of dualism and idealism, but this time in more direct terms.

STUDENT. If you don't mind, I'd like to come back to our point regarding the dualistic paradigm. What's the verdict: do we have to accept it, or to refute it?

LECTURER. According to what we have discussed, I think it should be clear now that a strict radical dualism between energy and consciousness cannot be maintained.

STUDENT. Nonetheless, conscientiology considers that both energy and consciousness exist and are distinct from one another.

LECTURER. Yes, but we also understand that they do interact together in some way, although we have no clear specifications as to the possible mechanisms involved in their interaction. Being however understood that there must be some kind of an interaction, be it direct or mediated by an interface, certainly the dualism contemplated in conscientiology cannot be a strictly radical one.

STUDENT. Are you pretending that if one is interested in the description of reality at a very fundamental level, then one must refute a radical dualistic paradigm and is, hence, left with a single possible paradigm: the idealistic, or "conscientialistic" one?

LECTURER. Yes. The point is that we cannot know, understand and be affected by what is beyond the reach of our direct or indirect experience. Therefore, it is natural to operationally

understand reality, in very general terms, as the collection of all entities that can directly or indirectly interact together. And this means that all these entities necessarily share some common attributes.

STUDENT. What kind of common attributes?

LECTURER. For instance, the attribute of being part of the same system of interactive entities. And this is just another way to say that reality is made of a *unique mother substance*, and that the different entities belonging to reality are just different states, or configurations, of this same fundamental multidimensional stuff. But of course, this doesn't mean that we have to adhere to a sort of naïf idealism, or solipsism, where the whole of our perceived reality would be just a sort of illusion created by our single mind, or consciousness. The view of a world made of a unique multidimensional mother substance doesn't mean that there isn't a reality "out there," composed of phenomena or entities having different degrees of stability and autonomy, which certainly cannot be considered as mere hallucinatory creations of our individual minds, or consciousnesses.

SEPARATION

STUDENT. All right, but then how should I understand the distinction between energy and consciousness?

LECTURER. I really don't know. This is not a simple question.

STUDENT. Then, why do we distinguish them?

LECTURER. For the same reason, I believe, that we like to distinguish a driver from his car.

STUDENT. Let me be provocative: can we really distinguish a driver from his car, in operational terms I mean?

LECTURER. If you go to Italy, you'll certainly have the occasion to meet some individuals, usually of masculine gender, who are certainly not distinguishable from their car. But apart from these extreme exceptions, the answer is: yes, you can operationally

distinguish a human driver from its car.

STUDENT. And how? They are strongly interacting together and form a sort of whole composite entity.

LECTURER. That's correct. But the fact that two entities are interacting together doesn't mean they are necessarily to be considered as a single entity. All entities are forcedly interacting with their environment, and thus with other entities. If they were not, they would be totally and permanently isolated, and thus not belonging to the same reality.

STUDENT. But then, if I understand correctly, it is the very act of defining an entity that separates that entity from the rest of reality.

LECTURER. Good observation. The very act of defining an entity, by attributing to a portion of reality a set of specific properties and states, generates an inevitable separation within reality. This cannot be avoided, for as long as one is concerned with a scientific investigation, or an investigation tout court, of reality.

STUDENT. And what are the criteria a scientist uses to separate an entity from its surrounding reality?

LECTURER. Do you remember the definition of what a property is?

STUDENT. Of course: a property is something an entity *has* independently of the type of context it is confronted with.

LECTURER. Good. Therefore, when defining an entity, a scientist will proceed by identifying a set of properties that are distinguishable with respect to their context. And this also means that these properties are sufficiently *stable,* in the sense of not being too easily influenced, or destroyed, by the stream of countless phenomena with which they are necessarily and constantly interacting.

STUDENT. So, entities are stable phenomena, in a way?

LECTURER. Yes, or at least an idealization of them. They need to be sufficiently stable in order to be *identifiable*. But although

phenomena may never be separated one from the other in a strict sense, entities, by definition, are separated fragments of reality that are somehow in part *constructed* by the investigating consciousness.

STUDENT. Do you mean that entities are the result of our analytical investigation of reality?

LECTURER. Precisely.

STUDENT. This is disturbing. It means that by doing science we introduce an arbitrary separation inside reality, because of our analytical approach to it.

LECTURER. Yes and no. You must consider that in the course of their investigations, researchers will also learn that, for instance, two previously defined entities, which they considered as being separated, in fact are not, so that according to this new information they can improve their ability to describe reality, by partitioning it into more realistic (less fragmented) elements.

STUDENT. Do you have an example?

LECTURER. Quantum experiments of the kind of Einstein, Podolsky and Rosen, of which you may have learned in the popular book of quantum mechanics you have read, are typical examples of this [AGR, 1982]. These experiments have shown that many pair of physical particles, after having strongly interacted together in a certain way, cannot be considered anymore as separated entities, even though they are apparently separated by arbitrary large distances.

STUDENT. Do you mean that entities which were believed to be separated, are in fact the connected elements of a larger single entity?

LECTURER. Yes. But of course, in the same way one can establish a stable connection between two different entities, thus creating a new single composite entity, one can also break that same connection and split the single entity into two separate pieces. Obviously, sometimes this could be dangerous.

STUDENT. In what sense?

LECTURER. In the sense that when breaking an entity, there are no guarantees that the obtained fragments will afterwards manifest the same attributes they previously had, once integrated in a single unit. If a mad scientist breaks entity *S*, your soma, into two macroscopic pieces, he (or she) will certainly obtain two different single entities, but not any longer two biologically alive entities.

STUDENT. That's a Frankenstein-like remark! Now I have a question: what does it mean, precisely, that two entities are separated? Can we define the relational property of "being separated" in operational terms?

LECTURER. Yes, it is certainly possible. We already know that separation doesn't mean isolation. Two entities can be separated though still interacting together. Let us take for instance the situation of a driver with his car. Is the driver-entity separated from the car-entity?

STUDENT. I think it depends how we consider them. I would say that they are at least *separable*.

LECTURER. And how would you proceed to separate them?

STUDENT. Simply by taking the driver out of his car.

LECTURER. And why, then, do you believe they would become separated entities?

STUDENT. Because they wouldn't be interacting together any longer, being now spatially separated.

LECTURER. So, according to you, *separation* is synonymous of *spatial separation*. Are you sure this is sufficient? After all, as we have already thoroughly discussed, space is just another entity, an element of our reality's construction.

STUDENT. Yes, I remember, space is a dimension contained inside reality, and not the other way around.

LECTURER. Exactly. By the way, this is something absolutely obvious for all intraphysical individuals having lucidly experimented the extraphysical dimensions, for instance during a projection. There isn't a unique physical space, containing a unique

physical reality, but a number of physical and extraphysical spaces containing many different physical and extraphysical realities. In fact, even the more materialistic physicists should admit today that, at least at the microlevel, physical objects couldn't be considered as "being in space," but only as being "potentially in space." In other terms, physical space is just a sub-structure of reality, inside which classical relations between macroscopic physical entities can be established.

STUDENT. All right. The point then is not that the car and the driver are spatially separated, but that when they are spatially separated, they cannot anymore interact together.

LECTURER. But we have said that interaction has nothing to do with separation. Your soma is separated from mine, do you agree?

STUDENT. No doubts about that.

LECTURER. Nevertheless, your soma and mine are constantly interacting together, by means for instance of gravitational and electromagnetic fields. As you can see, separated entities are not necessarily isolated entities.

STUDENT. Ok, now I know what I was trying to say. I believe there is a subtle difference between "two *interacting* entities" and "two *connected* entities." I think that the former can be separated, whereas the latter cannot, but I don't know how to express with precision the difference between these two concepts.

LECTURER. Now you are getting closer to the point. The existence of interactions between entities means that entities are constantly influencing each other in the course of their evolution. In general, there are always interactions between entities, because our reality has a minimal structure of unity, as previously discussed. On the other hand, *separation* of two entities is an *operational property*, related to the possibility of performing *separated experiments* on both entities, so that the result of these experiments do not depend on the fact that one first do the experiment on one entity and after on the other one, or the reverse, or that both experiments are performed

simultaneously.

STUDENT. Are you telling me that separation means that if an experiment is performed on one of the two entities, it will not affect the state of the other one, and vice versa?

LECTURER. Definitely. So, tell me now: is the human driver, while driving his car, an entity separated from his car? It must be clear that the fact that the driver is physically in contact with his car is not an essential ingredient in our discussion. You may assume for instance that he is driving the car at a distance, via a radio remote control.

STUDENT. Ok, then I think they do form a sort of unique entity, and that they cannot be really considered as separated. And according to what you have said, to prove it I just need to find a couple of tests, one to be performed on the car and another one to be performed on the driver, and show that they are incompatible, in the sense of mutually influencing one another.

LECTURER. That's the right procedure. Any ideas?

STUDENT. Yes, although it is a rather cruel experiment.

LECTURER. Don't worry, we are just doing a pure thought experiment (*gedankenexperiment*), without any negative emotional association.

STUDENT. All right, I was thinking that any invasive test that would affect the ability of the driver to properly control his car, like for instance a test with an electroshock, may easily produce a car accident, thus sensibly altering the state of the car-entity. Consequently, one can design a number of tests to be performed on the car, for instance a measure of its length, that would be affected by the preceding electroshock test on the human driver. As a result, I believe that the two entities cannot be considered as separated.

LECTURER. Very good. So, if the driver is driving the car, the car and the human driver are not separated entities. However, when the driver is not anymore driving the car, and provided he is not too strongly identified with his car, like some Italian friends of mine, then both entities can be considered as separated.

STUDENT. Does it mean that the two entities are easily connectable and separable (disconnectable)?

LECTURER. Yes, because both entities are rather stable and independent one from the other, and the connection they establish is just affecting a few of their characterizing attributes. In other words, even when they are forming a single entity, in their "driving configuration," it is still possible to easily distinguish the human driver from the car.

STUDENT. Why is this?

LECTURER. Because there are still many compatible separated tests, not affecting one another, that can be performed separately on the car and on the driver, even when the driver is driving the car, that can be used to efficiently distinguish them. But of course, this is not true in the general situation.

STUDENT. Am I correct if I affirm that the fact that two entities can be considered as separated depends on the set of all the experiments one can conceive to perform on these two entities?

LECTURER. Absolutely. The better you can characterize the two entities in terms of properties and states, the greater will be the number of experiments you can conceive and perform on them, so that you may end up one day finding a test which cannot be performed independently on both entities, without mutually affecting one another.

STUDENT. And this would then show that these two entities cannot truly be considered as separated.

LECTURER. Correct. In quantum physics, one then says that the states of the two entities are *entangled*. Of course, you can have different degrees of entanglement, according to the number of properties involved. The more the entanglements are between two entities the deeper is the nature of their connection. And if the number of entanglements (connections) is maximal, we can say that the two entities have completely fused together, into a truly new born entity, having a full set of new properties, not reducible to any of the individual properties pertaining to the fusing fragments.

DISCONNECTING VEHICLES

STUDENT. Is this the so-called phenomenon of *emergence*?

LECTURER. Precisely: the connection between different entities can create genuine new properties and states, which are said to emerge from the underlying structure of the composing elements.

STUDENT. I was thinking: there is an obvious connection between my soma and my psychosoma, which is what you call the *holochakra*, or *energosoma*. Therefore, am I correct if I say that they are not separated?

LECTURER. At present you have all you need to answer this question by yourself. Can you exhibit two experiments, one for the soma and another one for the psychosoma, that are not mutually compatible, and thus not separated?

STUDENT. I think there are many conceivable experiments showing that the two vehicles are not separated. For instance, when the consciousness is in a projected state, any experiment involving moving or touching the soma will have a direct and visible repercussion on the psychosoma.

LECTURER. Exactly, which means that the two vehicles, although easily distinguishable in visual terms, in fact behave as a single unit. And the same evidently occurs when the consciousness is in its intraphysical state: any physical phenomena will affect without difficulty the state of the psychosoma, and any emotional experience will affect in return the physiology of the soma.

STUDENT. Then, soma and psychosoma are not separated, as they are deeply interconnected via the holochakra.

LECTURER. Yes. But what do you think: are they separable?

STUDENT. During the first desoma, the silver cord connection is permanently severed. Hence yes: they are indeed separable.

LECTURER. What happens then to the soma: does it maintain the same attributes it manifested when the consciousness was connected to it?

STUDENT. No, the soma then dies and decomposes.

LECTURER. So, the two vehicles are not really separable, as when the silver cord is severed, the soma loses its entire biological identity.

STUDENT. Can we then say that the so-called biological identity wasn't in fact really belonging, at least not entirely, to the soma?

LECTURER. That's a logical deduction. The biological identity, and in particular the vitality of the soma, are emerging properties, resulting from the strong coupling between the human body and the psychosoma, via the silver cord.

STUDENT. It is as if the soma was just a sort of temporary appendix of the psychosoma, without a stable identity of its own.

LECTURER. Yes, an appendix that quickly loses its apparent identity once it is disconnected from the more stable psychosomatic entity.

STUDENT. But then, can we repeat the same operation with the psychosoma and the mentalsoma? In the same way, they should not be separated and separable entities, and if one would cut the golden cord, whatever it is, the psychosoma, like the soma, would lose its apparent psychosomatic identity and only the mentalsoma would continue to stably exist.

LECTURER. Yes, exactly, and so forth.

STUDENT. What do you mean?

LECTURER. As I told you, we don't know if there are other vehicles of manifestation beyond the mentalsoma. But should it be the case, by breaking their connecting interfaces one should in principle be able to continue removing "accessory" appendixes. And each time that a vehicle would be disconnected, a higher, greater, more subtle and stable vehicle would be revealed, having a more fundamental identity. In fact, we have a partial picture of this process during the projective phenomenon. When

for instance the psychosoma projects out of the soma, there is a partial disconnection of the two vehicles, and all physiological functions of the soma are reduced to a strict minimum. And this is apparently also true during a mentalsomatic projection, although the dynamics is much subtler.

THE BEING-CONSCIOUSNESS

STUDENT. Can we disconnect, or partially disconnect, vehicles in a never-ending process?

LECTURER. Who knows? But assume for a moment that this is not an infinite regression, that at some point one finds "a last vehicle."

STUDENT. What would it mean to be in a last vehicle?

LECTURER. In operational terms, it would mean that this last vehicle couldn't anymore be further divided into viable sub-vehicles.

STUDENT. A sort of *irreducible vehicle*?

LECTURER. Yes, an irreducible vehicle of the consciousness, having the greater stability, autonomy, and an entirely self-sustainable identity. Such an irreducible vehicle would contain all the fundamental attributes of the consciousness: those same attributes that are also partially manifesting through the less stable vehicles of manifestation that are connected to it, by means of a cascade of interfaces of increasing densities, in that mega structure we call holosoma. In other words, such an irreducible vehicle, or *ultimate consciential entity*, is what we may call the naked consciousness, or the *being-consciousness* itself.

STUDENT. I see. But then, why affirm that the consciousness, or the being-consciousness, would be fundamentally different from its holosomatic energetic vehicles? After all, it is also a vehicle in itself.

LECTURER. Not a vehicle, but the driver, or primal mover. The consciousness, or being-consciousness, by definition, would be

the entity having the strongest and most stable attributes, capable of deeply connecting with all the other energetic vehicles, truly immerging into them or, rather, fusing with them, so becoming a multi-connected, multi-structured, multi-dimensional and multi-existential holosomatic entity.

STUDENT. In consequence, the consciousness would be distinct from the holosoma, being a sort of ultimate unit, capable of "infecting" all the other denser vehicles with its own specific attributes. And, in that sense, it would be different from energy, as energy loses its coherence and dies when the driver "quits the car".

LECTURER. I like the way you have put it. Yes, most likely the consciousness is a fundamental element of reality made of mother substance in its most stable energetic configuration. A configuration we might call *living energy*, to distinguish it from all the other less stable energetic configurations, which can lose coherence and die once disconnected from the source of living energy.

STUDENT. Tell me: what are the fundamental intrinsic properties, or attributes, of the consciousness?

LECTURER. That's not an easy question. We know many of the emerging attributes that a consciousness manifests while fused with its different energetic vehicles of manifestation. But again, these attributes may not correspond to the fundamental ones, those truly characterizing the "nude" *conscientia*l *unit* and the *living energy* it is made of.

STUDENT. You mean those from which all the others would follow?

LECTURER. Yes, those constituting the initial, more stable and permanent condition of the evolving consciousness, from which all the other more complex attributes and properties would have been derived, in the course of an incredibly vast evolutionary process.

STUDENT. Don't you have even a guess of what these fundamental attributes of the consciousness could be?

LECTURER. Guesses are always possible, of course. But maybe, to gain a deeper insight into such a difficult question, a good idea would be to come back to our definition of reality and try to be a little more specific.

STUDENT. All right, let me first order some more tea!

LECTURER. Excellent idea. (After having taken a few sips of a bergamot flavored tea, the LECTURER continues). If you remember, we have said that reality can be defined as the collection of all entities that can possibly interact together, in a direct or indirect way. This, however, was a deliberately vague and abstract definition. For instance, it doesn't tell us how to combine together, in a single coherent scheme, all the different and personal reality's constructions of the many consciential participators.

STUDENT. Are you saying that my reality and your reality are not one and the same?

LECTURER. They certainly have a lot in common, since we can easily interact together. But this doesn't mean they necessarily share the same structure, and are thus perfectly isomorphic. Although we can both say that there is a reality out there, we are also continuously co-creating and co-constructing this reality, not only outside of us, but also inside of us, at a much more personal and intimate level. How to integrate all these individual constructs in a single coherent mega-structure is an extremely difficult problem. Think for instance of the very simple situation illustrated by Einstein's special relativity theory, where the only fact that two physical observer-entities are uniformly moving one with respect to the other, through physical space, is capable of deeply altering the way they perceive and are affected by their spatiotemporal surroundings. And to intelligibly share their different points of view, they must know how to correctly translate their experiences in order to meaningfully compare them. In other words, they need a spatiotemporal dictionary, which in the simple case of classical special relativity is constituted by the so-called *Lorentz transformations*.

STUDENT. I think I have read something about these transformations: they are supposed to describe how different observers in different inertial frames measure the same spatiotemporal event.

LECTURER. Yes, and in that sense, they constitute a dictionary, translating experiences lived by different inertial participators of reality. But the situation of special relativity is extremely simple. Imagine the general situation, where all kinds of movements are allowed, internal and external, in all kinds of dimensions. What would be in that case the dictionary capable of translating all the different points of view of the countless consciential participators of reality?

STUDENT. Indeed, it looks like a vast problem.

LECTURER. Probably as vast as the problem of evolution itself, because finding these translators, sort of universal communication interfaces, may be equivalent to solving the immense compatibility problem of harmoniously integrating all the different creative expressions of the consciousnesses into a same non-conflicting scheme. But let us now come back to our point and try to define in simple and operational terms what the personal reality of a consciousness may look like. To begin with: how would you define what is *real* for you?

EXISTENCE

STUDENT. You mean what *exists* for me?

LECTURER. That's a good start: so, your *reality* is made of all that *exists* for you. And what does it mean "to exist"?

STUDENT. I was tempted to say that something exists if it is real, but then of course I would go around in a circle.

LECTURER. Ok, let us be very pragmatic. Does the entity named "cup of tea," here in front of you, exist for you?

STUDENT. No doubt!

LECTURER. Why?

STUDENT. Well, for instance because I can touch it.

LECTURER. Right, then tell me: what is "touching a cup of tea," for you?

STUDENT. A process?

LECTURER. Yes, you can certainly call it a process, in view of the fact that it is part of that great stream of interactions passing through your holosomatic entity. But, more specifically, how would you call those processes that you are consciously living?

STUDENT. Experiences?

LECTURER. Yes, that's the word I was looking for. So, correct me if I'm wrong: the cup of tea exists for you since it is an entity *available* to your *personal experience*.

STUDENT. I agree.

LECTURER. Ok, then "being available to your personal experience" is a good test for determining whether or not an entity exists or doesn't exist for you. Let us consider now Vieira's Projectiology book, that you previously saw on the shelves of the IAC's office. Does it exist for you?

STUDENT. Of course.

LECTURER. How can you be so sure?

STUDENT. I had an experience with it a couple of hours ago.

LECTURER. Then a couple of hours ago you knew the book was existing. But since you can't have an experience with it *now*, how can you pretend it is still existing in your present?

STUDENT. In fact, I cannot be sure. A crazy scientist guy may have taken it to check if it was burnable. And since the test has been certainly successful, maybe the book is currently destroyed and is not existing any longer.

LECTURER. Yes, this is certainly a possibility we cannot logically exclude. Nevertheless, let us assume for a moment that we have a perfect control of IAC office's territory, so that we can exclude that exceptional circumstances would have occurred producing the disappearance or destruction of the book. Then,

what do you think: does this book exist for you now? And I insist on the word "now."

STUDENT. In that case, what I can tell you is that I'm sure it exists for me now, though I cannot have an experience with it now, being in this very moment with you in this tea room.

LECTURER. Why are you so certain?

STUDENT. I don't know. The situation reminds me of a well-known koan-like riddle: if a tree falls in the forest and no one is there to hear it, does it make any sound? Similarly, one could ask: does an unperceived entity exist? I know the book is still existing now, but I cannot prove it. By the way, isn't this a famous issue, also raised by some quantum physicists pretending that the consciousness who is observing the experiment is somehow responsible for its outcomes, or something like this?

WAVE FUNCTION COLLAPSE

LECTURER. Yes, this idea, that in order to properly understand the outcomes of an experimental test in quantum mechanics one needs to invoke a mysterious influence of the consciousness on the tested entity, was first proposed long ago, among others, by the physicist *Eugene Wigner*, as an attempt to solve the so-called problem of the *collapse of the wave function* [W, 1967].

STUDENT. What is this collapse all about?

LECTURER. If you remember, I told you that the wave function is just a suitable mathematical object describing the state of a given pure quantum entity. Now, when all of a sudden, some new properties are created during an experiment, the state of the entity necessarily endures an abrupt change, and so will the corresponding wave function describing it. This sudden change of the wave function during an experiment is what is usually called a *collapse*.

STUDENT. But isn't this something to be expected? If the state of an entity is a description of its actual properties, and if during an experiment some new properties are created and become ac-

tual, whereas others are destroyed and become potential, then, a sudden change of the state of the entity is to be expected. Where is the problem?

LECTURER. In fact, there is no problem. Because of structural shortcomings in the standard formulation of quantum theory, it was impossible, since rather recently, to operationally separate in the formalism the measured entity from the measuring apparatus, so that it wasn't clear what kind of mechanism was allowing for the selection of a final outcome at the end of a measuring process.

STUDENT. Do you mean that the problem was something like: who is measuring the measuring apparatus?

LECTURER. Yes, and for that reason some speculative physicists, like Wigner, pretended that the selection of the final outcome (the passage from the quantum probability to the actual result) was performed by the very consciousness, or mind, of the experimenter. This pretended phenomenon was subsequently used by a number of researchers in parapsychology as a basic ingredient to explain *telekinesis*, or *PK-effect*.

STUDENT. Yes, I have read something on that: being the consciousness responsible for the collapse of the wave function, it could coherently guide and reorder the microphysical processes in such a way to achieve a macroscopic effect… However, I understand that you don't believe that this may be possible.

LECTURER. I know that the PK-effect is a real effect, but I also know that the Wigner argument is not a sound argument. As we have discussed to some extent, quantum probabilities are of an epistemic nature, and just correspond to our lack of knowledge about the subtle interactions arising between the entity and the apparatus. Therefore, it is the measuring apparatus that influences the entity and determines the final outcome, not the consciousness, and if we want to explain telekinesis, I believe we need to find a more credible mechanism.

STUDENT. Now I forgot: why are we discussing this?

LECTURER. Because of your pseudo-koan: you said that some individuals believe that according to quantum physics we may not know if something truly exists without directly observing it, and this is because reality would be influenced by the observer.

STUDENT. Yes, now I remember. So, according to you, reality is not influenced by a consciential observer?

LECTURER. That's not what I have said. No doubt that every consciousness can deeply influence reality at many different levels, by emitting and absorbing specific energetic patterns. But this doesn't mean that a consciousness is necessarily affecting everything, every time. There are no credible reasons to believe that an experimenter can affect the outcome of an experience, be it physical or extraphysical, by just observing what the outcome is, in the sense of being informed of the result. Hopefully, reality is much more stable than that. And in any case, quantum physics is not in contradiction with the so called "realistic hypothesis:" as far as we know, entities can exist independently of our observing or measuring them. But I think it is now time to come back to our construction of your personal reality.

PERSONAL REALITY

STUDENT. All right. I was saying that what is real for me now, is what exists for me now, and that what exists for me now, is what is available to my experience now. But then, I also intuitively believe that Vieira's book in the IAC's office is existing for me now as well, although, apparently, it is not directly available to me now.

LECTURER. Yes, and then you started with your koan-like riddle. All right, let's step back for a moment: do you remember what we have discussed about actual properties?

STUDENT. Sure: a property is actual if, should I decide to perform one of the corresponding tests, the positive answer would be certain.

LECTURER. Let us then consider again the specific property of your soma-entity *S* of "being burnable". Do you still agree that "being burnable" is an actual property of entity *S* now, and again I insist on the word "now"?

STUDENT. Certainly yes, because should I decide to carry out the test with the furnace, the "yes" result would be certain.

LECTURER. Correct, but preparing and executing the experiment demands some time. You must find a furnace, heat it up, put entity *S* inside of it and wait for a couple of hours to see what the outcome will be. In other words, once the entire experimental procedure will be completed, you will not be any longer in the *now*. So, how can you say that being burnable is an actual property of entity *S* now, in this present instant.

STUDENT. Oh, I see. Following your reasoning, I can only say that entity *S* is burnable in my future, because it is only in my future that, should I decide to perform the test, I will get the outcome of the test.

LECTURER. Yes, but on the other hand, you and I perfectly know that your soma-entity *S* is actually burnable also now, in your present, and not only in some future. So, it seems we are missing something in our operational definition.

STUDENT. Now I'm confused. All I know is that even if I want to, I cannot complete the furnace test in a fraction of a second in my present.

LECTURER. But in your past, you could have decided to perform the test.

STUDENT. You mean… oh yes, of course, now I have it: entity *S* is *actually* burnable *in my present* because, should I have decided *in my past* to perform the furnace-test, the "yes" answer would have been certain *in my present*.

LECTURER. Perfect, that's it! Then, what about the existence of Vieira's book, in this present moment of yours?

STUDENT. In this moment the book is not directly accessible to my experience. But should I have decided in my past to remain

inside the IAC office and read the book, instead of coming with you to this tea room, then instead of sipping a cup of tea I would be having an experience with it.

LECTURER. Exactly, the book would have been accessible to your present experience, should you have decided to act differently in your past. So, don't you think that you have now all you need to give a clear operational definition of your *personal present reality*?

STUDENT. Ok, I'll try. To start with, let me say that my present personal reality is made of all the entities existing for me in my present.

LECTURER. So far so good.

STUDENT. Thanks. Then, I can add that *existing* is an operational property, and therefore it can be tested.

LECTURER. Yes, and what is the test for the property of existing?

STUDENT. The test is very simple: it consists in checking if the entity is present, in the sense of being available to whatever personal experience I can decide to have with it, in my present moment. And since the existing-property is defined in operational terms, I can also say that a given entity exists for me in my present moment, and is thus part of my present personal reality, if and only if its property of existing for me is actual in my present.

LECTURER. Yes, and this means that, should you have chosen in your past to act accordingly, *with certainty* you would be having an experience with said entity in your present. In other words, the answer "yes" for the *existence-test* performed in your present moment would be certain in advance.

POTENTIAL EXISTENCE

STUDENT. Tell me: do you agree that before one can even talk of whatever properties a given entity may have or have not, first of all the entity must exist?

LECTURER. I agree that this is a desirable requisite for an investigation: to deal with real entities, i.e., existing entities.

STUDENT. Then, if this is so, the property of existing should be an intrinsic property of all entities, without exception.

LECTURER. Are you pretending that the property of existing must always be actual for any entity?

STUDENT. Somehow.

LECTURER. Think about the situation where this mad scientist would have burned Vieira's book. If you cannot know with certainty if such an event really occurred, then the best you can say is that the existence of Vieira's book is at present only potential for you.

STUDENT. Do you mean that the concept of *potential existence* becomes meaningful in situations where entities may have been destroyed?

LECTURER. Not only in cases of destruction, but also of non-creation. In general terms, when a property is said to be potential, you can distinguish two different circumstances. The first one is when you are in a situation of lack of knowledge. This is for instance the case with the book of Vieira, which is only potentially existing for you if you aren't certain that nobody has destroyed it. But it is also the case of an elastic band in your packet, which is only potentially left-handed, because its "left-handedness" property is still non-created, and you don't know if it will be successfully created during the test, since you don't control all the subtle fluctuating interactions arising between the elastic and the experimental apparatus constituted by your two hands. And the situation is similar with physical elementary particles, like for instance electrons, which are only potentially present in a given place of the physical space, because position is only created when the apparatus detects the particle, in a way you cannot usually control and predict.

STUDENT. If I understand correctly, every time I don't know if a property has been destroyed, or created, then all I can say is that the property is just potential.

LECTURER. Precisely. The second circumstance is when potentiality is not related to a contextual lack of knowledge, but to your certain knowledge that the property in question is not and cannot be presently actual.

STUDENT. Do you mean the situations where I know with certainty that, should I decide to perform the test, the answer "no" would be certain?

LECTURER. Exactly. In this case it is the *inverse test* which would be true, namely the test obtained by interchanging the terms of the alternative[14] (exchanging the roles of "yes" and "no").

STUDENT. I understand, but an example would certainly help.

LECTURER. All right. I was planning to write a book about the interesting dialogue we are having today. What do you think: does this book-entity exist right now, in my present?

STUDENT. Certainly not. But, on the other hand, if I use our operational definition of existence, I can also say that if in your past you would have acted differently, you could have had this dialogue with me in advance and succeeded writing it down in time for the book to exist right now, in this present moment. It sounds bizarre.

LECTURER. Not bizarre, but incorrect. It is important not to confuse our *creations* with what is *available to our creations*. In our operational definition of existence, what is asked is not that the entity is *creatable*, but that it is *already created*, and thus available to our experience. All entities are in principle creatable, but not all entities are already created. Actual existence is about created entities and not about creatable entities. Consider-

[14] The reader should however keep in mind that in the general situation the prejudgment that either a test or its inverse is true is not correct, given that not all tests necessarily have a predetermined outcome, as it was shown in the first part of the dialogue for the case of a product test. Also, it should be emphasized that strictly speaking the "yes" and "no" outcomes are not the only two possible alternatives of an experiment. Indeed, a third possibility is constituted by the fact that the experimenter may chose not to perform the experiment, so that its result can remain purely hypothetical.

ing the book that I want to write, first of all we haven't yet finished our dialogue, so that the rough material for the paper is not even available. But let us suppose we have just finished our talk. Then, a sort of mental-book-entity already exists in the mental dimension of our reality, given that all the information regarding the paper is already available to my present mental experience. However, there is no physical book existing right now, since it hasn't been created so far in the physical dimension, and therefore it cannot be available to my present physical experience. In other words, its physical existence is only potential for the time being,[15] in the sense that we know for sure it doesn't exist right now, although it may certainly exist in the future. Is it clear?

STUDENT. Yes. I would nevertheless appreciate if you could resume once more the definition of *personal present reality*.

POSSIBILITY

LECTURER. Sure. Let me see if I succeed at being more concise. The personal present reality of a consciousness is the collection of all entities that exist for that consciousness at its present moment. These existing entities are, by definition, those which are available to its experience, thus constituting the collection of all *possible experiences* the consciousness may live at its present moment.

STUDENT. Now that you are saying that, I'm realizing something quite amazing: that my present personal reality is nothing but a construction about the *possible*, and more precisely about the *possible experiences* I could have lived, although probably will never live.

LECTURER. More than correct. Although your personal present experience is that of, say, drinking a cup of tea, you could as

[15] The situation is different for you, reader, since you have presently in your hands the physical (electronic or paper) book and you are having with it an experience. Enjoy.

well have chosen to act differently in your past to live now a different experience, by creating with other entities which are available to you. All these available entities constitute your personal present reality, so that your personal present reality is not made by the collection of your actual experiences but, instead, by the collection of your possible experiences.

STUDENT. It is as if possibility would be the basic stuff reality is made of.

LECTURER. Yes, this is an inescapable conclusion emerging from our analysis: *reality is about possibility*. And possibility is about *choice*.

STUDENT. Why?

LECTURER. Your present reality is made of all entities that are existing for you *at once*. If you want to test if a given entity exists for you in your present, you must check if in your past a different *choice* was possible, so that in your present that entity would have been part of your experience. Thus, *possibility is related to choice*. If choice wouldn't be an attribute of the consciousness, then we couldn't operationally construct our reality as we do. If you remember, this same conclusion emerged from our earlier discussion about *meet properties* and *product tests*.

STUDENT. Yes, I remember: choice is fundamental, since we cannot experience everything at once.

LECTURER. But even though we cannot experience everything at once, entities can exist all at once, and thus *existence is about possibility.*

EXPERIENCE

STUDENT. All these concepts are in a way very simple and at the same time very subtle.

LECTURER. I agree. Intuitively we already know all these things, since we have a direct experience of reality. For instance, you

don't need our clever conversation to know that Vieira's book exists inside IAC office; but what maybe you didn't realize, is why you know it![16]

STUDENT. Yes, and this gives me food for thought. By the way, talking about *experience*, it seems it is the central concept in the definition of our personal reality. Is it possible to be more precise about what an experience is, exactly?

LECTURER. Definitely. As we have said at the beginning of our conversation, the concept of *experience* is truly at the basis of our operational description of reality. And we can certainly try to define it in more precise terms. First of all, I think it is important to point out that an experience is not reducible to a mere interaction between two entities. An experience arises only when at least one of the two entities is a consciousness.

STUDENT. But doesn't an experience require some form of interaction?

LECTURER. That's correct. Interaction between two different entities is a necessary condition for an experience, although not a sufficient one. What is important is that one of the two entities is *living the interaction*. And this can only be the case if the entity in question is at some degree aware of the interaction and

[16] The operational definition of existence presented in this text, which is due to Diederik Aerts, can however become much more counter-intuitive if one starts considering relativistic aspects [A, 1999]. In fact, according to Einstein's relativity theory, if a physical entity moves at high speed in space, then a relativistic effect of "time dilatation" becomes relevant. Because of this effect, and according to the given operational definition of reality, one can easily conclude that part of my future is also coexisting in my present. I will not deal here with these time paradoxes, which depends on what interpretation of relativity is adopted. Let me just mention that if the act of moving through space is considered as a process of creation, affecting the functioning of the internal clocks of the entity (as a consequence of the interaction of the entity with the physical-space-entity), then all these time paradoxes naturally disappear. In physics such a hypothesis is referred to as the Lorentz's process view, as opposed to Einstein's geometric view.

can distinguish the situation where its own self is interacting from the situation it is not.

STUDENT. Are you saying that the entity must be *self-conscious*?

LECTURER. Yes, and this is a typical fundamental attribute we want to assign to the consciousness.

STUDENT. Therefore, so far, we have identified two intrinsic properties, or attributes, a consciousness must have: *free will*, or the ability to self-determine oneself by operating free choices, and *self-consciousness*, or the ability to have subjective personal experiences, distinguishing the self from the non-self.

LECTURER. I agree. But that's not all. An experience also requires that the consciousness must be capable of identifying the entity, or phenomenon, with which it interacts.

STUDENT. But if the experience is a completely new experience, how could it be identified?

LECTURER. Identification doesn't mean recognition. Any experience you have affects you in some way. And if you *memorize* the pattern of these effects, then you'll have identified the experience, even though it is a first-time experience. In other words, you'll have discovered something about the entity with which you have interacted, and in return about yourself as well, of course. In other words, there is a *discovery-aspect* in any experience, which is one of the two basic aspects of any experience.

STUDENT. And what's the other one?

LECTURER. The other one is the *creation-aspect*, the active part of the experience that the consciousness has the power to control.

STUDENT. I see, whereas the discovery-aspect would be the passive part of the experience, that the consciousness cannot control, but just discover. Correct?

LECTURER. Absolutely. So, putting all this together, we obtain that an experience is the interaction of a consciousness with an

available piece of reality, that we have called entity, such that it always consists of two different basic aspects: an active *creation-aspect* and a passive *discovery-aspect*. The creation-aspect is that *animistic* part of the experience which is acted and controlled by the consciousness, whereas the discovery-aspect is that *mediumistic* part of the experience, not controlled by the will of the consciousness, but lending itself to its action and control. Do you agree?

STUDENT. I think a specific example would help.

LECTURER. Sure. The creation-aspect of an experience is usually described by verbs, whereas the discovery-aspect is often expressed by substantives. If you consider the simple experience of drinking your cup of tea, then the discovery-aspect of the experience is the entity called "cup of tea," which is one of the many existing entities available to your possible experiences. The creative-aspect, on the other hand, is your action of taking the cup in your hands and drinking its content, which is fully under your control. The experience in itself, of course, is the *fusion* of these two aspects.

STUDENT. What have I created in this experience, or fusion?

LECTURER. For instance, an entity called "empty cup of tea." Before your experience, such an entity wasn't existing.

STUDENT. But I can also say that I have destroyed the entity called "plenty cup of tea," that after my experience is not existing any further.

LECTURER. Yes, if you prefer you can also say that. Creation and annihilation are the two sides of the same coin. The name of the coin being *transformation.* Of course, all is a question of points of view. Take for instance the narrow point of view of a materialistic intraphysical consciousness, for whom the first death corresponds to a complete destruction of its very self, whereas from the broader point of view of a more advanced consciousness, knowing about the existence of the other vehicles of manifestation, it is just a transformation of its holosoma.

STUDENT. Yes, it depends a lot on what entity we are focusing our attention. Some entities appear more *stable* than others, more lasting in time. Apropos of time, what's its role in the description of reality? How does time intervene in the description of my personal reality?

TIME

LECTURER. You have certainly noted that our definition of your personal reality was relative to a specific instant.

STUDENT. Yes, my present reality is different from what my reality was in my past and from what it will be in my future.

LECTURER. Correct. Your *present* reality is a construction about all that *is* available to you, to *possibly* be fused with one of your creations, in your personal present, whereas your *past* reality is the construction about all that *was* available to you, to *possibly* be fused with one of your past creations, in your personal past; and your *future* personal reality is the construction about all that *will* be available to you to *possibly* be fused with one of your future creations, in your personal future.

STUDENT. And since my past realities differ from my present one, as well as from my future ones, this means that reality is constantly changing, or evolving. Is it for this reason that time exists?

LECTURER. I hope you haven't forgotten our operational definition of existence. Can you use it to test the existence of a *time-entity*? Is time an available piece of your reality, that you can fuse in your present moment with one of your creations?

STUDENT. Surely not. How could I interact with time? And, furthermore, the very fact of speaking on the availability of a time-entity in my present is already a paradoxical, self-referential reasoning.

LECTURER. I agree. Thus, the only possible conclusion is that what we usually call time doesn't exist.

STUDENT. But since reality changes, in a way there must be a time flow, explaining that my present moment, my *now*, is not fixed but moves continuously towards the future direction.

LECTURER. If time doesn't exist, how could it flow? But let us assume for a moment it may exist, even if it doesn't. What would it mean that it flows?

STUDENT. It means that it moves from the past to the future direction, in the same way a one-dimensional object would move on a line, from the left to the right.

LECTURER. That's interesting. Let me consider as an example the movement of a car on a road, and to simplify let me suppose it moves at constant speed. Do you know what a speed is?

STUDENT. Absolutely: by definition a speed is a measure of how a position in space varies with respect to time.

LECTURER. Exact. Hence, do you agree if I say that the car is flowing on the road because it has a non-zero speed?

STUDENT. Yes, no objections. Flow and speed are related concepts: without a speed, there wouldn't be a flow.

LECTURER. Good. Consequently, if time is flowing, there must be a movement, hence a speed characterizing its untiring walk from the past to the future.

STUDENT. Without a doubt.

LECTURER. Tell me then: the speed of time, is the variation of what?

STUDENT. What a question: the variation of time, of course.

LECTURER. With respect to what?

STUDENT. …

LECTURER. You are in trouble, aren't you? To make sense of a time flow you need a second sort of time, with respect to which you could characterize its speed. But then, the same argument also applies to this second sort of time, so that you are obliged to introduce an infinite number of different times in a never-ending regression [D, 1998].

STUDENT. I never realized that.

LECTURER. Luckily, we don't need to be bothered by that: *time doesn't exist*, so neither can it have a flow.

STUDENT. Then, how should I understand the concepts of past, present and future?

CHRONOLOGICAL ORDER

LECTURER. These concepts are to be understood in relation to a specific ability of the consciousness: the one of consistently *ordering* its experiences. Your reality is a collection of simultaneous things, all available at once, at the same moment, to be possibly experienced by you. But the experiences you live are not in general simultaneous: they are subsequent one to the other. Now, since I know you are a scrupulous consciousness, you'll certainly want to consistently keep track of all your experiences, giving to each of them a specific label, for instance an increasing real number, that you may call *the moment of your experience*. By doing so, you introduce in your reality a *personal chronological order*. This has important consequences, seeing that when you apply a chronological label to one of your experiences, the same label automatically applies to all those simultaneous entities of your reality with which you could have had an experience at the same moment, should you have made in your past a different choice.

STUDENT. If I understand correctly, you are saying that all consciousnesses possess a sort of natural innate ability of consistently ordering their experiences, and that by doing so they automatically introduce a chronological order also applying to all the other entities that are simultaneously existing (as possibilities) in their personal realities.

LECTURER. Precisely, and from that order it follows that you can distinguish past realities from present and future realities or, shortly, your past from your present and future.

STUDENT. I see, and by ordering my experiences by means of an

increasing real parameter, I'm also automatically generating a personal *time's arrow* in my personal reality.

LECTURER. Exactly, and consequently you create the possibility to discover that there are parts of your reality that change according to the so-called *law of cause and effect*, or *karma*, as you observe that certain of your experiences, or possible experiences, are always necessarily preceded or followed by some others, according to the chronological order you have established.[17] In this way, you can recognize how your personal creations may affect your personal reality, and of course the personal reality of other consciousnesses. And from that you can learn how to better and more responsibly chose the entities with which you can fuse into an experience and thus create.

MEMORY

STUDENT. This innate ability of the consciousness to chronologically order experiences, where does it come from?

LECTURER. I think it is a consequence of another key attribute of the consciousness: *memory* [Al, 2004].

STUDENT. Are you saying that, in addition to free will and self-consciousness, memory is also an intrinsic property characterizing the core identity of a consciousness?

LECTURER. Yes, most probably. Roughly speaking, memory is the ability of the consciousness of trapping, storing and subsequently recovering the impressions or information derived from its experiences, as a consequence of its interaction with its inner and outer reality. And since experiences are not simultaneous, but one subsequent to the other, memories exhibit a sort of natural layered structure, from which we can derive our personal chronological order and time arrow.

STUDENT. Why are my experiences one subsequent to the other,

[17] It is worth noticing that a correlation, however strong it may be, is just a necessary condition for the existence of a cause-effect relation, but never a sufficient one.

and not simultaneous, not all at once?

LECTURER. Good question, but also a very difficult one. What I can say is that if two of your experiences are simultaneous, then you can also say that they are part of a single bigger experience, of a more complex structure. But the level of complexity of the experiences we can handle is necessarily limited by the structural limits of the vehicles we are using to manifest. Therefore, we can conjecture that the nature of our partitioning of reality into chronologically ordered fragments is dictated by the typical level of structural complexity reached by the vehicle we are using to manifest.

STUDENT. If I follow your speculative reasoning, then our perception of an apparent time flow would be the result of the strategy we use to handle a very complex reality we cannot experience all at once. And therefore, different consciousnesses would experience different personal time flows as a result of the structural complexity of the vehicles they are using in the dimension inside which they are manifesting.

LECTURER. Yes, we cannot experience reality all at once, because the entire reality is much more complex than the vehicles we are typically using to manifest inside of it.[18] Thus, we have to deconstruct the entire reality-entity into a number of less complex parts, with which we are then able to successively interact, in a personal chronological order. And since all these parts are not independent one from the other, being the interconnected elements of a bigger more complex structure, this may well explain why we have discovered an emergent law of cause and effect, that we can use to reorganize our fragmented experiences into a coherent bigger scheme.

STUDENT. So, first we deconstruct, then we reconstruct.

LECTURER. Yes, like when you deconstruct a cube into 6 different 2-dimensional faces, that you can observe one after the oth-

[18] However, this doesn't exclude that an evolving consciousness might reach, one day, a level of complexity comparable to that of the whole reality, thus creating a fractal-like cosmic structure [S, 2005].

er, and subsequently reintegrate them back into a single 3-dimensional more complex structure. When you do so, when you use the fragments of your perceived reality to construct a more integrated picture, you increase the structural complexity of your vehicles and become more able to experience larger, less divided and higher-dimensional portions of reality. All that, of course, requires the essential attribute of memory or, more precisely, of a structured memory. Memories are our best available theories of reality, or *holotheories*, recorded in the intimate structure of our holosomas [S, 2005].

STUDENT. All this sounds very metaphysical to my taste. Are you saying that not only time is an illusion, but also change?

CHANGE

LECTURER. Not exactly, what I'm saying is that every consciousness chronologically orders its reality in a very personal and specific way, according to its evolutionary level and the different evolutionary contexts. This process of ordering experiences of an increasing level of complexity is what we may call *personal change*, or *personal evolution*, and is probably responsible for our subjective impression of a time flow. But of course, reality is filled with countless consciousnesses, which are also constantly deconstructing and reconstructing their reality, so that every personal change or evolution is in fact happening inside a bigger inter-subjective reality, which is also constantly changing because of the creative presence of all the other consciousnesses.

STUDENT. Tell me: can we operationally define change? In simple terms I mean.

LECTURER. Yes. For instance, you can say that an entity has changed for you if, according to your chronological order, you know that the entity existed in your past and that at least one of its former states was different from its actual state.

STUDENT. Of course, that's obvious. And do you think that all parts of reality are always changing?

LECTURER. Once the *Buddha* said:[19] *nothing is constant except change.*

STUDENT. And do you agree with his statement?

LECTURER. Well, I think it's a very suggestive statement, and certainly all modern physicists would agree with it. Indeed, even a massive physical object at absolute zero temperature continues to show some internal residual movement. It seems that nothing can be put completely at rest and kept perfectly immobile. As we discussed before, all matter and paramatter are energetic substances, and energy means movement. But of course, not every movement is the cause of a deep structural change.

STUDENT. What do you mean by this?

LECTURER. I think that one should distinguish two kinds of evolution. The first one is what we may call an *evolution of the first kind.* It is such that although the state characterizing the entity changes, all its intrinsic properties, or attributes, remain unaffected. For instance, when you walk in the street, your spatial position changes, and so does your somatic state, although your somatic identity remains clearly unaffected. An *evolution of the second kind*, on the other hand, would correspond to a change of the very identity of the entity.

STUDENT. Do you mean a process such that some of the attributes of the entity, which are normally always actual, become then potential, while new attributes are created?

LECTURER. Yes. And since the attributes are the stable intrinsic properties characterizing the identity of an entity, if they change then not only the state of the entity changes, but its entire intimate structure.

STUDENT. A *transformation*?

LECTURER. Precisely. And if the number of attributes that are affected during the process is sufficiently large, the new entity may be so different from its previous version that it may

[19] This saying is also attributed to *Heraclites*.

deserve a new name. In this case, we can speak of a process of true *transfiguration*.

STUDENT. Do you have examples?

LECTURER. As many as you want. Take for instance a cube made of wood. The main attributes of this simple macroscopic physical entity are that it is "made of wood" and it is "shaped as a cube." And this is the reason we call it a wooden-cube-entity. Of course, from these fundamental attributes, others follow, like for instance the one of "being burnable" or "having a place in physical space" or "floating on water," provided of course the density of the wood is not too high. But in addition to all these stable characterizing attributes, which usually don't change with time, there are also other properties, also associated to the cube, which are of a more *accidental* nature, and are constantly changing. For instance, the different positions that the cube may take when it is displaced in space, or the different possible orientations of its faces when it is rotated, but also the speed or acceleration of its center of mass, its angular velocity, its temperature, the number of thermal photons it emits per second in a specific direction, and so on. Contrary to its stable attributes, all these properties constantly change with time, according to what we have called an evolution of the first kind.

STUDENT. Yes, the state of the wooden cube changes with time, but the wooden cube always remains a wooden cube.

LECTURER. Good. But now imagine that you take the cube and cut it into two identical pieces with a handsaw. This is what I have called an evolution of the second kind. Because now there is no cube anymore: now there are two newborn wooden-parallelepiped-entities.

STUDENT. What about the first death process: is it an evolution of the first or second kind?

LECTURER. Good question. What do you think?

STUDENT. I think the answer depends on the perspective one adopts. If I consider the soma as an independent entity, then of course it is an evolution of the second kind, because after its

death the soma loses all its main characterizing attributes. But if I consider the soma just as an appendix, or extension of the holosoma, then I may consider the first death as a simple change of the state of the holosoma, and thus as an evolution of the first kind.

LECTURER. You are correct: in general, there is no clear-cut frontier separating an evolution of the first kind from an evolution of the second kind. In fact, it depends on how we define the entity under investigation, and in particular on how we identify its essential attributes. But of course, our identification of the countless entities composing our reality is strongly dependent on our understanding and knowledge of it, and consequently on our specific evolutionary level.

STUDENT. Right, but coming back to Buddha's statement, what did he mean: evolution of the first or second kind?

LECTURER. Well, I don't know, you should ask him. Roughly speaking, you may say that an evolution of the first kind is a more superficial dynamics, not deeply affecting the structure of reality, whereas an evolution of the second kind is a relatively deeper process of change, giving rise to more profound structural modifications. But of course, you must always keep in mind that this distinction is relative to the adopted point of view. Now, to answer your question, what I personally believe is that when the Buddha mentioned change in his famous quote, he referred to deep change, thus to an evolution more of the second kind. But how deep a process of change can really go? If you take literally what he said, there must be a limit.

STUDENT. What kind of limit?

LECTURER. Well, he indicated that there is something that is always constant and cannot change.

STUDENT. You mean, change itself?

LECTURER. Yes, if change is a constant, it means that change is a stable attribute of reality, and therefore no process of change can go as deep as to affect change itself.

STUDENT. Are you playing with words?

LECTURER. Not really. What I'm trying to emphasize is that when we observe that something is changing, we also discover that something is not. Change, like motion, is a relative concept. To define a process of change, like for instance our personal evolution, we always need a stable unchanging frame of reference.

STUDENT. Do you mean that there is a deep level of reality that cannot change, otherwise change itself would become meaningless?

LECTURER. Yes, something like that. And it appears reasonable to me to hypothesize that such a level is based on the being-consciousness itself. I think there must be a set of attributes defining the core identity of what a being-consciousness really is, and that by definition these attributes cannot change at all, or very little.

STUDENT. Why couldn't they?

LECTURER. Simply because change itself, as we understand it, would be a direct consequence of the existence and stability of these very attributes.

STRANGE

STUDENT. But then, aren't you introducing a sort of unnatural dichotomy in our description of reality? I mean, if there are things that are always constant and others that, instead, are always changing, aren't we back to a sort of dualistic paradigm of a reality composed of two radically distinct antithetical substances: a purely static one and a purely dynamic one?

LECTURER. Not necessarily. Assume for a moment that the name of the mother substance composing reality would be *strange* (*str*ucture + ch*ange*), and that such a *strange-substance* would have the possibility of assuming many different states. Suppose also that all these different states, or configurations, of the strange-substance composing reality, could be indexed by a suitable multidimensional variable that we may call *velocity*.

Then, in general terms, different parts of reality would be made of strange-substance having different velocity-states. And what we usually call a *structure* would just be a (relatively) slow strange-substance, whereas what we usually call a *process* would be a (relatively) rapid strange-substance (a short-lived structure). As you can see, there is no radical dualism in this description.

STUDENT. Are you saying, then, that also change can change?

LECTURER. Probably yes. If the attributes defining change (what is kept fixed with respect to what changes) are allowed to vary, then the process of change itself may vary as well and acquire new qualities. In that sense, I believe it is more reasonable to assume that there are many different qualities of change inside of reality, as the stability of structures can only be defined in relative terms. Of course, one is free to hypothesize idealized *pure structures*, perfectly *stables*, always and forever isomorphic with respect to themselves. However, one should be aware that, almost certainly, such a hypothesis would never be experimentally testable, irrespective of our evolutionary level.

PERMANENCE

STUDENT. Could you please define the term "stability" in terms that are more precise?

LECTURER. Yes. An entity (or morphothosene) is said to be *stable* if all its characterizing attributes are stable. And an attribute is said to be stable or, rather, relatively stable, if it has a relatively high *degree of permanence*, which means that the attribute isn't easily affected by all the background phenomena with which it interacts, neither does it have the tendency of transforming spontaneously.

STUDENT. Do you mean that, independently from the context, the attribute remains actual for a long time?

LECTURER. Yes, that's the idea. By *degree of permanence* I

mean *duration*, or *temporal length.* As we have already discussed, everything a consciousness experiences during its evolution is typically *transitory*. Take for instance the intraphysical life: an intraphysical consciousness will usually perceive its soma as stably existing. However, after its first desoma, that same consciousness (if not a "psychotic post mortem") will experimentally realize the impermanent character of the soma and the more permanent character of the psychosoma. In other terms, that consciousness will understand that its soma was only a *transitory entity*, having a *relative degree of existence*, whereas its psychosoma, if compared to its soma, possesses a higher permanence, and thus a higher *relative degree of reality*, or of *existence*.

STUDENT. Are you saying that we can order the entities composing our reality into different *classes of permanence*, according to their specific *life spans*?

LECTURER. Exactly. The highest of these classes, namely the one containing the entities of the highest known relative degree of permanence, constitute what a consciousness will usually call its *highest reality*. And this also means that, in general terms, reality and existence do not possess a common valence for all the evolving being-consciousnesses, but depend on the evolutionary level from which each of them perceives the world.

STUDENT. Are you sure it is truly meaningful to say that a real entity is *more real* than another real entity?

LECTURER. Why not? What I'm trying to emphasize is that the numerous entities populating our reality possess different qualities of existence. And that one of these qualities can be characterized by their tendency of actually existing for a long time.

STUDENT. And this, I imagine, can be defined in operational terms.

LECTURER. Sure, that's very easy: a real entity *A,* belonging to my present personal reality, is for me *more real* than another real entity *B,* also belonging to my present personal reality, if

the property of *A* of existing is more permanently actual than the one of *B*, which means that there will be a future present reality of mine in which *A* will still be an actually existing entity, whereas the existence of *B* would have ceased to be actual.

STUDENT. But do you agree that duration, or permanence, are also relative concepts? As far as I know, according to Einstein's relativity theory, the measured duration of a process is not in general the same for two different observers, because of the well-known relativistic phenomenon of *time dilatation*.

LECTURER. Yes, of course. Since the perceived degrees of permanence are, by definition, subjective, they will generally differ for two different consciousnesses. However, as we have previously discussed, this is just a matter of finding the good communication interfaces, to coherently translate and compare the different subjectively perceived durations.

STUDENT. But given that time doesn't exist, how can duration be unambiguously defined?

LECTURER. We have observed that time cannot exist as an entity, and that there is no such thing as a time flow from the past to the future. But we have also recognized that change is a fundamental attribute of the *strange* mother substance of which reality is made of, and that consciousnesses can keep track of change by constructing personal time-arrows, thanks to which they can order their non-simultaneous experiences about reality. From this ordering, a subjective *sense of duration* naturally emerges.

STUDENT. I'm not certain if I understand. How does a sense of duration emerge from an ordering of the experiences?

LECTURER. It's very simple. Consider a consciousness having lived two different non-simultaneous experiences, that we shall denote *E* and *F*. Since *E* and *F* aren't simultaneous (for that consciousness), but one subsequent to the other, the consciousness will sense that *E* and *F* are separated by a certain *temporal interval*, or *duration*. Then, the question is: when sensing a duration between *E* and *F,* what is this consciousness

measuring, really? The answer, to my opinion, is rather simple: the consciousness is *counting*.

STUDENT. Counting what?

LECTURER. The consciousness is counting the number of intermediary experiences it is living between *E* and *F*.

STUDENT. What kind of experiences?

LECTURER. Don't forget that we are constantly passing through a stream of countless phenomena, through all sorts of entities localized in all sorts of dimensions. Therefore, generally speaking, we can reasonably say that the number of entities possibly interacting with a consciousness is, in every moment, practically infinite. But of course, because of the structural limits of the evolving holosoma, only a subclass of these interactions can be identified by a given consciousness and produce an impression in its holomemory. My hypothesis is that the duration the consciousness perceives between the two experiences *E* and *F* is directly proportional to the number of intermediary experiences it can *discriminate* between *E* and *F*.

STUDENT. But don't you think that many of the impressions we receive, both from outside and inside of us, barely remain at an unconscious level?

LECTURER. Yes, but this doesn't mean that they haven't been identified and discriminated at some level of the holosoma. I'm not saying that we have to necessarily be fully aware of any single impression occurring between *E* and *F*. What I'm saying is that our holosoma can process all these impressions as subroutines, to generate emerging subjective macro impressions, or sensations, like for instance the one of duration.

COMPLEXITY

STUDENT. Ok, then you are affirming that the perception we have about a time interval, or duration, is related to our capacity to *resolve,* at some level of our holosoma, the different interactions we can have with the countless entities populating

our reality.

LECTURER. Exactly. And this temporal resolution also depends on the *speed* of the vehicle we are using to manifest.

STUDENT. By "speed of the vehicle," do you mean something similar to the inner processor frequency of a computer?

LECTURER. There are of course different ways to understand speed. But in rather general terms, we can say that the speed of a vehicle of manifestation is a measure of its ability to efficiently process information, and in that sense, it is an attribute related to its structural complexity.

STUDENT. And how do you explain that the perception of duration we have in the extraphysical dimensions is different from the one we have in the physical dimension?

LECTURER. The psychosoma is more complex than the soma, as the mentalsoma is more complex than the psychosoma. Therefore, when a consciousness is in its psychosoma, it can have in a short time period, say 2 hours as measured by a terrestrial physical clock, a given number of very complex experiences. But when these experiences are downloaded into the brain, they must be deconstructed and linearized into a longer sequence of less complex sub-experiences, according to the lesser complexity of the physical brain, if compared to the *parabrain*. The result of this linearization process is that the intraphysical consciousness will have the bizarre impression of having lived a, say, two-day extraphysical experience in a two-hour physical time.

STUDENT. But don't you think one can also say that, given that the psychosoma can move more rapidly than the soma, this is sufficient to explain why it can live more experiences than the soma in the same physical time period?

LECTURER. Yes, I agree. We are just saying the same thing in two different ways: complexity is not a static concept, but a dynamical one. If a vehicle is more rapid than another vehicle, internally and externally speaking, its greater speed is also an expression of a greater complexity.

STUDENT. I'm not certain to understand.

LECTURER. Complexity is in itself a rather complex concept, particularly difficult to define. Going back to the original Latin word, *complexus* means twisted together, entwined or entangled. In other words, a complex entity is an entity made of several distinguishable but at the same time connected, or connectable parts. However, a vehicle can be understood as being relatively complex not only because it is made of a number of parts interconnected in some interesting way, but also because it can rapidly vary its geometry, thus establishing new and even more interesting configurations.

ACTUALIZATION OF POTENTIAL

STUDENT. All right, but coming back to the concept of relative degree of reality of an entity, tell me please: can we say that, for instance, *physical matter* is less real than, say, my psychosoma?

LECTURER. Well, it depends. What do you mean by "physical matter"? We know that the psychosoma, which can live a multimillenary evolutionary cycle, has a rather high degree of permanence, certainly superior to many known physical entities.

STUDENT. So, is it more real than matter?

LECTURER. Not necessarily. It is certainly more real than the physical human body, and also it is certainly more real than a physical old centenary tree, but what about a many millions of years old mountain, or a few billions of years old planet like Earth, or the sun, or even our entire Milky Way galaxy, or the whole visible physical universe? But we don't even need to consider physical entities of an increasing size. Take just a single proton: according to today's available experimental evidence, its time of permanence (expressed in terms of *half-life*) is larger than 10^{32} years, namely about ten thousand trillion times larger than the supposed age of our physical universe (according to modern cosmological theories). So, can we really say that a proton is less real than your psychosoma? Probably it

is the converse that is more likely to be true.

STUDENT. I'm confused. I was thinking that the physical dimension was, in a sense, younger than the extraphysical one, and that the extraphysical one was younger than the mental one.

LECTURER. Well, first of all nobody can say if the different mega-dimensions we call physical, extraphysical (astral) and mental, have been created one after the other, in a kind of succession, or all together at once, in the same movement. In fact, we don't even know if they have been created at all, since it may as well be possible that they have always existed. Who really knows? But something we can nonetheless say is that there is, apparently, a principal direction for the stream of creation, going from the subtler to the denser dimensions. According to this movement, we can say that, typically, what is created in a given dimension is always the result of something previously existing in a "higher," less "dense" dimension.

STUDENT. For example?

LECTURER. Consider again our present dialogue, which one day, as we discussed, perhaps will become a physical book. I have no doubts that, once our conversation will be terminated, and probably even before that, it will already exist as an energetic entity in the mental dimension.

STUDENT. Do you mean that in the mental dimension the book about our dialogue is already a real object?

LECTURER. Precisely: it is already an available piece of reality, or entity, with which I, you, or anybody else, can possibly have an experience: an experience of a mental nature, of course.

STUDENT. This is amazing. Are you saying that every time I have a conversation with a person, I'm giving birth to an entity in the mental domain?

LECTURER. Yes. If a dialogue, or conversation, receives sufficient energy from its creators, the corresponding structure, or morphothosene, can stabilize and exist with a relatively high degree of permanence. In other words, the greater is the interest the interlocutors put into the subject of their conversation, truly

willing to understand and constructively participate in the discussion, the greater also will be the quantity and quality of energy available for the assemblage of the multidimensional mental-entity corresponding to their conversation. Then, with time and with the right intentionality, this same mental-entity, or "mental-book," can settle "down" into the physical dimension and develop a "denser" extension. And from the view point of an intraphysical observer, a physical book whose existence was previously only *potential*, will come into *actual* physical existence.

STUDENT. That's interesting. If I understand correctly, this "sedimentation," or "densification," from a "higher" to a "lower" dimension, is nothing but a process of *transformation of potentiality into actuality*.

LECTURER. Exactly. As we have thoroughly discussed, existence and reality are about possibility, whereas potentiality is related to non-existence or, if you prefer, to potential entities, which are not available with certainty, or at all, to a consciousness' experience.[20] Therefore, if we understand the consciousness, or being-consciousness, as a *principle of a purely creative nature,* we can say that when it lives its countless experiences, it works as a *reality operator*, incessantly *transforming potentiality into possibility* or, if you prefer, endlessly transforming *potential existence into actual existence*.

STUDENT. Are you affirming that the stream of creation only goes from the "subtler" to the "denser" layers of reality?

LECTURER. Certainly not. *Actualization of potential* is a process that can take place in every direction, from the "subtler" to the "denser," from the "denser" to the "subtler," or on a same "density" level of reality. For instance, all that happens here in the physical dimension (our present dialogue, for instance) will

[20] One should not confuse *potentiality* with *possibility*. Possibility refers to what is presently available, with certainty, to a consciousness' experience, whereas potentiality refers to what is not yet available, with certainty, to a consciousness' experience (but could have been available in its past or may be available in its future).

also immediately affect the extraphysical and mental dimensions, because all these dimensions are deeply interconnected.

STUDENT. Then, why do you pretend that there is a sort of *principal direction* for the stream of creation, going from the subtler to the denser dimensions?

STRUCTURING REALITY

LECTURER. Because, according to my understanding, one goes from a "higher," "subtler" level, to a "lower," "denser" one, by *restricting the number of possibilities*.

STUDENT. What do you mean?

LECTURER. Do you remember when you asked me if it was true that every time we impose constraints on a system, we get some structure?

STUDENT. Yes, and you replied that the imposition of *constraints*, in the sense of *limiting the possibilities*, was indeed a key ingredient for the emergence of structures.

LECTURER. Exactly. Imagine now for a moment that I am a very powerful free consciousness, manifesting inside the pure mental domain, and that I am in the process of creating an entire new extraphysical dimension. How do you think I would proceed?

STUDENT. I really don't know.

LECTURER. Ok, in fact me neither. But let us speculate for a moment about a possible mechanism. Consider for instance, as a simple analogy, a sculptor having in his (or her) hands a piece of shapeless clay, from which he wants to work out a little figurine. How do you think he would proceed?

STUDENT. Well, first of all I think he will have to figure out what kind of figurine he wants to create, then proceed by giving a suitable structure to the clay in his hands, to achieve the desired result.

LECTURER. Exactly. So, what the sculptor must do is to first

select a model of figurine, within an infinite number of different possibilities. In other words, he will have to limit the possibilities and impose his choice to the clay in his hands, by applying some suitable constraints. In the same way, in more general terms, we can say that by applying constraints to a substance composing a certain level of reality, we obtain a new, more structured dimension, and in that sense (but only in that sense) a "denser" one.

LAWS

STUDENT. Could you please be more explicit? What are these constraints you are talking about?

LECTURER. In physics, we call them *physical laws.*

STUDENT. I have never thought of physical laws in terms of constraints.

LECTURER. Nevertheless, it is a general and well-known fact that physical laws can be formulated in terms of so-called *variational principles*, expressing the fact that they are the result of an *optimization procedure under the imposition of certain constraints* [B, 2005].

STUDENT. And do you think that the paraphysical laws, governing the extraphysical dimensions, are expressible in terms of optimization procedures under the imposition of constraints as well?

LECTURER. It is a rather natural hypothesis. And I believe it is also natural to postulate that what differentiates the mental, extraphysical (astral) and physical dimensions, is just the nature and number of constraints that are imposed. And since constraints mean structure, we can also say that each reality level is obtained as a structuring of the previous level, through the imposition of a certain number of additional constraints.

STUDENT. But why do so?

LECTURER. Probably because the process of limiting the

possibilities is at the core of the very mechanism of creation.

STUDENT. Do you mean that a "denser" dimension would be created from a "subtler" one, by forbidding certain relations between the entities?

LECTURER. Yes, something like that.

STUDENT. I'm confused. I have always believed that a creative process is about increasing and not diminishing the possibilities.

LECTURER. What you are saying is correct in regard to the process of empowerment of an evolving consciousness. The more a consciousness evolves and the more it will discover and develop its creative powers. Accordingly, the number of creative acts it will be able to produce is going to increase and not to diminish, as you said. But if an increase of the number of possibilities is at the heart of the process of empowerment of an evolving consciousness,[21] a limiting of the possibilities is, on the other hand, at the heart of any single creative act.

STUDENT. I see: a good sculptor has the power to perform a great number of figurines, but then he will have to choose one and impose a specific shape to his shapeless clay.

LECTURER. Correct. And when the sculptor does this, he transforms potentialities into actualities, in a process which increases the differentiation of structures inside of reality.

STUDENT. Can we say, then, that there are regions of reality which are less structured than others are?

DISTINCTION AND CONNECTION

LECTURER. Yes, although we must be careful with the meaning

[21] What can actually be experimented by a consciousness depends on the *present personal power* of that consciousness. The present personal power of a consciousness can be defined as the collection of all the creations that said consciousness can possibly perform, in its present personal moment, with all the available entities composing its *personal present reality*; see [A, 199a], page 168.

we attach to the term "structure." For instance, we must not confuse structure with complexity. A structure is nothing but the manifestation of an order, or disorder, as it is imposed by a set of constraints: precisely those constraints (or laws), which are forcing the elements belonging to that structure to arrange in that specific (structural) order. Complexity, on the other hand, as we have previously discussed, is a (difficult to define) property characterizing a structure, which takes into account aspects of *distinction* and *connection* between its composing elements. The *distinction aspect* is related to the variety and heterogeneity, which is present inside the structure, whereas the *connection aspect* is related to the interdependency of its different components.

STUDENT. But then, what are the factors responsible for the fact that, within a same dimension, governed by a same set of imposed constraints, or laws, one can find structures having different levels of complexity?

LECTURER. I believe it is because consciousnesses of different evolutionary levels can manifest inside a same dimension, by means of their different vehicles of manifestation. And their evolution inside a specific dimension can be described, in dynamical terms, as a process of *maximization of the structural complexity* of that dimension, by means of a maximization of the structural complexity of their vehicles. This is something that consciousnesses can do because, to use a trendy terminology, they are entities who can trap and amplify information by maintaining their dynamics *at the edge of chaos* [G, 2002].

STUDENT. Which means?

LECTURER. When there is a perfect order, like for instance in a crystal, then there is a minimum of complexity, because there is a minimum of information, being everything exactly the same. Similarly, if there is an extreme disorder, like for instance in a gas of independent particles, then again there is a minimum of information, because everything is perfectly different. Maximal information, and therefore complexity, is somewhere in between these two extremes of perfect order and perfect

disorder, a regime that some modern scientists like to call "edge of chaos." This intermediary regime is where the divergent processes that promote differentiation, and the convergent processes that promote similarity, or sameness, meet and find an optimal harmonic equilibrium.

STUDENT. Are you saying that we, evolving consciousnesses, are behaving as *optimizators of structures*?

LECTURER. Yes, I think this is an attractive hypothesis. We are creators; creators who proceeded in a sort of two steps *modus operandi*. In a first step, probably arisen in an extremely remote past, we created, or should we rather say co-created, the different rough multidimensional clays, imposing a suitable set of cosmic macro-constraints (the *primothosene*) to the primordial mother substance; then, in a second step, we immerged ourselves into these rough multidimensional clays, to refine them and optimize their structural complexity.

STUDENT. And for what reasons have we done that?

LECTURER. That's really the big question. To start with, I'm not certain that all we have said is correct, or even partially correct. It is just an educated guess, based on the hypothesis that, as we are part of a same reality, we must all share a same substantial origin. More precisely, what I'm hypothesizing is that within our reality there is a sort of ideal "place[22]" where everything would be, in a sense, perfectly symmetric: no distinctions, no preferred directions, no impositions of any sort. Accordingly, at that ultimate (or primordial) level of reality, everything would be perfectly unstructured. A nothingness containing everything: a "place" where everything you can conceive would already exist (not in potentiality, but in actuality), for the reason that the very substance this place would be made of is *pure unlimited possibility*.[23] Of course, no need to say, the existence of such a

[22] In fact, such a "place" would be literally everywhere, being a dimension superposed and intertwined with all the others, as all dimensions probably are.

[23] Adopting a bottom-up point of view (from the "denser" to the "subtler") instead of a top-down point of view (from the "subtler" to

dimension is a very speculative assumption but, after all, I'm just taking very seriously what our previous operational analysis taught us: that *reality is nothing but a construction about the possible*. Now, if you agree, we can call such an idealized purely unstructured level of reality the *non-manifest reality*, or the pure domain of residence of the *being*, where the term "being" refers to the truly immortal, perhaps undivided, *nude consciousness*, a consciousness having not yet acquired any structured holosoma.

STUDENT. So, correct me if I'm wrong, all began at that non-manifest level, as a result of a purely creative act of choice, made by the nude consciousness, corresponding to the first symmetry breaking, by way of imposition of a first cosmic constraint. And, accordingly, the many different entities and dimensions composing our manifest reality would have been shaped in a series of successive symmetry breakings, by the subsequent imposition of a nested hierarchy of always more stringent constraints.

LECTURER. I couldn't have said better.

UNIVERSAL LOVE

STUDENT. But my question is still open: why?

LECTURER. Well, to answer your question, one would need to know what was this first possibility that, hypothetically, had been chosen.

STUDENT. Chosen by whom?

LECTURER. Chosen by the first being-consciousness who initiated the entire evolutionary process.

STUDENT. Are you pretending that at the beginning there was only one consciousness? Are you speaking about God?

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the "denser") we could say as well that the substance this place would be made of is *pure unlimited potentiality*.

LECTURER. If in the beginning, and please consider the term "beginning" with all due reservation, all that existed was a nothingness made of pure unlimited possibility, an unstructured substance having a perfect symmetry, then, I believe, we can reasonably assume that this was the primeval "body" of a *single* nude consciousness. You want to call it God, well, why not, it's just a matter of personal taste.

STUDENT. But why a single consciousness?

LECTURER. Because if it wasn't a single one, then, forcedly, there would have been already some structure, thus contradicting our assumption that this was, and is, a domain of yet unstructured possibility. In metaphysical terms, we can symbolize this undivided and undifferentiated realm by means of the first natural number, the number *zero*. Zero is the perfect metaphor for describing this undivided first being-consciousness, not yet manifested but already pregnant of an infinity of acts of pure creation.

STUDENT. And what do you think this first act of creation was all about?

LECTURER. Listen, I hope you understand that we are here in a domain of pure speculation. Nobody I believe is really in a position to assert what was the content of this first choice, if it ever happened.

STUDENT. All right, so let's speculate.

LECTURER. Okay. Then, my guess is that what this first consciousness had in mind, so to say, was to go from the *zero* to the *infinity*. In other terms, the initial project was that of giving birth to new being-consciousnesses.

STUDENT. By what kind of mechanism? If all that existed was a single consciousness, how could it generate new ones?

LECTURER. Keep in mind that this primeval substance, this *living energy* of which the first consciousness was and is made of, is not submitted, by definition, to any conservation law. This means it can split indefinitely, in a sort of cosmic parthenogenesis. And this process of division, or multiplication,

of the mother substance, can be understood as the imposition of a given set of constraints, giving rise to more structured reality's layers, or dimensions, constituted by the *protoholosomas* of the newborn individual consciousnesses.

STUDENT. Are you affirming that all consciousnesses are in fact one and the same, and that our individuality, our specific individual self, is just a byproduct of our holosoma?

LECTURER. Well, you asked me to speculate, and that's what I'm doing. According to my conjecture, we are all part of the same single consciousness, continuously multiplying itself through the creation of an increasing number of evolving holosomas.

STUDENT. If I understand correctly, our personal evolving holosoma is what would confer to us our individual evolving identity. So that, in the end, we are all like the faces of a single cube.

LECTURER. Yes, like the countless faces of a single evolving hypercube, so that, in a strict sense, identity and individuality would be relative rather than absolute matters.

STUDENT. And tell me, according to this hypothetical line of thought, why do you think the first consciousness would have decided to fragment itself and give rise to that mega-process of structuring of reality we call evolution?

LECTURER. I think that only a metaphorical answer can be given to a question like this. Tell me: is it fun to play alone?

STUDENT. Not so much.

LECTURER. Why?

STUDENT. Because there are no exciting games one can play alone.

LECTURER. Precisely, and this is perhaps the answer to your question, the reason why the first consciousness would have desired, and chosen, to pass from a single "zero" to a countless "infinity": to have partners with whom to play more exciting games. As everybody knows, life is easier when we are single,

but also much less funny. When we are more, there are more games to play, and therefore more fun available to be experienced. But also, of course, there are bigger challenges, because we need to find ways to harmonically integrate our different views, in a much more complex picture.

STUDENT. I see, and this would explain why complexity is the key ingredient of this whole process of integration. By increasing the complexity, we allow the multitude of the different manifesting consciousnesses (the *distinction aspect*) to establish deeper and multivariate relationships (the *connection aspect*).

LECTURER. Well said. And in more poetic terms, I like to think of this diversity and connectedness (or *morphoconnectedness*), of this emerging structural complexity, as the manifestation of what we may call the law of *universal love*, which would be a sort of structural necessity, given that we are all emerging from the same single source (see also the concluding remarks in [S, 2005]). And universal love, I believe, is a perfect note to put a temporary end to our exciting conversation.

STUDENT. I agree. Thank you so much for sharing these things.

LECTURER. Don't mention it! It was really my pleasure.

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SPECIAL TERMS [24]

Animism (Latin: animus, soul): The set of intracorporeal and extracorporeal phenomena produced by the intraphysical consciousness without external interference. For example, the phenomenon of lucid projection induced by one's own will.

Atomic properties (synonym: state property): the strongest properties characterizing an entity, in the sense that the actuality of an atomic property cannot be deduced from the actuality of any other property of the entity under consideration. Each atomic property is in a one-to-one correspondence with a specific state of the entity, so that an entity *is* in a given state if and only if it *has* a given atomic property.

Attribute (synonym: intrinsic property): a property of an entity which is permanently actual.

Classical probabilities: probabilities expressing our lack of knowledge about something which is already present in the system under consideration.

Con: hypothetical unit of measurement of lucidity of an intraphysical or extraphysical consciousness.

Consciential paradigm: Leading-theory of conscientiology, based upon the consciousness itself.

Conscientiology: The science that studies the consciousness in an integral, holosomatic, multidimensional, multimillenary, multiexistential manner and, above all, according to its reactions in regard to immanent energy (IE), consciential energy (CE) and its multiple states.

Desoma (de + soma): Somatic deactivation, impending and inevitable for all intraphysical consciousnesses; final projection; first death; biological death; monothanatosis. First desoma, or simply desoma, is the deactivation of the human body or soma.

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[24] See also the glossary of conscientiological terms in the first issue of AutoRicerca (2011), and at: www.iacworld.org.

Second desoma is the deactivation of the holochakra. Third desoma is the deactivation of the psychosoma.

Entity (synonym: system, morphothosene): a portion of reality characterized by a collection of properties having a certain degree of permanence and forming an aggregate.

Existence: An entity is said to exist for a consciousness, in its personal present, if it is available to its experience in its personal present, in the sense that, should the consciousness have decided in its past to act accordingly, with certainty it would be having an experience with said entity in its personal present.

Experience: the interaction of a consciousness with an entity, consisting of two different aspects: an active creation-aspect (acted and controlled by the consciousness) and a passive discovery-aspect (not controlled by the consciousness, but lending itself to its action and control).

Evolution of the first kind: a process of change not affecting the intrinsic properties (the identity) of an entity.

Evolution of the second kind: a process of change affecting the identity (the intrinsic properties) of an entity.

Extraphysical: relative to that which is outside, or beyond, the intraphysical or human state; the consciential state less physical than the soma.

Extraphysical consciousness: the paracitizen of an extraphysical society; a consciousness which no longer has a soma. Outworn synonym: discarnate.

Free consciousness (Latin: con + scientia, with knowledge) (FC): The consciousness – or, more precisely: the extraphysical consciousness – which has definitively freed itself (deactivation) from the psychosoma or emotional parabody and the series of lifetimes. The free consciousness is situated in the evolutionary hierarchy above Homo sapiens serenissimus.

Golden cord: The alleged energetic element – similar to a remote control – that maintains the mentalsoma connected to the parabrain of the psychosoma.

Holochakra (holo + chakra): The energetic parabody of the human consciousness.

Holotheory: the holosoma, when understood as the support of the organised and structured knowledge (information) of the consciousness about reality.

Holosoma (holo + soma): The set of vehicles of manifestation of the intraphysical consciousness: soma, holochakra, psychosoma and mentalsoma; and of the extraphysical consciousness: psychosoma and mentalsoma.

Identity: the set of all the permanently actual properties, or attributes, of an entity.

Intraphysicality: the condition of human, intraphysical life, or of the existence of the human consciousness.

Intraphysical consciousness: Human personality; citizen of intraphysical society. Outworn synonym: incarnate.

Lucid projection (LP): Projection of the intraphysical consciousness beyond the soma; extracorporeal experience; out-of-body experience (OBE).

Mentalsoma: mental body; parabody of discernment of the consciousness.

Mentalsomatic cycle: The evolutionary cycle or course of the consciousness that begins when it is a FC, or free consciousness, in which it definitively deactivates its psychosoma (third death), and lives only with the mentalsoma.

Morphothosene (morpho + tho + sen + e): A thought or a set of thoughts when gathered and expressed, in some manner, as a form. Archaic expression now in disuse: thought-form. The accumulation of morphothosenes composes the holothosene.

Multi-existential cycle: The system or condition – at our current, average evolutionary level – of continuous alternation of one period of intraphysical rebirth (lifetime) with another extraphysical post-somatic deactivation period (intermission).

Parabrain: The extraphysical brain of the psychosoma of the consciousness in the extraphysical (extraphysical conscious-

ness), intraphysical (intraphysical consciousness) and projected (when projected in the psychosoma) states.

Paragenetics: The genetics restricted to the inheritance of the consciousness, received through the psychosoma, from the previous life to the human embryo. It is a subdiscipline of conscientiology.

Personal present reality: the collection of all entities existing for a consciousness in its present moment.

Physical space (synonym: physical dimension): a dimension made of entities sharing, among the others, the property of macroscopic wholeness.

Primothosene: the same as the primary cause of the universe; the first compound thought. This term has no plural form.

Projectiology (Latin: projectio, projection; Greek: logos, treatise) – The science that studies projections of the consciousness and their effects, including projections of consciential energies (CEs) outward from the holosoma. It is a sub discipline of conscientiology.

Property: something an entity *has* independently of the type of context it is confronted with; a state of prediction towards a certain experiment.

Psychosoma (Greek: psyche, soul; soma, body): The emotional parabody of the consciousness; the objective body of the intraphysical consciousness. Outworn expression: astral body.

Quantum-like structure: an intermediate general structure which is neither purely classical nor purely quantum, but something in between.

Quantum probabilities: probabilities associated to our lack of knowledge about properties, which did not exist before the experiment, but are literally created during the experiment.

Separated entities: entities for which all known possible experiments are separated experiments.

Separated experiments: experiments that can be performed on different entities without mutually influencing each other.

Seriality: The quality of the consciousness subjected to existential seriation (rebirth cycle).

Silver cord: The energetic connection between the soma and the psychosoma which is present in a projection of the consciousness, resulting from the (stretching of the) holochakral energies.

Soma: Human body; physical body. The body of the individual of the Animal kingdom, Chordata phylum, Mammiferous class, Primate order, Hominidae family, Homo genus, and Homo sapiens species, being the most elevated level of animal on this planet; nonetheless, this is the most rudimentary vehicle of the holosoma of the human consciousness.

State: the set of all the actual properties of an entity. A mode of being of an entity.

Test (synonyms: experimental test, operational question, experimental project, yes-no experimental test): an experiment to be performed on an entity, defined by the given of a measuring apparatus, of a manual of operations to be performed on the apparatus, and a rule allowing to interpret the result in terms of a "yes" and "no" alternative.

Thosene (tho + sen + e): The practical unit of manifestation of the consciousness, according to conscientiology, that considers thought or idea (concept), sentiment or emotion, and CE (consciential energy), as being three inseparable elements.

Vehicle of the consciousness: The instrument or body through which the consciousness manifests in intraphysicality (intraphysical consciousness) and in the extraphysical dimensions (projected intraphysical consciousness and extraphysical consciousness).

Wave function: a mathematical object describing the state of a pure quantum entity, in conventional quantum mechanics.

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AutoRicerca is the journal of the *LAB – Laboratorio di Autoricerca di Base* (Laboratory of Basic Self-Research).
Its mission is to publish writings of value, mainly in Italian, on the topic of *all round research* (both inner and outer).

Standing outside the usual editorial categories, *AutoRicerca* offers to its readers articles of a high level, selected, translated and checked personally by the editor. These works, although they usually require some effort to be assimilated – they should be studied, more than read – remain nonetheless accessible to the willing general reader who is really eager to learn something new.

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