

REALITY: THE SEARCH FOR OBJECTIVITY OR THE QUEST FOR A COMPELLING ARGUMENT

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I claim that the most central question that humanity faces today is the question of reality. And I claim that this is so, regardless of whether we are aware of it or not, because every thing that we do as modern human beings, either as individuals, as social entities, or as members of some non-social human community, entails an explicit or implicit answer to this question as a foundation for the rational arguments that we use to justify our actions. Even nature, as we bring it forth in the course of our lives as human beings, depends on our explicit or implicit answer to this question. Indeed, I claim that the explicit or implicit answer that each one of us gives to the question of reality determines how he or she lives his or her life, as well as his or her acceptance or rejection of other human beings in the network of social and non-social systems that he or she integrates. Finally, since we know from daily life that the observer is a living system because its cognitive abilities are altered if its biology is altered, I maintain that its not possible to have an adequate understanding of social and non-social phenomena in human life if this question is not properly answered, and that this question can be properly answered only if observing and cognition are explained as biological phenomena generated through the operation of the observer as a living human being.

Accordingly, my purpose in this essay is to consider the question of reality, and to do so dealing with the observer as a biological entity. To attain this end, I shall initially present some reflections upon the biology of observing, language and cognition, and then I shall pursue the consequences that I see that the contents of these reflections have for our understanding of social and ethical phenomena. In this endeavour, I shall proceed presenting these reflections under five themes: the ontology of explaining; reality, the ontology of cognition; social phenomena; and ethics. Finally, this essay is written in a way that allows for these different themes to be read to some extent independently.

THE ONTOLOGY OF EXPLAINING: CONDITIONS OF CONSTITUTION OF OBSERVING

Whenever we want to compel somebody else to do something according to our wishes, and we cannot or do not want to use brutal force, we offer what we claim is an objective rational argument. We do this under the implicit or explicit pretence that the other cannot refuse what our argument claims because its validity as such rests on its reference to the real. We also do so under the additional explicit or implicit claim that the real is universally and objectively valid because it is independent of what we do, and once it is indicated it cannot be denied. Indeed, we say that whoever does not yield to reason, that is, whoever does not yield to our rational arguments, is arbitrary, illogical or absurd, and we implicitly claim that we have a privileged access to the reality that makes our arguments objectively valid. Moreover, we also implicitly or explicitly claim that it is this

privileged access to the real that allows us to make our rational arguments. However, is this attitude about reason and the rational rationally valid? Can we in fact claim that it is its connection with reality that gives reason the compelling power that we claim it has or should have? Or, conversely, does reason give us a partial or total access to the real so that we can claim for reason the compelling and universal validity that we pretend it has when we attempt to force somebody else with a rational argument? Now, and in order to answer these questions, let us consider the operational foundations of rationality.

PRAXIS OF LIVING

We human beings operate as observers, that is, we make distinctions in language. Furthermore, if we are asked to explain what we do, we usually say that in our discourse we denote or connote with our arguments entities that exist independently from us. Or, if we accept that what we distinguish depends on what we do, as modern physics does, we operate under the implicit assumption that, as observers, we are endowed with rationality, and that this need not or cannot be explained. Yet, if we reflect upon our experience as observers, we discover that whatever we do as such happens to us. In other words, we discover that our experience is that we find ourselves observing, talking or acting, and that any explanation or description of what we do is secondary to our experience of finding ourselves in the doing of what we do.

Indeed, whatever happens to us, happens to us as an experience that we live as coming from nowhere. We do not usually realise that because we normally collapse the experience upon the explanation of the experience in the explanation of the experience. That this is so is apparent in situations that startle us. This, for example, happens when, while driving a car, another vehicle that we had not seen in the rear-view mirror overtakes us. When this occurs we are surprised, and we usually say immediately to ourselves or to others, as a manner of justification of our surprise, that the other vehicle was in the blind spot of the rear viewing system of the car, or that it was coming very fast. In our experience, however, we live the overtaking car as appearing from nowhere.

I express this, our situation as observers, by saying: a) the observer finds itself in the praxis of living (or the happening of living or the experience) in language, in an experience which as such just happens to him or her out of nowhere; b) any explanation or description of how the praxis of living in language comes to be is operationally secondary to the praxis of living in language, even though the explanation and the description also take place in it; and c) explanations and descriptions do not replace what they explain or describe. Finally, it is apparent that if explanations and descriptions are secondary to the praxis of living of the observer (our human praxis of living), they are strictly unnecessary for it, even if the praxis of living of the observer changes after his or her listening to them. In these circumstances, observing is both the ultimate starting point and the most fundamental question in any attempt to understand reality and reason as phenomena of the human domain. Indeed, everything said is said by an observer to another observer that could be him or herself (see Maturana, 1970), and the observer is a human being. This condition is both our possibility and our problem, not a constraint.

EXPLANATIONS

We, modern western human beings, members of the greco-judeo-christian cultural tradition to which modern science belongs, like to explain and to ask questions that demand an explanation for their answer. Furthermore, if we are in the mood of asking a question that demands an explanation, we become pacified only when we find an explanatory answer to our question. However, what does take place in an explanation? What must happen for us to say that given phenomenon or situation has been explained?

If we attend to what we do in daily life whenever we answer a question with a discourse that is accepted by a listener as an explanation, we may notice two things: a) that what we do is to propose a reformulation of a particular situation of our praxis of living; and b) that our reformulation of our praxis of living is accepted by the listener as a reformulation of his or her praxis of living. Thus, for example, the statement "You were made by your mother in her belly" becomes an explanation when a child accepts it as an answer to his or her question, "Mother, how was I born?" In other words, daily life reveals to us that it is the observer who accepts or rejects a statement as a reformulation of a particular situation of his or her praxis of living with elements of other situations of his or her praxis of living, who determines whether that statement is or is not an explanation. In doing this, the observer accepts or rejects a reformulation of his or praxis of living as an explanation according to whether or not it satisfies an implicit or explicit criterion of acceptability that he or she applies through his or her manner of listening. If the criterion of acceptability applies, the reformulation of the praxis of living is accepted and becomes an explanation, the emotion or mood of the observer shifts from doubt to contentment, and he or she stops asking over and over again the same question. As a result, each manner of listening of the observer that constitutes a criterion for accepting explanatory reformulations of the praxis of living defines a domain of explanations, and the observers who claim to accept the same explanations for their respective praxes of living.

Accordingly, and regardless of whether we are aware of this or not, we observers never listen in a vacuum, we always apply some particular criterion of acceptability to whatever we hear (see, touch, smell....or think), accepting or rejecting it according to whether or not it satisfies such criteria in our listening. Indeed, this is taking place now with the reader of this article.

EXPLANATORY PATHS

There are two fundamental kinds or manners of listening for explanations that an observer may adopt according to whether he or she asks or does not ask for a biological explanation of his or cognitive abilities. These two manners of listening define two primary exclusive explanatory paths that I call the path of objectivity-without-parenthesis, or the path of transcendental objectivity, and the path of objectivity-in-parenthesis, or the path of constituted objectivity. Let me describe them.

1) In the explanatory path of objectivity-without-parenthesis, the observer implicitly or explicitly accepts his or her cognitive abilities, as such, as his or her constitutive

properties, and he or she does so by not accepting, or by rejecting, a complete enquiry into their biological origin. In doing this, the observer implicitly or explicitly assumes that existence takes place independently of what he or she does, that things exist independently of whether he or she knows them, and that he or she can know them, or can know of them, or can know about them, through perception or reason. In this explanatory path, the observer uses a reference to some entity such as matter, energy, mind, consciousness, ideas or God as his or ultimate argument to validate and, hence, to accept a reformulation of the praxis of living as an explanation of it. In other words, it is the listening by the observer with a criterion of acceptability that entails a reference to some entity that exists independently of what he or she does for a reformulation of the praxis of living to be accepted as an explanation of it that constitutes this explanatory path and, in fact, defines it. Therefore, this explanatory path is constitutively blind (or deaf) to the participation of the observer in the constitution of what he or she accepts as an explanation.

In this explanatory path, the entities assumed to exist independently of what the observer does, as well as those entities that arise as constructs from these, constitute the real, and anything else is an illusion. In other words, in this explanatory path, to claim that a given statement is an illusion is to deny its reality and to negate its validity. Accordingly, due to its manner of constitution, this explanatory path necessarily leads the observer to require a single domain of reality - a universe, a transcendental referent - as the ultimate source of validation of the explanations that he or she accepts and, as a consequence, to the continuous attempt to explain all aspects of his or her praxis of living by reducing them to it. Finally, in this explanatory path, the assumption by different observers of different kinds of independent entities as the ultimate source of validation of their explanations constitutively leads them to validate with their behaviour different, and necessarily mutually exclusive, universes, realities or domains of objective explanations. Therefore, in this explanatory path, explanations entail the claim of a privileged access to an objective reality by the explaining observer, and in it the observers do not take responsibility for the mutual negation in their explanatory disagreements because this is the consequence of arguments whose validity does not depend on them. It is in this explanatory path that a claim of knowledge is a demand for obedience.

2) In the explanatory path of objectivity-in-parenthesis, the observer explicitly accepts: a) that he or she is, as a human being, a living system; b) that his or her cognitive abilities as an observer are biological phenomena because they are altered when his or her biology is altered; and c) that if he or she wants to explain his or her cognitive abilities as an observer, he or she must do so showing how they arise as biological phenomena in his or her realisation as a living system. Moreover, by adopting this explanatory path, the observer has to accept as his or her constitutive features all constitutive features of living systems, particularly their inability to distinguish in experience what we distinguish in daily life as perception and illusion. Let me explain. When we observe animals, we can see that they, in general, commit what we call perceptual mistakes. Furthermore, we use this in our interactions with them when we cheat them in hunting. Thus, for example, in fishing trout we use a hook with feathers that we make fly like an insect hovering on the surface of the water. A trout that sees this fake fly, and jumps to catch it, 'discovers' only

on being hooked that the fly was an illusion. That the observer knows, through his or her design, that he or she has been cheating all the time does not alter this. It is only after being hooked that the previous experience of catching a fly is devaluated for the trout into an illusion. We observers, as living systems, are not different from the trout in this respect. The use that we make in daily life of the words 'mistake' and 'lie' reveal this, and the word hypocrisy shows that we use our inability to distinguish in the experience between perception and illusion for the manipulation of our interpersonal relations. Indeed, regardless of the sensory avenue through which an experience takes place, and regardless of the circumstances under which it occurs, its classification as a perception or as an illusion is a characterisation of it that an observer makes through a reference to another different experience that, again, can only be classified as a perception or as an illusion through reference to another one.....

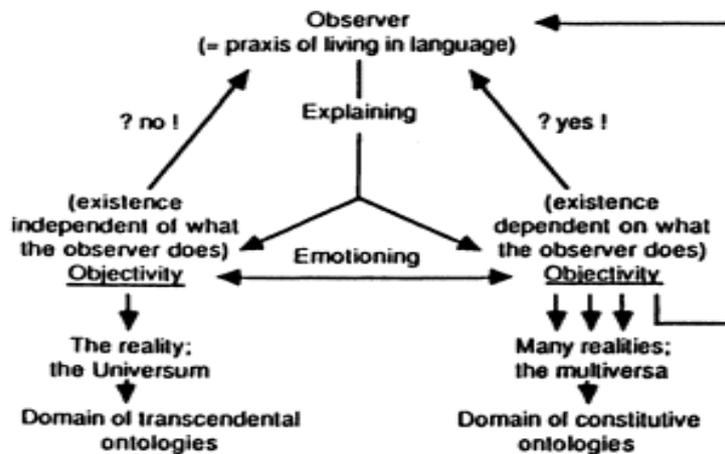
From all this it follows that an observer has no operational basis to make any statement or claim about objects, entities or relations as if they existed independently of what he or she does. Furthermore, a community of observers that cannot distinguish in the experience between perception and illusion is, in this respect, in no better position. Their agreement does not give operational validity to a distinction that none of them can make individually. In fact, once the biological condition of the observer is accepted, the assumption that an observer can make any statement about entities that exist independently of what he or she does, that is, in a domain of objective reality, becomes nonsensical or vacuous because there is no operation of the observer that could satisfy it. In the path of objectivity-in-parenthesis, existence is constituted with what the observer does, and the observer brings forth the objects that he or she distinguishes with his or her operations of distinction as distinctions of distinctions in language. Moreover, the objects that the observer brings forth in his or her operations of distinction arise endowed with the properties that realise the operational coherences of the domain of praxis of living in which they are constituted. In the path of objectivity-in-parenthesis, the observer constitutes existence with his or her operations of distinctions. For these reasons, the observer knows in the path of objectivity-in-parenthesis that he or she cannot use an object assumed to exist as an independent entity as an argument to support his or her explaining. Indeed, I call this explanatory path the path of objectivity-in-parenthesis precisely because of this, and because as such it entails instead the recognition that it is the criterion of acceptability that the observer applies in his or her listening that determines the reformulations of the praxis of living that constitute explanations in it.

The fact that, in this explanatory path, the observer constitutes existence as he or she brings forth objects with his or her operations of distinction in his or her praxis of living in language has three fundamental consequences: 1) Each configuration of operations of distinctions that the observer performs specifies a domain of reality as a domain of operational coherences of his or her praxis of living in which he or she brings forth particular kinds of objects through their application (for example, the domain of physical existence is brought forth as a domain of reality through the recursive application by the observer in his or her praxis of living of the configuration of operations of distinctions constituted by measurements of mass, distance and time); 2) Each domain of reality constitutes a domain of explanations of the praxis of living of the observer as this uses

recursively the operational coherences that constitute it to generate explanatory reformulations of his or her praxis of living (for example, the recursive application of the operational coherences of the praxis of living of the observer that constitute the physical domain of existence as the criterion of acceptability for the explanatory reformulation of the praxis of living of the observer constitute the domain of physical explanations); 3) Although all domains of reality are different in terms of the operational coherences that constitute them, and, therefore, are not equal in the experience of the observer, they are all equally legitimate as domains of existence because they arise in the same manner as they are brought forth through the application of operations of distinction by the observer in his or her praxis of living.

If follows from all this: a) that in the explanatory path of objectivity-in-parenthesis the observer finds him or herself as the source of all reality through his or her operations of distinction in the praxis of living; b) that he or she can bring forth as many different but equally legitimate domains of reality as different kinds of operations of distinction that he or she performs in his or her praxis of living; c) that he or she can use one or other of these different domains of reality as a domain of explanations according to the criterion of acceptability for an adequate reformulation of the praxis of living that he or she uses in his or her listening; and d) that he or she is operationally responsible for all the domains of reality and of explanations that he or she lives in his or her explanations of the praxis of living. It follows that, in this explanatory path, explanations are constitutively not reductionist and not transcendental because in it there is no search for a single ultimate explanation for anything. Accordingly, when one observer accepts this explanatory path, he or she becomes aware that two observers, who bring forth two explanations that exclude each other in front of what, for a third observer, seems to be the same situation, are not giving different explanations for the same situation, but that all three are operating in different yet equally legitimate domains of reality, and are explaining different aspects of their respective praxes of living. The observer that follows this explanatory path realises that he or she lives in a multiversa, that is, in many different, equally legitimate, but not equally desirable, explanatory realities, and that in it an explanatory disagreement is an invitation to a responsible reflection of coexistence, and not an irresponsible negation of the other. As a result, in this explanatory path, an illusion is the statement of a distinction listened at from a domain of reality different from that in which it takes place and where it is valid, and the experience of an illusion is an expression in the observer of his or her confusion of explanatory domains.

All this can be summarised graphically in the diagram that I show below, and that I call the ontological diagram:



Descriptively, what is entailed in these two basic explanatory paths as fundamental ontological domains, can be summarised as follows.

An observer in the domain of transcendental ontologies claims that his or her explanations are validated by their reference to entities that he or she assumes to exist independently of what he or she does. Matter, energy, God, Nature, mind, consciousness, and so on, can be such entities, and there can be as many different transcendental ontologies as different kinds of entities different (or the same) observers may assume to exist independently of what they do, in order to validate their explanations. Furthermore, different transcendental ontologies are exclusive, and each constitutes all that there is, specifying as it is brought forth by the observer the only objective domain of reality that he or she accepts as a foundation for his or her explaining. Due to this, for an observer in a particular transcendental ontological domain, any statement that does not pertain to it, or is not supported by it, is intrinsically false.

An observer in the domain of constitutive ontologies claims that what validates his or her explanations as reformulations of his or her praxis of living with elements of his or her praxis of living is the actual operational coherences that constitute them in his or her praxis of living, regardless of the criterion of acceptability used. In the domain of constitutive ontologies, everything that the observer distinguishes is constituted in its distinction, including the observer him or herself, and it is as it is there constituted. Moreover, in this domain each domain of explanations, as a domain of reality, is a domain in which entities arise through the operational coherences of the observer that constitutes it, and as such it is an ontological domain. Finally, in the domain of constitutive ontologies there are as many different legitimate domains of reality as domains of explanations an observer can bring forth through the operational coherences of his or her praxis of living, and everything that an observer says pertains to one. Due to this, every statement that an observer makes is valid in some domain of reality, and none is intrinsically false.

EXPLANATORY DOMAINS

Since each domain of explanations is defined by the criterion of validation used by the observer to accept a given reformulation of the praxis of living as an explanation of it, there are as many domains of explanations as criteria of acceptability for explanations an observer may use in his or her listening. At the same time, and as a result of this, each domain of explanations constitutes a domain of actions (and statements of actions in a domain of descriptions) that an observer considers in his or her reflections as legitimate actions for a particular domain of the praxis of living because they are supported by the explanations that he or she accepts in that domain. Moreover, and as I shall show later, since each domain of actions that are accepted as legitimate actions in a particular domain of the praxis of living by an observer is a domain of cognition in that domain, each domain of explanations, by specifying a domain of legitimate actions in the praxis of living of the observer, specifies a domain of cognition. Due to this, all observers that use the same criterion of validation for their explanations operate in cognitive domains that intersect in those aspects of their praxis of living specified by their common domains of explanations as domains of consensual co-ordinations of actions, and have their isomorphic domains of existence. Finally, whether an observer operates in one domain of explanations or in another depends on his or her preference (emotion of acceptance) for the basic premises that constitute the domain in which he or she operates. Accordingly, games, science, religions, political doctrines, philosophical systems, and ideologies in general are different domains of operational coherences in the praxis of living of the observer that he or she lives as different domains of explanations or as different domains of actions (and therefore of cognition), according to his or her operational preferences. Of these, I shall now only consider science - modern natural science - both because I am a scientist and because science plays a central role in the validations of knowledge in our western culture and, hence, in our explanations and understanding of social and ethical phenomena now in our cultural present.

We scientists like to explain the praxis of living, and the passion for explaining is the fundamental emotion that supports what we do as such. Furthermore, what is peculiar to modern scientists in general, and especially to modern natural scientists, as they do science, is their particular manner of listening for what they consider acceptable reformulations of the praxis of living, and their serious attempt to remain always consistent with it in their statements about what happens in their domains of experience. As a result, modern science is a peculiar domain of explanations and of derived statements about the praxis of living that is defined and constituted in the application by the observer in the particular criterion of validation of explanations - the criterion of validation of scientific explanations. Indeed, all those persons who accept, and consistently use, the criterion of validation of scientific explanations for the generation of their explanations, as well as for the validation of their statements in a particular domain, are scientists in that domain. Let me now present this criterion of validation and then reflect upon what I consider its significance per se, and for its application for the purpose of this article.

We modern natural scientists accept a given proposition as a scientific explanation of a particular situation of our praxis of living as observers (or phenomenon to be explained), only if it describes a mechanism that produces that situation or phenomenon as a consequence of its operation as one of four operational conditions that the observer can conjointly satisfy in his or her praxis of living. These four conditions are:

- a) The specification of the phenomenon to be explained as a feature of the praxis of living of the observer through the description of what he or she must do to experience it.
- b) The proposition in the praxis of living of the observer of a mechanism that as a consequence of its operation would give rise in him or her to the experience of the phenomenon to be explained.
- c) The deduction from the mechanism proposed in (b) and of all the operational coherences that it entails in the praxis of living of the observer, of other phenomena as well as of the operations that the observer must do in his or her praxis of living to experience them.
- d) The actual experience by the observer of those additional phenomena deduced in (c), as he or she performs in his or her praxis of living those operations that, according to what has also been deduced in (c), would be generated in it as he or she realises them.

When these four conditions are satisfied in the praxis of living of the observer, and only then, the mechanism proposed in (b) as a generative mechanism that gives rise as a consequence of its operation to the phenomenon specified in (a) becomes a scientific explanation of that phenomenon for the observer. Furthermore, the generative mechanism proposed in (b) remains, for an observer, as a scientific explanation of the phenomenon specified in (a) only as long as all the phenomena deduced in (c) are experienced by him or her according to the indications also deduced in (c). Therefore, scientists are only those observers who use the criterion of validation of scientific explanations for the validation of their explanations, and they do this by carefully avoiding confusing operational domains.

I call these four operational conditions the criteria of validation of scientific explanations because we modern natural scientists use them in the praxis of scientific research for the generation of scientific explanations. Indeed, what I say is that science as a domain of explanations and statements arises in the praxis of scientists through the application of the criterion of validation of explanations presented above, and not through the application of a criterion of falsification, as suggested by Popper. Let me now make some comments.

1) To the extent that science arises as an explanatory domain through the application of the criterion of validation of scientific explanations, science, as a domain of explanations and statements, is valid only in the community of observers (henceforth called standard observers) that accept and use for their explanations that particular criterion. In other words, science is constitutively a domain of reformulations of the praxis of living with

elements of the praxis of living in a community of standard observers, and as such it is a consensual domain of co-ordinations of actions between the members of such a community. As a result of this, scientists can replace each other in the process of generating a scientific explanation. At the same time, it is this constitutive interchangeability of scientists that gives rise to the statement that scientific explanations must be corroborated by independent observers. Indeed, when two scientists do not coincide in their statements or explanations, it means that they belong to different consensual communities.

2) Since the criterion of validation of scientific explanations does not entail or require the supposition of an objective world independent of what the observer does, scientific explanations do not characterise, denote or reveal in an objective world independent of what the observer does. Due to this, as a domain of explanations and statements, as a domain of consensual co-ordinations of actions in a community of standard observers, science takes place as a system of combinations of explanations and statements in the praxis of living of standard observers that expand their praxis of living according to their operation with those combinations of explanations and statements in their praxis of living as members of a community of standard observers.

3) Since it is not measurement, quantification or prediction that constitutes science as a domain of explanations and statements but the application of the criterion of validation of scientific explanations by a standard observer in his or her praxis of living, a standard observer can do science in any domain of the praxis of living in which he or she applies this criterion.

4) Since the criterion of validation of scientific explanations validates as a scientific explanation a mechanism that generates the phenomenon to be explained as a consequence of its operation, the explanatory mechanism and the phenomenon to be explained necessarily belong to different and not intersecting phenomenal domains. Therefore, constitutively, a scientific explanation does not consist in a phenomonic world.

5) The operations that constitute the criterion of validation of scientific explanations are the same that we use in the operational validation of the praxis of our daily life as human beings. It follows from this that, in a strict operational sense, what distinguishes an observer in daily life from an observer as a scientist is the scientist's emotional orientation to explaining his or her consistency in using only the criterion of validation of scientific explanations for the system of explanations that he or she generates in his or her particular domain of explanatory concerns, and his or her commitment to avoid confusing phenomenal domains in his or her generation of scientific explanations.

6) A structure determined system is a system in which all that happens happens as a structural change determined in it at every instant by its structure at that instant, regardless of whether this structural change arises in it in the flow of its own internal dynamics, or contingent on its interactions. This means that nothing external to a structure determined system can specify the structural changes that it undergoes as a consequence of an interaction. An external agent that interacts with a structure

determined system can only trigger in it structural changes determined in it. The components, plus the static or dynamic relations between them that an observer distinguishes at any instant as composing a structure determined system, are the structure of that system. A dynamic structure determined system, that is, a structure determined system constituted as a system in continuous structural change, is a mechanism. In these circumstances, to claim that the criterion of validation of a scientific explanation is centred around the proposition of a mechanism that gives rise to the phenomenon to be explained as a consequence of its operation is to claim that science can only deal with structure determined systems. Or, in other words, to claim that a scientific explanation entails the propositions of a mechanism that generates the phenomenon to be explained, is to claim that the observer can propose scientific explanations only in those domains of operational coherences of his or her praxis of living in which he or she distinguishes structure determined systems.

7) Although the practice of science entails the application of the criterion of validation of scientific explanations, most scientists are not aware of the epistemological and ontological implications of what they do because for them science is a domain of practice and not a domain of reflections. Something similar happens to many philosophers that do not understand what takes place in science because for them science is a domain of reflections, and not a domain of practice. As a result, both of them usually follow the general trend of our western culture and a) accept scientific explanations as reductionist propositions under the implicit belief that they consist in expressing the phenomenon to be explained in more fundamental terms, and b) do not see the generative character of scientific explanations because they are under the implicit or explicit belief that the validity of scientific explanations rests on their direct or indirect reference to an objective reality independent of what the observer does. Finally, due to this usual blindness about what constitutes a scientific explanation in modern science, both scientists and philosophers frequently believe in our culture that to be objective in the practice of science and philosophy means that the statements or explanations that one makes as such are valid through their reference to an independent reality. In practice however, for an acting scientist to be objective only means not letting his or her desire for a particular outcome in his or her research to obscure his or her impeccability as a generator of scientific explanations in the operational terms that I have presented above.

8) Together with the implicit or explicit assumption that scientific statements refer to an objective independent reality usually goes the implicit belief (and the emotion of certainty that supports it) that it is in principle possible to find for any dilemma of human life an objective (transcendental) argument that dissolves it, and whose reference to the real constitutively makes it undeniable and rationally valid. However, there is at the same time in our western culture a frequent doubt about the possibility that science may at all be able to explain certain features of the praxis of living like psychic and spiritual phenomena, precisely because of the mechanistic nature of scientific explanations and their assumed reductionistic character. What I have said above, however, shows that his manner of thinking entails a misunderstanding about scientific explanations that, for my purpose in this article, it is necessary to dispel. As I have said, scientific explanations are constitutively not reductionist. On the contrary. Since a scientific explanation is the

proposition of a generative mechanism that gives rise as a consequence of its operation to the phenomenon to be explained in a different phenomenal domain than the one in which it takes place, a scientific explanation constitutes and validates the existence of completely different nonintersecting phenomenal domains that are intrinsically not reducible to each other. So, the mechanistic character of scientific explanations constitutively does not negate the possibility of a scientific explanation of psychic and spiritual phenomena. On the contrary, it opens the possibility to explain them as biological phenomena. Indeed, the mechanistic character of scientific explanations specifies that, in order to explain psychic and spiritual phenomena as biological phenomena, the observer must propose a generative mechanism that applies to him or herself as a living system giving rise to such phenomena as a consequence of its operation. As such a mechanism would give rise to psychic and spiritual phenomena as a consequence of its operation, it would not negate their particular experiential character because it would constitute the phenomenal domain in which they take place as a phenomenal domain that does not intersect with the phenomenal domain in which it takes place as a generative mechanism.

Einstein said on one occasion that scientific theories were free creations of the human mind. What I have said above about the criterion of validation of scientific explanations shows that this indeed has to be so. Both the phenomenon to be explained and the generative mechanism proposed are proposed by the observer in the flow of his or her praxis of living, and as such they happen to him, and he or she lives them as experiences that arise in him out of nowhere. In his or her actual living, the observer brings them forth a priori, even if afterwards he or she can construct rational justifications for them. Einstein also said that what marvelled him was that, even though scientific theories were free creations of the human mind, they could be used to explain the world. That this should be so is also apparent from the criterion of validation of scientific explanations. In fact, scientific explanations do not explain an independent world, they explain the experience of the observer, and that is the world that he or she lives.

REALITY: AN EXPLANATORY PROPOSITION

In the western culture in which modern science and technology has arisen, we speak in daily life of reality and of the real as a domain of entities that exist independently from what we do as observers. Furthermore, we act and speak, both colloquially and technically, as if we knew we were able to make reference to such independent entities. The flow of normal daily life and experience, in which things appear to us as if they were there independently of what we do, seems to confirm this. Furthermore, the use that we make of the operational coherences of daily life for successful cognitive predictions of the consequences of our operations in it with objects also contributes to support this implicit view. This I want to change by reflecting further on the consequences of accepting the operational separation of the experience and explanation of the experience in the explanation of the biology of observing.

THE REAL

The observer happens in the praxis of living in language, and he or she finds him or herself in the experience of happening as such as a matter of fact, prior to any reflection or explanation. The observer is in the experience of observing as a constitutive a priori starting condition in the moment of reflecting, explaining or talking. Therefore, the observer and observing as experiences need not be explained or justified to happen, even though we may want to explain them as we may want to explain any other experience. Indeed, all experiences happen as a matter of fact, and as such they cannot be disputed; they can only be disbelieved, or one can claim that they are not properly distinguished. It is in the domain of explanations where conflicts may arise. Explanations take place in the praxis of living of the observer, and they are experiences also. Yet explanations as experiences are second-order experiences in the sense that they are reflections of the observer in his or her praxis of living in language about his or her praxis of living. In this context, reality is not an experience, it is an argument in an explanation. In other words, reality arises as an explanatory proposition of our experience of operational coherences in our daily and technical life as we live our daily and technical life. Yet, in these circumstances, reality can arise as an explanatory argument or proposition of one kind or another according to whether the observer accepts or rejects the question about the biological origin of his or her properties as such.

Thus, if the observer follows the explanatory path of objectivity-without-parenthesis, he or she accepts a priori an objective independent reality as a source of validation of his or her explanations of the praxis of living in terms of entities that ultimately do not depend on what he or she does. In the explanatory path of objectivity-without-parenthesis, the observer sees reality as that which is, not as an explanatory proposition. If, on the contrary, the observer follows the explanatory path of objectivity-in-parenthesis, he or she accepts that reality is what he or she does in validating his or her explanations of the praxis of living, and that in doing this he or she brings forth many different domains of reality as many different domains of entities that are constituted in his or her explaining. In other words, in following this explanatory path the observer becomes aware that each domain of reality is a domain of entities constituted in the explanation of his or her praxis of living with the operational coherences of his or her praxis of living. Furthermore, in following this explanatory path the observer can also realise a) that in the explanatory path of objectivity-without-parenthesis reality is also an explanatory proposition, b) that, in it, reality is necessarily constituted as a domain of entities that are assumed to exist independently of what the observer does, and c) that this is unavoidably so because in such an explanatory path the cognitive abilities of the observer are assumed to be his or her constitutive properties, and in it there is no enquiry about their biological origin.

Indeed, from the perspective of objectivity-without-parenthesis, none of these two explanatory paths exist because, in the absence of a full reflection about the biology of the observer, there is no operational domain in which they may arise. Or, in other words, whenever the observer operates with the implicit assumption of objectivity, he or she operationally accepts his or her properties as observer as constitutively given, and denies for him or herself any effective subsequent reflection upon their origin. It is only when

the observer accepts the question about observing as biological phenomena that the explanatory paths of objectivity-in-parenthesis and without-parenthesis appear, and it is only then that it is possible for the observer to reflect upon their epistemological and ontological implications. Whether the observer follows one explanatory path or the other, however, does not depend on a rational argument - it depends on his or her preferences, on his or her inner disposition to implicitly or explicitly accept and take one or the other of these two possible starting conditions: a) the properties of the observer as given, for objectivity-without-parenthesis, and b) the happening of the living of the observer in language both as the instrument of enquiry and a phenomenon to be explained, for objectivity-in-parenthesis. In daily life, we normally move unconsciously from one explanatory path to the other in the manner we argue to validate our statements and explanations, and we do this according to the flow of our emotioning in our interpersonal relations and desires. Thus, if in a discussion we accept our interlocutor totally, and we are not in the mood for imposing our views on him or her, we de facto operate treating the other as if he or she were in a domain of reality different to our own but equally legitimate. When we do this, we accept that the other is in a different position from ours, but we do not claim that he or she is mistaken or arbitrary. We may even say that the position of the other is inadequate under certain conditions (that, without our awareness, in fact specify a particular domain of reality), but we do not claim that he or she is blind to how things really are. On the other hand, if we do not accept our interlocutor totally, or we want to assert our position, or we are certain that we are right, or we want to force the other to perform certain actions, we explicitly or implicitly claim that what we say is valid because it is objective (that, founded on the objective reality, that we know how things really are, that our argument is rational, and that the other is objectively wrong and cannot ignore it.

From all this, it follows that the reality we live depends on the explanatory path we adopt, and that this in turn depends on the emotional domain in which we enter at the moment of explaining. Thus, if we are in an assertive mood, and we want to impose our views on the other without reflection, de facto negating him or her, or if we are directly in an emotion that negates him or her, we find ourselves operating in the explanatory path of objectivity-without-parenthesis. If, on the contrary, we are in the emotion of acceptance of the other and in the mood of reflection, we find ourselves operationally in the explanatory path of objectivity-in-parenthesis. It follows, then, that the kind of reality that we live as a domain of explanatory propositions, reflects at any moment the flow of our interpersonal relations and what sort of co-ordinations of actions we expect to take place in them. Finally, from the perspective of the explanatory path of objectivity-in-parenthesis, this is so regardless of whether we are aware of it or not because it is constitutive of our operation in the human biology of observing.

RATIONALITY

Reason has a central position in our western culture. This we westerners generally accept. I maintain, however, that that which we call reason is not an unanalysable property of the mind, but an expression of our human operational coherence in language, and that as such it has a central and constitutive position in everything that we do as human beings. We

argue rationally in favour or against any case that we chose to reflect upon, even when we reflect upon reason itself, either to uphold it or negate it in one domain or another, by the very fact that we operate in language. As a result, different cultures differ not in rationality but in the implicit or explicit accepted premises under which their different kinds of discourse, actions, and justifications for actions take place. Accordingly, in my reflections upon reason, I shall endeavour to show its biological foundations as a phenomenon of our operation in language.

If we adopt the explanatory path of objectivity-without-parenthesis, reason appears as a constitutive property of the observer, that is, as a cognitive feature of his or her conscious mind through which he or she can know universals and a priori principles, and which, since it is accepted as given, can be described but not analysed. In this explanatory path, reason reveals the truth through a disclosure of the real by referring in a transcendental manner to what is as if independent of what the observer does. In this path, the rational is valid by itself and nothing can negate it; at most the observer can make a logical mistake, but nothing of what he or she does can destroy its transcendental cognitive power. Furthermore, in this explanatory path emotions do not contribute to the constitution of the validity of a rational argument, they may blind the observer to its binding power, but they do not alter it because it is founded on the real. As a result, in the explanatory path of objectivity-without-parenthesis the search for reality is the search for conditions that make an argument rational, and, hence, undeniable. Or, in other words, due to the nature of rationality in the explanatory path of objectivity-without-parenthesis, in it the search for reality is the search for the compelling argument.

Contrary to this, if we adopt the explanatory path of objectivity-in-parenthesis, reason appears as the distinction by an observer of the operational coherences that constitute his or her linguistic discourse in a description or in an explanation. Furthermore, it also becomes apparent that the operational coherences of the observer that constitutes reason are the operational coherences of the observer in his or her praxis of living in language. In this explanatory path, therefore, rationality is not a property of the observer that allows him or her to know something that exists independently of what he or she does, but it is the operation of the observer according to the operational coherences of languaging in a particular domain of reality. And, accordingly, there are as many domains of rationality as there are domains of reality brought forth by the observer in his or her praxis of living as such. In other words, in this explanatory path, the observer is aware that every rational system is a system of coherent discourses whose coherence results from the impeccable recursive application of the constitutive characteristics of basic premises accepted a priori. Or, what is the same, every rational system is founded on non-rational premises, and it is enough to specify some initial elements that through their properties specify a domain of operational coherences to specify a rational domain. Indeed, this is why every domain of reality is a domain of rationality. Still in other words, the coherence of the operation of the observer in language as he or she explains his or her praxis of living constitutes and validates the rationality of the operation of the observer as he or she constitutes a domain of reality.

Furthermore, an observer in the explanatory path of objectivity-in-parenthesis is aware that, although his or her emotions do not determine the operational coherences of any domain of reality in which he or she may operate, they determine the domain of operational coherences in which he or she lives and, hence, the domain of rationality in which he or she generates his or her rational arguments. Indeed, biologically, what an observer connotes when ascribing an emotion or a mood to some other being through the distinction of a particular configuration in the flow of its actions is a particular dynamics of inner body dispositions (which, of course, includes the nervous system) that determines the domain of actions in which that being can operate at that moment. It is because of this that I call emotions and moods body dispositions for actions, and distinguish moods as emotions in which the observer does not distinguish directionality or possibility of an end for the type of actions that he or she expects the other to perform.

Finally, as an observer in the explanatory path of objectivity-in-parenthesis becomes aware of his or her biology in observing, he or she also becomes aware that his or her emotional flow entails also a flow through different rational domains. Or, what is the same, such an observer becomes aware that the rational domain in which he or she constructs his or her rational arguments may change as his or her emotions and moods change. In other words, in this explanatory path the observer becomes aware that a change in emotion or mood constitutes a change in the operational premises under which his or her praxis of living takes place, and therefore in what an observer may distinguish as the accepted a priori conditions that support his or her rational explanatory arguments. That we know that, in daily life, this is the case is apparent when we say something like this: "Do not pay attention to his argument; he is angry; as he becomes serene he will think differently." Due to all this, in the explanatory path of objectivity-in-parenthesis, the observers who meet in a disagreement do not face each other as antagonists in the search for a compelling argument. Indeed, what they do is to search for a domain of coexistence in mutual acceptance (understanding), or for the acceptance of their disagreement with separation in mutual respect, or for a responsible mutual negation.

As a general summary, and in answer to questions that I asked at the beginning of the first section, I can say that it follows from all this that, in the explanatory path of objectivity-in-parenthesis, we as observers become aware: a) that reason constitutively does not, and cannot, give us an access to an assumed independent reality; b) that the compelling power of reason that we live in our rational lives is social, and results from our implicit a priori (that is, non rational) adoption of the constitutive premises that specify the operational coherences of the conversational domains in which we accept the arguments that we consider rationally valid; c) that we cannot force anyone, through reason, to accept as rationally valid an argument that he or she does not already implicitly accept as valid by accepting the constitutive premises of the conversational domain in which it has operational coherence; and d) that all that we can do in a conversation in which there is no previous implicit agreement is to seduce our interlocutor to accept as valid the implicit premises that define the domain in which our argument is operationally valid.

LANGUAGE

We human beings happen in language, and we happen in language as the kind of living systems we are. We have no way of referring to ourselves or to anything else outside of language. Even to refer to ourselves as non-language entities we must be in language. Indeed, the operation of reference exists only in language and to be outside language is, for us as observers, nonsensical. For these reasons, it is essential for understanding the observer as a human being to explain language as a biological phenomenon, and in order to do this I want to show what happens with language in the two explanatory paths I have talked about above.

1) In being consistent with the basic tenet of objectivity of the explanatory path of objectivity-without-parenthesis, the observers that take this explanatory path cannot avoid taking language as a system of behavior that they use to communicate with each other about entities that exist independently of what they do. Furthermore, in doing this they cannot avoid the implicit assumption that they have the constitutive ability to grasp the existence and features of such independent entities, and of symbolising both their existence and features with words. That is, in this explanatory path, the observers that want to talk about language cannot avoid talking about words as if they were symbols that stand for the independent entities about which they communicate with each other. This has two basic consequences for the observers who indeed want to talk about language in this explanatory path:

a) If language is taken by the observer as one of his or her constitutive properties, then language shows up in his or her discourse as an unanalysable given, and the most that he or she can do is to describe its regularities and conditions of use.

b) If the observer takes language as a result of its operation as a biological entity, and want to give a scientific explanation of it as a biological phenomenon while remaining in the explanatory path of objectivity-without-parenthesis, then he or she must show the operation of a biological structural mechanism through which the living system grasps the features of the independent entities that the words that he or she uses symbolise. That mechanism, however, does not take place in the domain of scientific explanations, and cannot take place because the observer as a scientist must treat living systems as structure determined entities, that is, as entities in which everything that happens is determined by their structure, and not by any external agent that many impinge upon them. In other words, the conception of the observer as a biological entity whose properties result from its operation as such, and the conception of the observer as an entity that can make any kind of statement about an independent reality, either directly through perception, or indirectly through reason, are intrinsically contradictory. Due to this, language, perception, cognition and self-consciousness are abilities, properties or operations of the observer that cannot be explained as biological phenomena in the explanatory path of objectivity-without-parenthesis.

2) In the explanatory path of objectivity-in-parenthesis, the situation is completely different. As this explanatory path is constituted by recognising that the observer is a living system, and that all its properties result from its operation as such, all the properties of the observer as an observer require a biological explanation. Furthermore, the observer who wants to do this has to satisfy two conditions: a) that the observer must take its own operation as a living system in language (that is, its own praxis of living as an observer) as its starting point, as its instrument for explaining his or her operation as such, as well as the phenomenon to be explained; and b) that the observer must propose a biological generative mechanism that gives rise to language as a consequence of its operation in the context of the satisfaction of the criterion of validation of scientific explanations. The first condition is intrinsically satisfied in the explanatory path in the recognition that in it explaining consists of a reformulation of the praxis of living of the observer. The second condition requires a special attention to the manner of existing of living systems as structure determined systems in recurrent interactions that I have presented in other publications (see Maturana, 1978 and Maturana & Varela, 1987), and which I shall repeat here only in its conclusions, but not in its whole justification, in the form of six statements:

a) An observer claims that language, or better, languaging, is taking place when he or she observes a particular kind of flow (that I shall describe below) in the interactions and co-ordinations of actions between human beings. As such, language is a biological phenomenon because it results from the operations of human beings as living systems, but it takes place in the domain of the co-ordinations of actions of the participants, and not in their physiology or neurophysiology. Languaging and physiology take place in different and non intersecting phenomenal domains. Or, in other words, language as a special kind of operation in co-ordinations of actions requires the neurophysiology of the participants, but it is not a neurophysiological phenomenon.

b) The scientific explanation of language as a biological phenomenon consists in the proposition of a generative mechanism that gives rise to the dynamics of interactions and co-ordinations of actions that an observer distinguishes as languaging. Such an explanation must show how languaging arises in the interaction of living systems as structure determined systems, and how it constitutes, as a domain of co-ordinations of actions, a phenomenal domain in which all that we do in language in the praxis of living can take place, and does take place, when certain historical contingencies occur. Since, as I have shown above, a scientific explanation does not constitute a phenomonic reduction, but on the contrary it constitutes the validation of a generative relation between otherwise independent nonintersecting phenomenal domains, the scientific explanation of language does not constitute a phenomonic reduction of it.

c) As an observer distinguishes a structure determined system, he or she brings forth a composite entity and the domain in which it interacts with conservation of organisation. Furthermore, as a structure determined system conserves its organisation while it interacts in a particular medium, and flows in the sequences of structural changes that

these interactions trigger in it, it also conserves its structural correspondence or adaptation in that medium, otherwise it disintegrates. Indeed, conservation of organisation (relations between components that define the class identity of a system) and conservation of adaptation (relation of interactions in a medium that do not trigger the disintegration of the system) are conditions of existence for any system distinguished by the observer. In these circumstances, an observer sees that when two or more structure determined systems interact recurrently with each other in a particular medium, they enter in a history of congruent structural changes that follows a course that arises moment after moment contingent on their recurrent interactions, to their own internal structural dynamics, and to their interactions with the medium, and which lasts until one or both of them disintegrate, or they separate.

In daily life, such a course of structural change in a system contingent on the sequence of its interactions in the medium in which it conserves organisation and adaptation is called 'drift'. If the interacting structure determined systems are living systems, what the observer sees along the flow of their recurrent interactions is that their congruent structural changes take place embedded in the realisation, and sometimes in the expansion, of a domain of co-ordinations of actions or behavior between them that was already allowed by their initial structures at the beginning of their recurrent interactions. If what takes place along a particular course of recurrent interactions between two or more living systems is the expansion of an initial domain of co-ordinations of actions, and the observer can claim that the new co-ordinations of actions would not have arisen in a different history of recurrent interactions between those living systems, then those living systems have established what I call a domain of consensual co-ordinations of actions. Domains of consensual co-ordinations of actions are, normally, the spontaneous outcomes of the operation of living systems under recurrent interactions. All that is needed for them to arise is that the participant living systems should already have at their first encounter the necessary structural disposition for their recurrent interactions to take place, structural plasticity in the domain of their interactions, and the initial structure that allows them to conserve organisation and adaptation while their structures change under their recurrent interactions. All living systems satisfy these three structural conditions to some extent, and they do so as a result of the evolutionary history to which they belong.

d) There are circumstances in which an observer can see that under the expansion of a consensual domain of co-ordinations of actions there is a recursion in the co-ordinations of actions of the organisms that participate in it. When this happens, what an observer sees is, on the one hand, organisms that interact with each other recurrently in consensual co-ordinations of actions, and on the other hand, a phenomenal domain in which all the phenomena that we distinguish as phenomena of praxis of living in daily life take place. Due to this, I claim that when this occurs, language happens, and that the phenomenon of language takes place in the flow of consensual co-ordinations of consensual co-ordinations of actions between organisms that live together in a co-ontogenic structural drift. Furthermore, I also claim that with languaging observing and the observer arise; the former as the second-order recursion in consensual co-ordinations of actions that constitute the phenomenon of distinction and the latter in a third-order recursion in which

there is the distinction of the operational realisation of observing in a bodyhood. Indeed, when languaging and observing take place, objects take place as distinctions of distinctions that obscure the co-ordinations of actions that these co-ordinate. Finally, when languaging, observing and objects take place, the phenomenon of self-consciousness may take place in a community of observers as a fourth-order recursion of consensual co-ordinations of actions in which the observer distinguishes his or her bodyhood as a node in a network of recursive distinctions.

e) Language as a domain of recursive consensual co-ordinations of actions does not operate with symbols, yet symbols arise in language as distinctions of relations of distinctions. Also, according to this, words are not symbolic entities, nor do they connote or denote independent objects. They are distinctions of consensual co-ordinations of actions in the flow of consensual co-ordinations of actions. This is why sounds, marks or movements do not constitute words by themselves, and sequences or groups of sounds, marks or movements do not constitute languaging. Language occurs only in the flow of recursive consensual co-ordinations of actions between organisms in recurrent interactions, or, in the operation of a single organism, in the flow of actions that an observer may see in it as belonging to an implicit domain of consensual co-ordinations of actions with other organisms because they arise in that single organism in its structural dynamics under circumstances in which its structure in that moment is the result of its participation in a history of languaging with other organisms. In daily life we know that this is the case, and we usually say that a human being is eccentric, mad or alienated when we see him or her performing the actions proper to languaging outside a domain of recursive consensual co-ordinations of actions.

f) Although language takes place in a domain of co-ordinations of actions, it results as such through the co-ontogenic structural drift of organisms in recurrent interactions. That is, language takes place in the flow of consensual co-ordinations of actions of organisms whose actions co-ordinate because they have congruent dynamic structures that have arisen or are arising through their recurrent interactions in a co-ontogenic drift. Due to this, interactions in language are structural interactions that trigger in the interacting organisms structural changes contingent on the course of the consensual co-ordinations of actions in which they arise. As a result, even though the domain of languaging does not intersect with the structural domain of the bodyhoods of the interacting organisms, the structural changes of the organisms that interact in language are a function of what takes place in their languaging, and vice versa. Although we are usually unaware of this, we in daily life show that we know that this is the case with the adjectives that we usually use to characterise the languaging of a conversation in terms of what happens to us as body encounters. Thus we say that the words were smooth, caressing, hard, sharp, and so on; all words that refer to body touching. Indeed, we can kill or elate with words as body experiences. We kill or elate with words because, as co-ordinations of actions, they take place through body interactions that trigger in us body changes in the domain of the physiology.

From what I have said above, it follows that language is not our only way of operating in consensual co-ordinations of actions. Indeed, language is a recursion in consensual co-ordinations of actions. The basic consensual co-ordinations of actions that are operationally prior to language I call linguistic co-ordinations of actions, and the domain of these basic consensual co-ordinations of actions I call a first-order linguistic domain (see Maturana, 1978). So, we can also say that language is a domain of recursive linguistic co-ordinations of actions, or a domain of second-order linguistic co-ordinations of actions. We human beings also co-ordinate our actions with each other in first-order linguistic domains, and we do so frequently with non-human animals. A domain of first-order linguistic co-ordinations of actions can be very rich and involved, depending on the complexity of the history of recurrent interactions in which it takes place, but, one can say, its expansion is only additive. Language as a second-order linguistic domain can be much more rich and involved because of its recursive nature, and one can say that its expansion is multiplicative.

EMOTIONING

The western culture to which we modern scientists belong depreciates emotions, or at least considers them a source of arbitrary actions that are unreliable because they do not arise from reason. This attitude blinds us about the participation of our emotions in all that we do as the background of bodyhood that makes possible all our actions and specifies the domains in which they take place. This blindness, I claim, limits us in our understanding of social phenomena. Let us reflect upon this.

1) All animals have different domains of internal operational coherences that constitute dynamic body postures through which their actions and interactions in their respective domains of existence take place. This we recognise in daily life to be similar to what happens in us by calling moods or emotions the different manners of interacting that we may observe in other animals.

2) The observer distinguishes different emotions and moods through the distinction of the different domains of actions in which the observed organisms move. Furthermore, as I have already said above (in "Rationality"), biologically, that which we distinguish when we distinguish emotions in daily life are dynamic body dispositions for actions (of course involving the nervous system) that specify at any moment the domains of actions in which the organisms move. Thus, all animal behaviour takes place in a domain of actions supported and specified at any moment by some emotion or mood. Indeed, all animal life takes place under a continuous flow of emotions and moods (emotioning) that changes the domains of actions in which the organisms move and operate, and they do so in a manner that is contingent on the course of their interactions. We human beings are not an exception to this. Moreover, in us human beings emotioning is mostly consensual, and follows a course braided with languaging in our history of interactions with other human beings. Thus, even for the recurrent interactions through which languaging occurs to take place between two or more human beings, it is necessary to occur in these a particular flow of body dispositions that moment after moment leads them to remain in recurrent interactions. When this flow of body dispositions for recurrent interactions ends, when in

the course of this emotioning the emotion that leads to recurrent interactions in language ends, the process of language (the conversation) ends. In other words, languaging flows in the co-ordinations of actions of human beings in a background of emotioning that constitutes the operational possibility of its occurrence, and specifies at any instant the consensual domains in which it takes place. Still in other words, the operational coherences of languaging have the universality of the operational coherences of the co-ordinations of actions of the observers in the praxis of living, and the flow of changing emotions under which languaging occurs does not change this, it only changes the domain of actions in which languaging takes place.

3) When an observer distinguishes the operational regularities of the recursive consensual co-ordinations of actions in the praxis of living that constitute languaging, he or she speaks of logic. As such, logic is independent of the content in terms of the domains of actions involved; it is specified by the operational coherences of the praxis of living of the observer, and has the universality of the operational coherences of the consensual co-ordinations of actions to which human beings can give rise as living systems. Due to this, emotioning, as I have already said above (in "Rationality") does not constitute a flow through different logics, but only a flow through different domains of co-ordinations of actions, and rationality is not constituted by the contents of languaging, but by its operational coherences.

4) When an observer distinguishes a flow of co-ordinations of actions in language in a group of observers, he or she speaks of a conversation. As such, a conversation takes place as the operation of a group of observers within an already established domain of consensuality, or as an expansion of it, or as a process through which a new domain of consensuality arises. It is our emotioning that determines how we move in our conversations through different domains of co-ordinations of actions. At the same time, due to the consensual braiding of our emotioning with our languaging, our conversations determine the flow of our emotioning. Finally, it is at every instant the circumstances of our interactions in the domain of actions in which our conversations take place in the conservation of the particular kind of human being that we are continuously becoming in the praxis of living that generates the path of consensuality of our emotioning, and determines the course of our conversations. So, strictly speaking, human life is always an inextricably braided flow of emotioning and rationality through which we bring forth different domains of reality. And we live our different domains of reality in our interactions with others, explicitly or implicitly, in objectivity-in or without-parenthesis, according to the flow of our emotioning.

5) We modern western human beings usually claim to be rational animals in order to distinguish ourselves from other animals that we claim move only under emotional drives. That we are animals who use reason, there is no doubt. Reason moves us only through the emotions that arise in us in the course of our conversations (or reflections) within the braided flow of our languaging and emotioning. Indeed, what makes us human beings the peculiar kinds of animals that we are is not the operational coherence of our rationality, which is the operational coherence of our praxis of living as living systems in

co-ordinations of actions, but our living in language in the constitutive braiding of languaging and emotioning.

6) Our emotioning also braids with our consensual co-ordinations of actions as we operate in first-order linguistic domains in our interactions with other human beings and with non-human animals. Indeed, it is this braiding of emotioning and first-order consensuality that constitutes the richness and complexity of our co-ordinations of actions with domestic animals that prompts us to call them intelligent.

CONVERSATIONS

In daily life we call conversation a flow of co-ordinations of actions and emotions that we observers distinguish as taking place between human beings that interact recurrently in language, and it is to this distinction to which I shall refer with the word 'conversation' in this article. In these circumstances there are three fundamental phenomena that an observer brings forth as he or she distinguishes a conversation. Two of them take place in the domain of distinctions of the observer; these are the co-ordinations of actions that appear as co-ordinations of behaviors, and then co-ordinations of emotions that appear as co-ordinations of domains of actions. The other takes place in the domain of the structural changes of the conversing human beings, whose continuously changing bodyhoods change congruently in a co-ontology that lasts as long as the conversation lasts. Let me make a few comments about this.

1) Conversations as operations in language are operations in domains of consensuality that may become expanded, restricted or disappear with or without the appearance of new ones. This is apparent in our daily life as we experience an increase, a diminution or a change in our intimacy with those with whom we converse as something that occurs while the conversation takes place. In every case, however, the bodyhoods of the participants unavoidably change in a congruent manner, even when the result is separation with loss of consensuality. In other words, although the dynamics of consensuality and bodyhood change take place in different and non-intersecting phenomenal domains, they braid along a conversation as a result of their manner of constitution as biological processes. That is, the changes in the bodyhoods of the participants follow a path contingent on the co-ordinations of actions and emotions that take place along a conversation, and the co-ordinations and actions and emotions that constitute the conversation follow a path contingent on the bodyhood changes that occur in the participants along it while generating it. This is again part of our daily life experience, and we can notice it if in a conversation we attend to the dynamics of our bodyhood in relation to our flow in it.

2) There are several classes of conversations that an observer can distinguish in the domain of human relations and interactions. These differ in the kinds of co-ordinations of actions and emotions involved, and each class of conversation is defined by a particular pattern or configuration of co-ordination of actions and emotional flow. Furthermore, all classes of conversations can take place in many different domains of actions and in many different emotional contexts, regardless of the operational domain, or domain of reality,

in which the actions take place. Finally, every human being usually participates in many different conversations, simultaneously or successively, that intersect each other through their realisation in his or her bodyhood. Indeed, we human beings live in communities that exist as networks of crisscrossing non-intersecting conversations of different kinds that couple with each other in their flow through their intersections in our bodyhoods. Let me mention some of them:

a) Conversations or co-ordinations of present and future actions. The conversations consist in the actual co-ordinations of actions that occur while languaging in a particular domain, and that the observer sees as taking place in an emotional flow in which the participants only listen for co-ordinations of actions. Two examples: "If you set the table, I'll prepare dinner/I shall do that with pleasure." "Do you know how to calculate the length of the diagonal of a rectangle? Yes, you must use Pythagoras' theorem./Ah! Of course! Many thanks."

b) Conversations of complaint and apology for unkept agreements. These conversations consist in a flow of co-ordinations of behaviour that an observer sees as taking place under the emotions of righteousness and guilt in an interplay of demands, promises and expressions in which complaints and apologies are lived as legitimate actions even when the apologies are not accepted. Two examples: "Why did you say that you would come if you were not coming?/Oh! At the time I said I was coming I was sure that I could. It was only afterwards that I discovered that my mother was ill and that I would rather stay with her./I did not know that. Well, do not worry, we shall arrange another meeting." "I am ready now. Are you ready?/I am sorry, I cannot do it now./But you promised..../Yes, but my mother is calling me. Can you wait until I come back?"

c) Conversations of desires and expectations. These conversations consist in co-ordinations of actions that the observer sees as taking place in a domain of discourse while each one of the participants has his or her attention in his or her description of a future, and not in the actions through which he or she is constituted as a human being in the present. Two examples: "After the presidential election, I shall be able to push my programme of reforestation./That will be the case if your candidate wins. I think however that she will not./I am sure that she will win; she has the support of the working people." "Eat your food and you will grow as big as your uncle./I do not want to eat. I do not want to be like my uncle because he is very old."

d) Conversations of command and obedience. These conversations consist in co-ordinations of actions that an observer sees as taking place in an emotional background of mutual-and-self-negation in which some of the participants obey, that is, do under the request of others what they do not want to do, and others command, that is, accept a condition of superiority and feel confirmed in it when their commands are carried out. Those who obey negate themselves by doing what they do not want to do, and negate the one who commands by ascribing to him or her, as a property, a condition of superiority

that is constituted as a relation of order by their obedience. He or she who commands negates those who obey by accepting their self-negation as legitimate, and negates him or herself by accepting as valid his or her characterisation as superior by those who obey. Two examples: "John, come and solve this problem on the blackboard./But I haven't finished the exercise in my copybook yet./It does not matter. I am asking you to come to the blackboard./Grrr...(John comes)" "You will have to go to Valparaiso./Now? I have some friends coming to dinner tonight at home./I am sorry, but I need you to go to Valparaiso today and stay there until tomorrow./Okay....you're the boss."

e) Conversations of characterisations, attributions and valuing. These conversations consist in co-ordinations of actions in a domain of discourse, descriptions and opinions that the observer sees as taking place in a braided emotioning of acceptance and rejection, pleasure and frustration, according to whether the participants who listen perceive that they are properly seen or not by the participants who speak. Three examples: "Here you are! I thought of you as a person who always arrived on time./What? Do you mean that I am unpunctual? This is the first time that I have been late." "I shall not look into your computations. You are so intelligent that you are always right./But sometimes I commit mistakes.../I have never found one./It is nice to hear that." "Look at your shirt. It is dirty./But mother, you know I was playing.../Oh! Come! You are sloppy. You are always dirty."

f) Conversations of complaint for unfulfilled expectations. These are conversations that consist in co-ordinations of actions in a domain of descriptions that the observer sees as taking place in an emotional background of frustration in which the speaker perceives the listener as dishonestly not fulfilling a promise, and the listener perceives him or herself accused of not fulfilling a promise that he or she did not make. Two examples: "You are late again and the food is over-cooked./But you know that at this time of the year I cannot arrive earlier!" "I had so much hope in the work of this committee./Well...but you knew that I did not have enough experience in the subject to chair it./Yes, but I could have helped you if you had had confidence in me."

There are still other kinds of conversations that could be added to this list, but I shall stop here. Yet, what I want to emphasise now is that as we human beings participate in many different conversations simultaneously or in succession, our actual community coexistence courses as the changing front of a network of conversations in which different crisscrossing co-ordinations of present and future actions braid with different consensual emotional flows. Indeed, the different systems of coexistence, or kinds of human communities that we integrate, differ in the networks of conversations (consensual co-ordinations of actions and emotions) that constitute them, and therefore in the domains of reality in which they take place. Whichever the case, however, as our present as human beings is always a node in a network of conversations, we frequently find ourselves in situations that we live as emotional contradictions because they arise as the intersection in our bodyhoods as the realisation of conversations that take place in contradictory domains of actions. When this situation becomes recurrent, suffering takes place.

THE NERVOUS SYSTEM

Anatomically, the organisation of a nervous system is that of a closed network of interacting components that integrates a larger system in which it expands through its operation the domain of states as well as the domain of interactions. Operationally, its organisation is that of a closed network of changing relations of interactions between components in which every change in relation of interactions between its components gives rise to further changes in relations of interactions between its components, and in which all takes place in a system of highly interconnected loops of unending recurrent circular processes of changing relations of interactions of different length and time constant. In us, the elements that compose our nervous systems are cells (neurons, sensory cells and effector cells), but in other systems they can be elements of a different kind, like molecules, as is the case in protozoans. There are several consequences of this organisation of the nervous system that I wish to mention due to their relevance to the contents of this essay.

1) As a structure determined system, the nervous system does not and cannot operate with representations of an environment; indeed, nothing external to it can specify what happens in it. It is due to the structural determinism of our nervous system, or, better, it is due to our structural determinism as living systems, that we cannot distinguish in the experience between perception and illusion. The operational congruence between any natural system with a nervous system and its medium is the result of the conservation of the structural congruence between the system (its nervous system included) and its medium through its history of interaction (see Maturana, 1983).

2) The states of a nervous system as a composite entity are relations of interactions between its components, yet, and at the same time, it is through the operation of the properties of its components that a nervous system interacts as a composite entity. Furthermore, the structure and the domain of states of a nervous system change as the properties of its components change as a result of the structural changes triggered in them by their interactions. Due to this, as the structure of the components of a nervous system changes as a result of their interactions, the structure and the domain of the states of the nervous system integrated by the changing components changes too, and does so following a course contingent on the history of their interactions.

3) As a nervous system integrates a larger system, let us say an organism, it exists as a whole, that is, as a composite entity, in the domain of existence of the organism that it integrates, and its components interact through this in the domain of interactions in which this interacts. As a result, the structure of the components of a nervous system, the structure of the nervous system that they compose as well as its domain of states, and the structure of the organism that the nervous system integrates, all change congruently, following a path contingent on the history of interactions of the organism. In other words, the structure of the nervous system and its dynamics of change are dynamically coupled to the structure of the organism and its dynamics of change. To the extent that the changes of state of the nervous system result in changes of state of the organism, and the changes of state of the organism result in changes in its interactions, that is, in changes in

its behavior, the nervous system participates through its dynamics of state in the generation of behavior of the organism that it integrates. Due to all this, the structure of a nervous system is necessarily always, and at any moment, the present in a flow of structural changes arising contingent on the history of interactions of the organism that it integrates, and its dynamics of states is necessarily always, and at any moment, operationally correspondent with the historical features of the behavior of the organism that it generates.

4) What I have said above is also applicable to us in our operation in language. Linguaging takes place in the flow of recursive co-ordinations of consensual behaviors. Operationally, a recursion takes place only in reference to a succession of events that the repetition of an operation is a recursion. That is, a recursion is the repetition of a circular process that an observer sees coupled to a historical phenomenon in a manner such that he or she can claim that, in the historical flow of that phenomenon, that repetition results in the reapplication of that process on the consequences of its previous occurrence. It is due to this manner of constitution of the phenomenon of recursion that not all circular processes are recursive processes. At the same time, it is due to this that, although the nervous system is a circular network of interconnected circular processes of different time constants, there are not recursive processes in it until linguaging arises. Or, in other words, the nervous system as a closed network of changing relations of interactions between its components only generates circular process regardless of whether the organism that it integrates participates in language or not, yet, in the context of the flow of the recursive co-ordinations of actions of linguaging, and only with respect to such flow of co-ordinations of actions, some of these circular processes constitute recursive processes.

5) Since the structure and operation of a nervous system always embodies the behavioral present of the history of interactions of the system that it integrates, and therefore generates the dynamics of states that gives rise to that behavioral present, the nervous system of an organism that participates in language can generate a dynamics of states proper to linguaging as a feature of its closed dynamics. Due to this, an organism that participates in a domain of linguaging in which observing, reflection and self-awareness have arisen can operate in a soliloquy, that is, in a flow of internal dynamics that an observer sees as reflecting an internal dialogue in self-consciousness of self-awareness.

SELF-AWARENESS

I claim that, whenever we speak of self-awareness, we connote the distinction that we make as members of a linguaging community of our bodily participation in a network of conversations in which the recursive distinction of the participants is possible. The 'I' arises in that distinction together with the distinction of the other. In other words, I claim that the phenomenon of self-awareness takes place, and can only take place, in language, and that only language constitutes in the animal domain the operational mechanism that makes such a distinction possible. An observer can claim that an animal not operating in language as such, as it lives, knows its body in the same way that we know our bodies as we operate outside language in all that we do without attending to the doing. We usually

connote this manner of knowing when we speak of unconscious or instinctive knowledge. Indeed, we speak of unconscious knowledge whenever we refer to the adequate operation of a living system outside the domain of language: unconscious knowledge is that which we connote with aphorisms such as 'the wisdom of the body' or 'to live is to know'. When an animal walks or scratches, it just does it without reflecting about what muscles to move and in what order - the 'body knows', we might say. The actual happening of self-awareness is in realisation, as a happening in the self-aware person, occurs in the same manner as a phenomenon realised through its bodyhood, but it is different as a phenomenon of observing in that the distinctions involved in it arise only through the recursive co-ordinations of actions that constitute languaging. Indeed, what an observer sees when another observer claims self-awareness is a behavior that he or she distinguishes as a behavior in which a particular observer appears co-ordinating its actions with other observers about the changes of states of the bodyhoods of the participants. Furthermore, the first observer sees the second observer performing distinctions that could not take place outside language because they require the recursive operations of the nervous system that arise when its closed circular dynamics becomes coupled to the historical flow of co-ordinations of actions that constitute language. In this process, language is required for the observer to operate in observing its own states, because observing observing arises in a third-order recursion in language. And the recursive operation of the nervous system is required because it is only through this that some of its states may become objects of distinction through other of its states, as they become coupled to the flow of conversations about the bodyhoods of the participant observers.

The 'I' and the 'self' arise in language as distinctions in self-awareness as self-awareness arises as a social phenomenon in those conversations in which the observer sees that the participants are distinguished as such through the distinctions of their bodyhoods. Indeed, the whole domain of self-consciousness arises as a domain of recursion in self-awareness.

EPIGENESIS

Nothing happens in a living system that its biology does not permit. Or, better, nothing happens in a living system that its initial structure does not permit as a case of historical transformation under a particular sequence of interactions. Yet in other words, the initial structure of an organism makes possible all that can happen to it in its individual history, but does not specify its future. Everything that occurs in a living system occurs as a result of its continuous change in a history of interactions in a medium under a form of epigenesis. Therefore, strictly, the phenomenon of genetic determination as the specification in the nucleic acids of a future outcome in the development of an organism does not exist. This deserves the following comments:

a) An observer can speak of genetic determination only if he or she is implying a total epigenetic repetition as a standard and unavoidable phenomenon in the development of a particular organism. In other words, if the initial structure repeats, and the history of relevant interactions repeats, then the outcome repeats. This, of course, every biologist knows, but it is not always clear in his or her discourse. Furthermore, that this is the case

is a consequence of the structural determinism of living systems.

b) We call learning that part of the ontogeny of an organism that we as observers see as occurring as if this were adapting itself to some novel and unusual circumstance of the environment. Furthermore, we usually see the phenomenon that we call learning as if the organism were adapting to the features of the environment and, therefore, handling them through the process of making a representation of them. Nothing of this happens or can happen. The living system is a structure determined system and, as such, nothing external to it can specify what happens to it; indeed, for the operation of a living system, there is no inside or outside, and it cannot make a representation of what an observer sees as external to it.

c) All that happens in the life of a living system arises through its ontogenic structural change under an epigenetic mode. Along the epigenetic transformations of an organism, the structure of an organism and the structure of the medium that it encounters (its niche) change congruently as an unavoidable result of their recurrent interactions. As we observe the conservation of the operational congruence between organism and medium that results from this, we call learning that part of the ontogeny of a living system that, due to its complexity, we do not see as an epigenetic process. From the perspective of the explanatory path of objectivity-without-parenthesis, we speak of the phenomenon that we call learning as if what happened to the organism along it had become a process directed to its adaptation to its final circumstances. In this explanatory path, learning is a commentary that an observer makes about two moments in the epigenesis of an organism in which he or she does not see the historical process that connects them and assumes an active mechanism of accommodation that does not take place. From the perspective of the explanatory path of objectivity-in-parenthesis, the phenomenon connoted by the word 'learning' takes place as an epigenetic process, and as such does not entail accommodation or the making of a representation of an environment.

All that happens along the life history of a living system since its inception as a single cell occurs in it in an epigenetic process. This, of course, also applies to us human beings. As a result, all the different kinds of systems that we integrate along our lives (such as mother-child relations from the uterus to after birth, social systems, communities or cultures) arise as different manners of our being in epigenesis, and constitute different domains of epigenesis for those of us who adopt them or grow in them. Furthermore, this also applies to what happens to us in the involvement of our bodyhoods in the flow of the conversations in which we participate, regardless of whether they take place in a community or in a soliloquy: we live our conversations and our reflections in epigenesis in a recursive interaction of our bodyhoods with the consequences in our bodyhoods of the course of our languaging. This is why all that we do, and all our different manners of living, appear embodied in our bodyhoods showing up in our actions, and we require to change our bodyhoods to change as persons. Finally, that this should be so does not constitute a limitation in us; on the contrary, it constitutes all our possibilities, even that our reflections should have consequences in our living.

ONTOLOGY OF COGNITION

In what follows, I shall reflect upon cognition following the explanatory path of objectivity-in-parenthesis. Therefore, unless I say it explicitly, I am always speaking in that explanatory path. Due to this, it should be always understood that I am speaking as an observer that arises in language, and who is aware that he or she does not exist outside languaging.

OBSERVER-OBSERVING

The observer and observing are operations in language that take place, respectively, as fourth and second-order recursive consensual co-ordinations of actions between organisms (*homo sapiens* in our case) in language. The observer and observing, therefore, arise in the flow of structural changes that takes place in the members of a community of observers as they co-ordinate their consensual actions through their recurrent structural interactions in the domain of operational coherences in which they realise their conjoined praxis of living. In other words, observer and observing constitutively take place through, and in the course of, the structural changes of the observers as these operate as a structure determined system conserving their structural correspondence with the medium in which they interact. There are some consequences of this which are worth mentioning.

- a) The observer is necessarily always in structural correspondence in its domain of existence. Due to this, the observer constitutively cannot make distinctions outside the domain of operational coherences of his or her praxis of living. As a result, the observer necessarily finds itself in the praxis of living making distinctions that are operationally never out of place because they pertain to the operational coherences of his or her realisation as a living system constitutively in structural congruence with the medium.
- b) When an observer who operates in the explanatory path of objectivity-in-parenthesis claims that a mistaken distinction has been made, what he or she claims is that a distinction has been made in an operational domain different from the one that he or she expected, and not that the operation of distinction is at fault. And this is so because in this explanatory path the observer is aware that the object is constituted in the operation of distinction. It is only in the explanatory path of objectivity-without-parenthesis, in which the object distinguished is assumed to exist with independency of what the observer does, that the observer can claim that, in a mistaken distinction, the fault is in the operation of distinctions and not in the appreciation of the observer about what took place.
- c) Since all the conversations in which an observer anticipates are realised through the structural dynamics of his or her bodyhood, the bodyhood of the observer is a node of intersection of all the conversations in which he or she participates. As a consequence, we move as observers from one domain of languaging to another in the braiding of our languaging and emotioning, as a result of the flow of our structural changes as we operate as such in the realisation of our praxis of living in structural congruence with the medium. Due to this, non-intersecting conversations in the domain of the actions that they co-ordinate may affect each other through the structural changes that they entail in

the bodyhoods of the observers that participate in them. And also due to this, any structural change in the observer, whatever its history, is liable to affect the course of his or her languaging and emotioning (see (3) below).

d) The generative relation between languaging and the structural dynamics of the observers that generate it in the flow of their recurrent interactions cannot be directly seen by a naive observer who has not become aware of it through explaining language as a biological phenomenon in the explanatory path of objectivity-in-parenthesis. A naive observer can only see an arbitrary, or even a mysterious, phenomenon when observing in another observer an unexpected change from one languaging domain to another, if he or she cannot propose a direct generative relation connecting the first and second languaging domains in a manner through which one will arise from the other.

COGNITION

We live a culture centred on what we call knowledge. Indeed, we frequently claim that our actions should be guided by objective knowledge. However, what are we claiming as observers when we claim to know, and to know objectively? I consider that the understanding of social phenomena requires an answer to this question. Furthermore, I think that all social and political projects imply an answer to this question. This is why, before proceeding to consider social phenomena, I shall present my answer to it, and I shall do so following the explanatory path of objectivity-in-parenthesis.

1) If we reflect upon what we do when we want to know if another person or animal has knowledge in a given domain, we discover that we look for adequate behavior or action of that person or animal in that domain, through asking an implicit or explicit question in it. If we consider that the behavior or action (or the description of possible behavior or action) given as an answer to our question is adequate or effective in the domain that we specified with our question, we claim that the person or animal knows. If, on the contrary, we consider that such behavior or action is not adequate or effective in the domain specified by the question, we claim that the person or animal has no knowledge in that domain. Of course, we apply the same criterion when we claim to know, and when we say "I know" we mean "I am able to act or behave adequately" in some particular domain. In general terms then, the observer grants knowledge to another observer or organism in a particular domain when he or she accepts as adequate or effective the behavior or action of that person or organism in that domain. Or, in other words, knowledge is behavior accepted as adequate by an observer in a particular domain that he or she specifies. As a result of this, necessarily there are as many different cognitive domains as different criteria the observer may use for accepting a behavior as adequate. Also as a result of this, each criterion that an observer may use to accept as adequate the behavior of another organism (human or not) with which he or she interacts specifies a domain of cognition in the domain of their interactions. Finally, it also follows from all this that each domain of reality, that as an explanatory domain of the praxis of living of the observer constitutes a domain of adequate actions for it, is a cognitive domain.

2) We human beings live in cognitive communities, each defined by the criterion of acceptability of what constitutes the adequate actions or behaviors of its members. As such, cognitive domains are consensual domains in the praxis of living of the observers. Due to this, membership in any human community is operational: whoever satisfies the criterion of acceptability for members of a particular community is a member of it. Sincerity is not to the point because sincerity is not a feature of the behaviors or actions performed. Sincerity is an assessment by an observer who reflects upon the course of actions of another human being in a particular domain of expectations. As a consequence of their manner of constitution, cognitive domains are closed operational domains: an observer cannot get out of a cognitive domain by operating in it. Similarly, an observer cannot observe a cognitive domain by operating in it. An observer can get out of a cognitive domain, and observe it, only through the recursive consensuality of language by consensually specifying another cognitive domain in which the first one is an object of consensual distinctions.

3) All the different cognitive domains that we human beings live intersect in our bodyhoods as the operational domain through which all arise. Due to this, relations can take place through our bodyhoods between operations that otherwise belong to independent, non-intersecting cognitive domains, like relations that an observer sees on a screen between shadows of objects that otherwise are unrelated because they lie on different planes. When this happens, illusions arise as distinctions of relations between operations that belong to different cognitive domains: any statement (or action) in a cognitive domain heard (or seen) from another cognitive domain is not valid in it and, therefore, is an illusion. At the same time, since we constitute reality with our distinctions, a distinction that an observer sees as an illusion or expression of madness because he or she does not take it as a possibility for new acceptable actions is an act of creation if it becomes, for the same or other observers, the fundament for a new domain of consensuality and, hence, for a new cognitive domain in a community of observers.

4) Every cognitive domain is a domain of co-ordinations of actions in the praxis of living of a community of observers. Due to this, every cognitive statement such as "I know..." is an operation in a domain of co-ordinations of actions which is different according to the explicit or implicit explanatory domain in which the observer finds itself through the braiding of his or her reasoning and emotioning. Thus, if an observer speaker finds itself in the explanatory domain of objectivity-without-parenthesis, his or her cognitive statements (such as "I know that this is the case") are implicit claims of a privileged access to an objective independent reality and are, hence, demands for obedience. When we are in this explanatory path, regardless of whether we are aware of it or not, we explicitly or implicitly claim that we have a compelling argument, and that he or she who does not follow it is unreasonable, stupid or mad. If the listener observer finds him or herself in the same domain of objective reality as the speaker, or candidly accepts the other's authority, he or she does not hear the demand for obedience and accepts the statement as valid without emotional contradiction. Contrary to this, the observer listener who finds him or herself in a different objective reality from the speaker, or does not accept his or her authority, implicitly or explicitly hears the demand for obedience and reacts emotionally accordingly. If otherwise the observer speaker finds him or herself in

the explanatory domain of objectivity-in-parenthesis, he or she is aware that there are many different domains of reality, all equally valid, and that his or her cognitive statements cannot constitute demands for obedience. In this explanatory path, cognitive statements operate as invitations to enter in the same domain of reality as the speaker and, regardless of whether they are accepted or not, they are listened as such. In the explanatory path of objectivity-in-parenthesis, cognitive disagreements do not entail the negation of the other, they are legitimate operations in different cognitive domains, and their recognition constitutes the possibility for a conversation that may lead to a new domain of reality where the disagreeing parties may coexist. The emotional dynamics of cognitive coexistence in this explanatory path goes through seduction, not through obedience.

5) Each cognitive domain, as a particular domain of operational coherences in the praxis of living specified as such by the criterion used by the observer to accept certain actions as effective actions, is a rational domain. Therefore, we as observers can live as many rational domains as we can live cognitive domains. However, we move from one rational domain to another emotionally, not rationally. This is so because a change in rational domain consists in the adoption of a different set of basic premises than those that define the rational domain in which one is operating at the moment of change, and this constitutively takes place as a change in our dispositions for action as a matter of our emotioning. We do not usually see this in daily life because we mostly operate in it in the explanatory path of objectivity-without-parenthesis, and as a consequence we are usually blind to our emotioning. As I said above, as we operate in that explanatory path, reason is lived as a constitutive property of the observer that allows him or her to rationally choose the basic premises that define a particular rational system. Due to this, we usually argue in a cognitive disagreement, claiming that our position is rationally grounded on some objective, rationally undeniable truth. It is only as we become aware of the biology of the observer, and operate in the explanatory path of objectivity-in-parenthesis, that we become aware that every rational system in which we operate is grounded on basic premises adopted through our emotioning. Moreover, it is only in this explanatory path that we can be aware that we live our rational systems as manners of existence. We can see that this is so in daily life when we reflect upon the strong emotional reactions that frequently arise in us when we disagree in the domains of religion, science, politics or philosophy. Religions, scientific theories, and political and philosophical doctrines are peculiar cognitive domains in that we can be easily aware that we live them as all-embracing manners of being, and we openly live our disagreements with respect to them as intolerable threats to our existence. Yet, as cognitive domains they are not special, but they allow us to see the emotional grounding of cognitive domains as a feature of our operation in daily life. In other words, the emotional upheavals that may lead to the actual mutual destruction of the participants in a cognitive disagreement do not depend on the rational content of their respective tenets, but are a necessary consequence of their operation in the explanatory path of objectivity-without-parenthesis. Disagreements in this explanatory path constitutively entail mutual negation and are existential threats. The only way to escape such an emotional trap is to move to the explanatory path of objectivity-in-parenthesis, but that cannot take place through reason, it can only take place through the emotioning of seduction.

MIND AND BODY INTERACTIONS

As living systems, we exist in two non-intersecting phenomenal domains; the domain of our realisation in our bodyhoods (the domain of physiology) and the domain of behavior (the domain of our interactions as totalities). Although these two domains do not intersect, they are coupled in their realisation through the manner of operation of the living system as a structure determined entity. The behavior of the organism as a flow of interactions occurs through its actual body encounters with the abiotic medium or with other organisms, but takes place in a domain of actions. At the same time, the body encounters of the organism trigger in it structural changes that arise through its behavior, but take place in its physiology. Recursively, the physiological changes of the organism change its manner of operation in its interactions and, hence, its behavior. Furthermore, these two phenomenal domains appear to an observer as of entirely different character: the domain of behavior appears as organismic, not mechanistic, and the domain of physiology appears as molecular, and mechanistic. It is here, in the lack of understanding of the relation between these two phenomenal domains, and in the belief from the perspective of the explanatory path of objectivity-without-parenthesis, that a scientific explanation realises a phenomonic reduction, where the mind-body problem arises as a paradox through the supposition that we have to explain the interaction between incommensurable entities. Yet if, as we reflect from the perspective of the explanatory path of objectivity-in-parenthesis, we recognise that there are phenomena like language that depend on the operation of our bodyhoods but do not take place in it, we can escape this paradox and recognise that there are many other phenomena of a similar kind, like the mind, ego, the psychic and the spiritual phenomena in general. Thus, we find not only that these phenomena do not take place in the head, but that they are distinctions made by an observer of the different manners of operation of the living systems in their different domains of interactions. Furthermore, we also find that in us these phenomena take place as different kinds of networks of conversations, and that that which we connote with the question "How do the mind and the body interact?" is the recursive coupling of the behavioral and physiological domains as indicated above. Or, in other words, we find that the mind, the ego, the psychic and the spiritual are some of the distinctions that an observer can make of the different kinds of networks of conversations in which we can live in recursive (behavioral and physiological) coupling, regardless of whether we operate in a social or in a non-social domain (see Maturana, 1980; 1987).

REFLECTIONS: THE SOCIAL AND THE ETHICAL

THE SOCIAL

Again, and unless I state it otherwise, I shall speak here from the explanatory path of objectivity-in-parenthesis. Accordingly, I shall speak of the social and ethical through reflecting upon the operations of distinction that the observer performs when he or she speaks of the social and the ethical in daily life.

1) If we listen to the circumstances under which we speak of socialisation in daily life, we discover that we do so only under circumstances of recurrent interactions in mutual

acceptance. Statements such as "Now we are working, we are not socialising" or "One must not socialise with the enemy" indicate this clearly. In fact, the first statement means "We now co-ordinate our actions in the commitment of fulfilling a task, not under the emotion of mutual acceptance" and the second one means "We must not enter in relations of mutual acceptance with the enemy because these destroy the emotion of enmity necessary to kill him or her." Accordingly, I maintain that an observer claims that social phenomena are taking place when he or she sees two or more organisms in recurrent interactions that follow an operational course of mutual acceptance. I also maintain that the emotion that makes possible recurrent interactions in mutual acceptance is that which we connote in daily life with the word love. Or, in other words, I say that love is the emotion that constitutes social phenomena; that when love ends, social phenomena end; and that interactions and relations that take place between living systems under other emotions different from love, are not social interactions or social relations. Therefore, when I speak of love I do not speak of a sentiment, nor do I speak of goodness, nor recommend kindness. When I speak of love I speak of a biological phenomenon; I speak of the emotion that specifies the domain of actions in which living systems co-ordinate their actions in a manner that entails mutual acceptance, and I claim that such operation constitutes social phenomena (see Maturana, 1974, 1985).

2) The awareness that love is the emotion that constitutes those phenomena in that in daily life we call social phenomena, also entails the awareness that those relations that in daily life we call social relations entail the living condition of the entities that realise them and, therefore, that whenever we speak in daily life of social systems we refer to systems formed by living systems in recurrent interactions under the emotion of love. Or, in other words, I claim that a system constituted by living systems that through their recurrent interactions integrate a network of co-ordinations of actions in a domain of mutual acceptance is a social system in that domain. Or, still in other words, I claim that it is their operation in co-ordinations of actions under the emotion of love that makes a group of living systems a social system. Finally, I also claim that relations and interactions that do not entail mutual acceptance between living systems are not social relations or interactions. This has the following implications:

a) It is constitutive of social systems that the components that realise them should be living systems. This means that any operation in a social system that denies or destroys the living condition of its components denies or destroys it. This, of course, also applies to human social systems.

b) The class identity of the components of a social system defines the class identity of the social system. Thus, a social system composed of human beings is a human social system. At the same time, it is the domain in which love (mutual acceptance) takes place between the components of a social system that defines the class identity of these, as well as the class identity of the social system. Accordingly, a human social system is defined as such by the mutual acceptance of its components in their condition of human beings. Similarly, a student social system is defined as such by the mutual acceptance of its components in their condition of students. As a human being realises in his or her bodyhood the structural intersection of many different human identities, a human being

can participate through the different identities that he or she realises in many different social systems. Finally, anything that denies or destroys the identity of the components of a social system, destroys it.

c) A social system is a system in which its component living systems realise themselves as living systems of a particular kind, through their co-ordinations of actions in the domain of their mutual acceptance. In other words, the components of a social system conserve their reciprocal adaptation in the domain of their mutual acceptance as they realise themselves as living systems in their co-ontogenic structural drift through their recurrent co-ordinations of actions. In human social systems this takes place through languaging. Furthermore, human social systems are networks of recurrent and changing conversations between human beings who are realised as human beings through their participation in the constitution of the social systems that they integrate. Moreover, I claim that language arose in the evolutionary history of primates, that resulted in human beings, as a feature of their social life in food-sharing, caressing, sexuality and male co-operation in child-caring.

d) An entity is a component of a system if it participates with other entities in the realisation of the relations of composition (organisation) of that system. In other words, an observer will claim that a given living system is a member of a social system if he or she sees it participating with other living systems in the co-ordinations of actions that constitute such a social system. Therefore, membership in a social system is not an intrinsic property of its component living systems, but a feature of their participation in its constitution. In general, the components of a system are components only in the relations of composition of it. Due to this, a human being will be seen by an observer as a member of a particular social system only as long as he or she is seen participating with other human beings through the operability of mutual acceptance in the co-ordinations of actions that define it.

e) When an observer sees that the behavior of some members of a social system entails the negation of others under the appearance of acceptance, he or she claims hypocrisy and lack of sincerity in them. In other words, we make the assessment of hypocrisy or insincerity when we claim that one of the members of a social system that we observe mimics the acceptance of the others by performing the behavior proper to it under a different emotion than love. However, we make such assessment in the members of a social system either a posteriori, that is, after seeing that these have already stopped operating in the acceptance of the others, or through seeing in them other emotions than love as the fundament of their realisation of the behavior of mutual acceptance that constitutes the social system that they appear to integrate.

Therefore, the observer claims that hypocrisy allows some individuals to participate in the actions that constitute a particular social system while under a hidden emotion that negates it. A social system, in which the emotional contradiction hidden by the hypocrisy or insincerity in which some of its members live becomes apparent, either disintegrates immediately, or it undergoes a structural change that results in the disappearance of the insincerity of those members, or hypocrisy hides again the emotional contradictions, or it

goes on with the exclusion of its insincere members. In other words, a social system can persist in the presence of hypocrisy in some of its members as long as these continue performing the actions of mutual acceptance, but it is unstable because insincerity always shows up in conflicting actions due to the emotional contradiction entailed in hypocrisy. In other words, it is the behavior of mutual acceptance between the components of a social system, not their sincerity, that is essential for its continued realisation. However, sincerity is essential for its stability and its existence through the emotional health (absence of emotional contradictions) of its members. Furthermore, our normal participation in the social systems that we integrate takes place under the implicit assumption of sincerity, and I claim that if we were to look into it we would find that it normally prevails. Indeed, I claim that, because love is the emotion that constitutes social phenomena, without the prevalence of sincerity the primate evolution that gave origin to humanity would not have taken place.

3) The components of a social system realise themselves as living systems in the composition of the social system that they compose. At the same time, a social system exists only in the dimensions in which its component living systems realise it through relations of mutual acceptance in their recurrent interactions. As a result of this, a social system recursively operates as a medium in which its component living systems conserve organisation and adaptation in the dimensions in which they compose it. Or, in other words, the behavior of the components of a social system that constitute it as a particular kind of social system become specified through their participation in its composition. Or, still in other words, a particular living system is a member of a particular social system only as long as it realises the behavior proper to the composition of that social system, otherwise the living system is not a member of it, or the social system disintegrates. This has several consequences:

a) Social systems are conservative systems. The new members of a social system learn the behavior proper to them in it as they contribute to its constitution through their participation in it. If this does not occur, the new member-to-be does not become a member, or the new member is dropped out. At the same time, a member of a social system that begins to behave in a manner that is not proper to it stops being a member of it, and is ignored or treated as alien, or its behavior is adopted and becomes an innovator.

b) Each social system is constituted as a network of co-ordinations of actions, or behaviors, that its components realise through their interactions in mutual acceptance. Due to this, there can be as many different kinds of social systems as configurations of networks of co-ordinations of actions can be realised by living systems while interacting in mutual acceptance. As such, a social system is a dynamic system in a continuous flow of changing co-ordinations of actions that remains the same as long as these stay contained within the configuration of co-ordinations of actions that defines it as a particular social system. In these circumstances, change in a social system, consists in a change in the configuration of co-ordinations of actions that constitute it, and can only take place through a change in the behavior of its components.

c) As social systems are constitutively conservative, social change can not take place as a result of the normal operation of a social system; and, at the same time, if change takes place it does so at the moment at which the new behavior becomes included as part of a new standard behavioral repertoire in the social system. As a result, if the new behavior of some of the members of a social system can not be integrated as part of a single social network, the social system disintegrates or fractures into two or more new social systems.

4) We human beings exist, as such, in language. For this reason, human social systems are systems of co-ordinations of actions in language; that is, they are networks of conversations. Accordingly, different human social systems, or societies, differ in the characteristics of the different networks of conversations that constitute them. At the same time, daily experience shows us that we affect each other in our bodyhoods through our languaging and emotioning in the course of our conversations. Indeed, we know from daily experience that we can recognise the members of different societies and different cultures through the different manners in which they handle their bodies, and that to grow in a given society or culture entails acquiring a particular manner of being a bodyhood. Let us see how it is that this takes place:

a) Each particular network of conversations, in which the people who realise that network operate in mutual acceptance, constitutes a social system. Thus a family, a chess club, a town community, a political party, a secret society, or a group of friends are all systems of co-ordinations of actions in language, and as such are networks of conversations that are social systems only to the extent that the people who realise them operate in mutual acceptance. As a result, and regardless of our awareness of this, we move in daily life through a network of conversations, entering and leaving social systems according to whether in the flow of our languaging and emotioning our behavior entails accepting or rejecting coexistence in mutual acceptance.

b) As we realise our conversations through our interactions, and our interactions are realised through our bodyhoods, any change in our bodyhoods is liable to result in a change in our conversations. Conversely, because we interact in the realisation of our conversations, and our interactions result in changes of our bodyhoods, our bodyhoods change in the course of our conversations in a course contingent on the flow of the interactions that constitute them. In other words, as changes in our conversations result in changes in our bodyhoods, changes in our bodyhoods result in changes in our conversations.

c) We human beings participate in our daily life in many different social systems which, although independent as domains of conversations (different cognitive domains) affect each other as their realisations intersect in our bodyhoods (see section on 'Cognition'). Due to this, every conversation in which we participate has consequences in our bodyhoods and everything that we do in our bodyhoods has consequences in the conversations in which we participate. Or, in other words, the manner of recursive (dialectic) involvement of languaging and bodyhood results in the conservative character

of social systems: as a particular social system is realised and conserved through the participation of its members in the network of conversations that constitutes it, the network of conversations that constitutes a particular social system specifies the characteristics and properties that its members must have as they realise it.

5) A social system is a closed system that includes as its members all those organisms that operate under the emotion of mutual acceptance in the realisation of the network of co-ordinations of actions that realises it. Due to this, the boundaries of a social system are emotional ones, and appear in the behavior of its members as they exclude other organisms from participation in the particular network of co-ordinations of actions that constitutes it. In the human domain this exclusion is usually justified with some rational argument from the perspective of the explanatory path of objectivity-without-parenthesis, and the emotions of rejection, shame or sadness, which, alone or in combination, arise when a social boundary becomes explicit in language, are negated. That these emotions should arise in us, however, reveals that in the core of our biological flow, as we grow up as healthy social entities, we accept all living beings and, particularly, all human beings, as members with us of a broad social domain that we have to learn to subdivide as we grow up as members of a particular culture. The denial of the presence of these emotions in us, when we rationally make explicit the boundaries of a particular social system, also blinds us about the emotional, and not rational, character of these boundaries. Daily life reveals this as it shows that social boundaries can only be crossed through emotional seduction and never through reason.

6) A change in a human social system takes place as a change in the network of conversations that its members generate. However, as the bodyhoods of the members of any particular social system become what they are, and generate the behaviors that realise it through their participation in its constitution, the normal interactions of a human being in a social system to which he or she belongs are confirmatory of it and of his or her membership in it, and contribute to the production of members that confirm it. Social systems are constitutively conservative systems; due to this, human social systems can only change if their members have experiences that trigger in them changes in bodyhood that result in them no longer participating in its constitutive network of conversations. For this to happen in any particular human social system, its members must have experiences outside the network of conversations that constitutes it. This can take place for any human being as a member of a particular social system fundamentally in two ways: a) through the encounter with other human beings in a network of conversations that do not confirm it, or through the experience of situations that do not belong to it; and b) through interactions that trigger in us reflections upon our circumstances of coexistence with other human beings. The first case usually happens when we encounter actual foreigners, either when on a trip abroad or when visitors come to us, or when we move beyond the normal ranges of our community. As a result of such encounters and experiences, the course of our structural drift may take us outside the domain of structural changes that are conservative of the social system to which we belong, and we become heretic in it. The second case usually happens when we live situations in which we fall in love, or in which, through the braiding of our reasoning and emotioning, we distinguish our circumstances and consider them in reference to our desires of coexistence with other

human beings. If, when this happens, we do not like those circumstances as expressions of our manner of living with other human beings, and take action, we stop being conservative of the social system in which this takes place, and become heretic in it.

MULTIPLICITY OF DOMAINS OF COEXISTENCE

We human beings exist in communities constituted as systems of co-ordinations of actions in language; that is, as networks of conversations, under certain emotions. If the emotion is love, that is, if the emotion involved is the emotion that constitutes the operability of recurrent interactions under mutual acceptance, then the community is a social system; if it is not, if it is an emotion that does not entail mutual acceptance, then the community is a non-social community. If the emotion involved is not love, but one that gives rise to co-ordinations of actions that an observer sees as commitments for the fulfilment of a task, then the community is a work community; if the emotion involved is that which gives rise to co-ordinations of actions that an observer sees as the behavior of obedience, then the community is a hierarchical community. Moreover, we human beings participate in many different communities that are constituted under different emotions as different networks of conversations that, although independent as domains of co-ordinations of actions, affect each other through the intersection of their realisations in our bodyhoods. Hypocrisy also applies to non-social communities, and a distinction that an observer makes of a particular social or non-social community remains valid only as long as the observer does not make the distinction of hypocrisy with respect to the underlying emotions that define it.

Furthermore, each human network of conversations, whether in the realisation of a social system or of a non-social community, is also operationally realised in language as a coherent system of descriptions and explanations that constitutes a domain of reality. As a result, we human beings operate in our living in many different domains of reality which, as different networks of conversations and explanations, intersect in their realisation of our bodyhoods. But, as the identity of each human being as a member of a particular network of conversations is constituted as it is realised in his or her participation in that network, each human being exists in the flow of his or her living as a particular configuration of many different, operationally distinct, social and non-social identities, which intersect in their realisations in his or her bodyhood. That is, the 'ego' is a dynamic node in a multidimensional space of human identities, and the 'I', the human individual, is the bodyhood that realises the intersection of the networks of conversations that constitute the ego. This is apparent in daily life in the different identities that we adopt under different circumstances, and that we live without emotional contradictions while the co-ordinations of actions and emotions in which they arise do not intersect and do not involve us in simultaneous opposing actions and emotions. This has several consequences:

- 1) The course followed by our individual structural changes in the flow of our interactions is recursively coupled to the course followed by our conversations, regardless of whether they take place in a social or non-social domain. This is why although the different domains of coexistence in which we normally operate simultaneously or in

succession do not intersect as such, what happens to us in one of them has consequences for our participation in the others. Finally, this orthogonal and indirect reciprocal influence between behavior and bodyhood is taking place in us all the time, regardless of the conversations and independent structural body dynamics in which we may be involved, as a necessary constitutive feature of our operation as living systems.

2) All that we do in the behavioral domain happens to us as a result of our structural dynamics. Furthermore, our structure is at every instant the changing dynamic structural configuration that appears in us at that instant as a result of the intersection of all the interactions, conversations and reflections in which we are involved at that instant in coincidence with the structural dynamics of the autonomous structural flow of our bodyhoods. As a result, at every instant our individual structures are expressions of the structural history of the network of intersections, conversations and reflections to which we belong as members of a network of social and non-social communities, and we only generate the conversations, reflections and interactions that happen to us according to our structural presentation in that network. Yet, at the same time, all this happens to us in the present of our continuous biological realisation as human beings.

3) Change in any particular social or non-social human community takes place as a conversational change; that is, as a change in the configuration of the network of co-ordinations of actions and emotions that constitutes it and defines its class identity. If such a conversational change takes place with conservation of the configuration of co-ordinations of actions and emotions that defines the identity of the particular community that is changing, this is conserved, otherwise it disintegrates. Such change only takes place through changes in the bodyhoods of the members of the changing community. Furthermore, if we see each human culture as a particular pattern of co-ordinations of actions and emotions that can be realised differently in different human communities, then we can also generalise this by saying that cultural change can only take place through changes in the bodyhood of the individual human beings that realise it through their conversations.

4) The reciprocal interdependence of all the domains of coexistence in which we participate through the intersection of their realisation in our bodyhoods is most apparent in our daily life in the fact that as we change our behavior in one domain of coexistence through an emotional shift, we find ourselves also changing our behaviors in others. Indeed, everything takes place in us as if to some extent the different networks of conversations that constitute the different domains of coexistence in which we participate constituted the expression of a single dynamic structural system, which is in fact the case because they intersect in their realisation through our bodyhoods. Due to this, the different domains of coexistence in which we participate influence each other continuously, even if our behavior in them is hypocritical, because it is not their sincerity that matters, but the actual structural intersection of the realisation through our bodyhoods. This also applies to our operation in the domain of conscious reflection as a manner of languaging in an individual body dance. Indeed, as we operate in conscious reflection our nervous systems operate in the flow of recursive internal correlations that corresponds to its flow of internal correlations while languaging in a conversation. Due to

this, the constitutive continuous structural change of our bodyhoods follows a course contingent on the conversational contents of our reflections, and our participation in the different domains of co-ordinations of actions constituting the different domains of coexistence in which we are involved becomes operationally a function of our values, desires, ideals and aspirations. All this means that although we cannot act differently from the way we act at any moment, because at every moment what we do is the expression of our structural present, we human beings are not free from responsibility in our actions because, due to our reflections, what we do is necessarily always the expression of our values, desires, ideals and aspirations. In other words, all languaging is a source of change in our bodyhoods because languaging takes place through the structural dynamics of our bodyhoods, and, due to this, reflection, conscious reflection, awareness of knowledge as a manner of languaging, is a source of change for the social and non-social communities that we integrate.

5) As all networks of conversations constitute domains of explanations regardless of whether they are social or non-social, and because, as such, they are also domains of reality, all that I have said above about explanations and reality applies to them. That is, we live our participations in the different communities that we integrate through our recurrent interactions as we generate different networks of conversations, either following the operations of the explanatory path of objectivity-in-parenthesis, and we do this regardless of whether we are aware of this or not. This means that we live all our interpersonal relationships either in mutual respect, in tolerance, or in demand for obedience, according to whether we follow the operability of one or the other of these two explanatory paths in the braided flow of our emotioning and reasoning. Furthermore, this also means that we accept or do not accept our responsibility for our actions and emotions according to the domain of explanations in which we find ourselves in the flow of our conversations; that is, according to whether we are aware or not of our constitutive participation in the bringing forth of the reality that we live at each instant.

THE ETHICAL

If we examine the circumstances under which we claim that ethical considerations are relevant, we find that we do so when we are concerned about the consequences of the actions of some human beings upon other human beings. At the same time, we find that unless we think that there is a breakdown in what we consider is human respect in a particular social community, we do not raise the question of ethics in that community. Slavery does not constitute an ethical problem in a society in which master and slave sincerely accept slavery as a manner of living in mutual acceptance, or as a legitimate manner of entering in a work agreement. Ethics, therefore, have to do with our emotions, not with our rationality. No doubt we use reason to justify our ethical concerns, and we speak as if there were transcendental values that validate our arguments against what we consider unethical behavior, but we do so only if we find ourselves in an emotional contradiction with respect to our concerns, and we want to dissolve the contradiction through denial, by employing a compelling argument. What determines whether we see a given behavior as unethical, and that we act accordingly, is an emotion - love, mutual

acceptance, empathy - and not reason. This is not usually apparent to us, for the following reasons:

1) Emotions have a biological foundation; they are as biological phenomena proper to our bodyhoods. Culture does not constitute our emotions, but the course of our emotioning is mostly cultural. Moreover, the braiding of our emotioning with our languaging is necessarily only cultural. In these circumstances, although our concern for the well-being of other human beings, that is, our ethical behavior, has a biological foundation, the applicability of this concern is cultural. We usually do not see the emotional foundation of our ethical behavior because we devalue emotions and pretend that our actions should have only a rational foundation. For this same reason we do not see the braiding of emotioning and rationality, and we are blind to how our epigenetic culturings sets boundaries to our ethical behavior.

2) Biologically, we human beings belong to the species *homo sapiens* and are characterised as such by a particular primate body constitution associated with our existence in language. I think that the great centrality of language in human beings, and its deep involvement, through the structure of the nervous system, with co-operation, with sensuality, with food-sharing, and with male concern for children, indicates that the bodyhood of *homo sapiens* must have arisen in the evolution of primates as a result of the conservation of a particular manner of living (i.e. through the conservation of a particular ontogenic phenotype) that entailed an intimate sensual coexistence in small groups, food-sharing, co-operation between male and female in child care and the enjoyment of domestic life by males and females. In the conservation of this mode of life, that started several (four?) millions of years ago, language is a consequence, not an initial condition. Yet, as language appeared (two...million years ago?), it became part of the ontogenic phenotype conserved, giving rise to a manner of living that is becoming progressively more involved in the recursiveness of consensuality, under the form of cultural complexities, that it entails. Indeed, the emotional problems that we modern human beings have with sexuality, with sharing, with domestic life, with loneliness, and with the glorification of relations of power, do not arise from our biology, but on the contrary, from our rational justification of manners of living that restrict our basic biology as sensual, domestic, languaging animals, that live in groups of mutual concern. Daily life shows this clearly as an emotional conflict in our need to justify rationally our actions when somebody begs from us and we refuse to share, acting as if we had not seen the beggar. We human beings are ethical animals, that is we are animals; that is, we are animals that have arisen in a biological history of love and mutual concern. Yet, we do not usually see ourselves like this. Nor do we usually see our human condition as ethical animals as the present of a primate evolution that is the result of a conservation of a manner of living that entails food-sharing, co-operativeness, sensuality and love (mutual acceptance), as the central actions and emotions that define the boundaries of coexistence of the evolving group.

3) Culturally, we are constituted as human beings of one kind or another by our participation in different social systems, each of which specifies the extension of our concerns for other *homo sapiens* by operationally defining as human beings only those

that belong to it. Due to this, although in us ethics arises in our emotioning as a biologically founded concern for the other, we live this concern differently in each social system that we integrate as a result of their different constitutive consensual braiding of emotioning and reasoning that specifies who is an 'other'. Daily life shows this clearly when we argue differently about our responsibility with respect to other homo sapiens in the different social domains in which we participate. Indeed, our behavior shows that those homo sapiens who do not belong to the particular social domain in which our emotioning is taking place at a particular moment do not belong to the domain of our concerns for human beings at that moment, and no ethical question arises in us with respect to them. We do not usually see this because, in the denial of the legitimacy of our emotioning, we do not see the emotional acceptance of the basic premises on which rests the validity of our reasoning. As a result, when somebody accepts our argument in favour of a particular ethical behavior in a given social domain, we believe that our interlocutor is yielding to the transcendental, compelling power of our reasoning, and we do not see that he or she is doing so because, by accepting as legitimate the social domain in which the argument takes place, he or she enters the emotional domain of mutual acceptance in which the premises of that argument are valid.

4) We change our concerns for other human beings as we move from one social domain to another, and we move from one social domain to another as we move from one network of conversations (social or non-social) to another in the braided flow of our emotioning and reasoning. Furthermore, this happens to us spontaneously as a result of the braiding of emotioning and reasoning that takes place in us, moment after moment in our epigenetic ontogeny, as our conversational and non-conversational domains of interactions and emotioning intersect in their realisation through our bodyhoods. That this is so is apparent in the changes that we undergo in our concerns for other human beings in the normal flow of our daily lives. We may live these changes in our concerns either as spontaneous emotional changes, or as emotional changes that result in us from our reflections in a domain different from the one in which they take place, or we may live them as emotional changes that take place in the same domain of our reasoning as a result of changes in our self-awareness; but they always happen to us in our cultural epigenesis as a result of the dynamics of our bodyhoods in it. Indeed we find ourselves immersed in our ethical concerns and we live them as a matter of course: we do not control their occurrence. Furthermore, generally we do not see this because usually we believe in the transcendental power of reason, and through it, in the universal validity of ethics.

The modern Western culture to which current science belongs is immersed in the explanatory path of objectivity-without-parenthesis. In this explanatory path, or, as I can say now, in this basic attitude of coexistence, in which usually we attempt to compel others with arguments that we deem to be universal because they are founded on reason, and in which we deny to emotions their basic legitimacy and devalue them, we argue as if ethics has, or should have, a rational, transcendental grounding. Yet, even if while living in this explanatory path we do not accept the emotional foundation of our ethical behavior, we in our praxis know that our concern for the other pertains to our emotioning because we resort to agreement to make it universal. Indeed, we show that this is so in the legal systems that we create to regulate our coexistence in the non-social communities

that we integrate. And we do this without being aware of why we do it, because we speak of social regulation to correct operational dynamics proper to the praxis of interactions in a non-social community; that is, in a community founded on an emotion different from love, which constitutively does not include the other in the domain of mutual acceptance of the participants. And, of course, this is possible because in a legal system sincerity does not matter, and it is only the behavior of mutual acceptance apparent in our compliance with the law, that is required. But, how is it that we are frequently not satisfied with rational arguments that negate the other, even if we believe that they are grounded on a universal, transcendental truth? How is it that ethical arguments that we accept to be fully rational are not in fact universally compelling as they ought to be? These questions have no adequate answer from the explanatory path of objectivity-without-parenthesis because this explanatory path denies the fundamental emotional grounding of human rationality. This issue will be examined next.

We human beings usually exist simultaneously or in succession in many different domains of coexistence, each constituted as a configuration of conversations and as a domain of rationality under a fundamental manner of emotioning, that specify who belongs to it. In these circumstances we may find ourselves emotionally negating the validity of the consequences of our actions upon other human beings while we accept them on rational grounds. If it is the case that as this happens we want the simultaneous validity of both our empathy and our reasoning, we are in an ethical conflict. And we are in an ethical conflict even if we are operating in objectivity-without-parenthesis; it just happens to us that although we accept our rational argument this is not sufficiently compelling to negate our empathy (love). If in this case we lean towards empathy, we operationally move out of the path of objectivity-without-parenthesis into the path of objectivity-in-parenthesis and take responsibility for our actions. If, on the contrary, we do otherwise, and we lean towards our rational argument, we devalue our emotion of empathy and do not take responsibility for our actions. In both cases, however, we may act without being aware of the epistemological and ontological implications of what we do; and if, in addition, we still remain in doubt about the validity or legitimacy of what we do, we remain in emotional contradiction, and we suffer.

If we are in the path of coexistence of objectivity-in-parenthesis, the situation is different because we are aware of the many different domains of reality in which we may live, as well as of the emotional grounding of our ethical concerns. In this path of coexistence we are also aware that at any moment our ethical concerns do not go beyond the operational boundary of mutual acceptance that specifies the social domain in which we make our ethical reflections. Furthermore, in this path of coexistence we are also aware that the social domains in which we participate, as well as their extension, depend on the epigenetic braiding of language and emotioning that we have lived in the culture to which we belong (see Maturana & Varela, 1980).

FINAL REMARKS

In writing this article I have followed the explanatory path of objectivity-in-parenthesis. Indeed, I could not have written it following the explanatory path of objectivity-without-

parenthesis, because such an explanatory path, by negating the question about the origin of the properties of the observer as a biological entity, is constitutively blind to what I have said. Now I shall end by presenting some concluding remarks also in the same explanatory path, and I shall do so in the form of statements that I shall not further qualify.

The praxis of living, the experience of the observer as such, just happens. Indeed, praxes are valid in themselves; they are as they do. Because of this, explanations are essentially superfluous; we as observers do not need them to happen; but when it happens to us that we explain, it turns out that explanations are not trivial: due to the recursive reciprocal involvement between language and bodyhood the praxis of living of the observer changes as he or she generates explanations of his or her praxis of living. This is why everything that we say or think has consequences in the way we live. We can be aware of this now.

It has been said that we human beings are rational animals, and that it is rationality what makes us human. Along this line we have devalued emotions and exalted rationality, and we have done this so much that whenever we see in a non-human animal some complex adaptive behavior, we immediately want to ascribe to the animal some sort of rational thinking. Furthermore, along the same line, in our daily life of coexistence with other human beings we usually demand from them rational behavior, and we justify our demand with the explicit claim that a rational argument is universally valid because it does not depend on what we do or feel as observers. Indeed, we human beings have created many complex ideologies that justify the destruction or preservation of the other on rational grounds. We are now aware that all this can end. We human beings are not rational animals; we are emotional, languaging animals that use the operational coherences of language, through the constitution of rational systems, to explain and justify our actions, while in the process, and without realising it, we blind ourselves about the emotional grounding of all the rational domains that we bring forth. Notwithstanding this, rationality, as expression of the operational coherences of languaging, and through this of the operational coherences of the flow of recursive consensual co-ordinations of actions that constitutes language, is the condition of possibility of any explaining. So, the logical coherence of an explanation depends on reason, but its contents, as well as the rational domain in which it takes place, depend on the emotioning of the observer expressed in his or her listening as he or she prefers one or another criterion of validation for his or her explaining. Now we can be aware of this.

It has been said that we human beings are ethical animals because we are rational animals. Now we are aware that this is not so. Ethics arises in our concern for the other, not in our compliance with a rational argument, and our concern for the other is emotional, not rational. It is love, the emotion that constitutes social coexistence, that specifies our domains of concern in the communities that we create with other human beings. Therefore, we do not have to justify our concern for the other in a social community because such a concern is constitutive of our social coexistence. At the same time, we do not have to justify our lack of concern for those others with whom we have a non-social coexistence, because that lack of concern is constitutive of the non-social coexistence. It is only when we want the operability of mutual concern between

human beings who are not members of the same social community that we may require a rational argument to bring it forth through the generation of an explicit agreement. We do not have to be afraid that the recognition of this may open a space for the justification of additional human abuse if we are aware of it. We can only act at any moment in a domain of actions specified by our emotioning at that moment. Moreover, what an observer sees as abuse, the actor genuinely may not see as such, and each, the observer and the observed, will act in the domain of actions that his or her emotion specify at that moment. If we recognise abuse we cannot escape the ethical concern that such a recognition entails, otherwise we would not have recognised it. As a result, we cannot avoid acting either according to our recognition of abuse, or to our accepting that we want the abuse that we see under some other emotion that obscures our concern for the other. We are aware of this now.

We human beings exist in language. As such we exist in a world that consists in the flow of our recursive consensual co-ordinations of actions with other human beings in the praxis of living. The lives that we human beings live, therefore, are necessarily always our responsibility because it arises in our languaging: the world that we live is always constituted in our human actions. In these circumstances, responsibility only means that we can be aware that our human life takes place in languaging, and that because awareness takes place in language, we can be aware that our awareness about what we do as human beings has consequences in what we do as human beings. Life happens to us, we find ourselves in it, yet it is not the same for our lives to be aware or not to be aware of what we do, to language or not to language what we language, or to think or not to think what we think as human beings. Now we are aware of this.

From all that I have said it is apparent that the physical domain of existence is one of many domains of reality or cognitive domains that we bring forth as we explain our praxis of living in the explanatory path of objectivity-in-parenthesis. The physical domain of existence, therefore, is an explanatory as well as an ontological domain in the domain of constitutive ontologies. It is, however, a peculiar one because it takes place as the domain in which we as observers explain ourselves as living systems that can give origin to the observer as an operation in a different and non-intersecting phenomenal domain from the one in which they exist as such. Or, in other words, the physical domain of existence as an explanatory domain that we bring forth in the explanation of some aspects of our praxis of living with other aspects of our praxis of living, is a peculiar cognitive domain because it is constituted as the domain of operational coherences in which we observers bring forth (distinguish) our components as living systems through the operation of our components as we interact as living systems. Our usual difficulties of grasping this are mainly twofold:

a) Due to our Western cultural tradition we like to be able to say something about a domain of things or entities that we assume to have an existence independent of what we do. Furthermore, we want to apply to that independent domain all the distinctions that we use in language as a human domain of recursive co-ordinations of consensual actions.

b) We do not like to accept or we are not aware, that it is the case that the distinctions, such as object or relation, that we make in languaging arise in the constitution of language as a closed domain of recursive consensual co-ordinations of actions, and constitutively do not apply outside it. As a result of this, we usually have difficulties in accepting, and in imagining, that outside language nothing (no thing) exists because existence is bound to our distinctions in language. No doubt a modern physicist may say that quantum physics says that the categories of daily life do not apply in the realm of elementary particles. Yet I am saying much more than that: I am saying that all phenomena, including of course those of quantum physics as well as those of the observer and observing, are cognitive phenomena that arise in observing as the observer operates in language explaining his or her praxis of living; that observing can only be understood as a result of the biology of language, and that observing does not reveal an independent reality, but constitutes the observed as a configuration of consensual co-ordinations of actions in language. Indeed, this is what I indicate as I call the explanatory path of objectivity-in-parenthesis the domain of 'constitutive ontologies' in the ontological diagram presented earlier. Nothing precedes its distinction; existence in any domain, even the existence of the observer themselves, is constituted in the distinctions of the observer in the explanation of his or her praxis of living.

Nothing exists outside language because existence is constituted in the explanation of the praxis of living of the observer, regardless of the explanatory path followed; even the praxis of living of the observer exists only as he or she beings it forth in languaging for explaining or describing. However, if in our search for explanation we ask for the characteristics of the transcendental substratum on which, for epistemological reasons we expect everything to take place, we find from all that I have said above that the ontology of observing shows us that we cannot say anything about it, not even to refer to it as an it, because as soon as we do so we are in language, in the domain of recursive co-ordinations of actions of observers that arise as they operate in language. Outside language no thing exists. We now can be aware that this is a constitutive human cognitive condition, not a circumstantial limitation.

Explanations pertain to the domain of human coexistence, and as such they take place only in conversations that demand a reformulation of the praxis of living of the observer. The same applies to reality: reality is a proposition that arises in a disagreement as an attempt to recover a lost domain of co-ordinations of actions, or to generate a new one. Indeed, in the daily life of the greco-judeo-christian tradition to which our modern scientific and technological culture belongs, reality and the real are argument that we use in our human coexistence whenever we want to compel another human being, without using force, to do something we want, and which the other will not do spontaneously. The same happens in this tradition with the notions of reason and rationality that we use as compelling arguments under the implicit cultural claim that through them we refer to universal, transcendental truths. It happens, however, that we are not usually aware of this because as we grow in this tradition we become members of a culture that entails that most or all the explanations given in it should take place following the explanatory path of objectivity-without-parenthesis. In this explanatory path, reality and the real are also

explanatory propositions of the praxis of living of the observer that arise in a breakdown of his or her co-ordinations of actions with an other, but which do not arise as his or her attempt to compel the other to do his or her will. Quite the contrary, in this explanatory path reality and the real arise as invitations of one observer to another to become involved in the constitution of a particular domain of co-ordinations of actions as a domain of coexistence in mutual acceptance. Furthermore, while in this explanatory path the observer is aware of all this, in the other he or she is not. We can be aware of this now.

Awareness of our actions makes our actions objects of our reflections, and opens their consequences to our liking or disliking them. Awareness of our liking or disliking of the consequences of what we do makes us aware that we always do what we do because we want the consequences of what we are aware that we do, even when we claim that we do not want those consequences. In other words, awareness of our liking or disliking of the consequences of what we do constitutes our responsibility for the consequences of what we do because it makes us aware that we do what we do because we want the consequences of what we do. Finally, awareness of our liking or disliking of our liking or disliking of the consequences of what we do constitutes our human freedom by making us responsible for our emotions through being aware of them, as well as our liking or disliking of them. In the recursive involvement between languaging, emotioning and becoming, that our epigenesis entails, we human beings live our lives in a continuous recursive involvement between awareness and becoming. In these circumstances, it is not the same for us to be aware or not to be aware of what we do in our interpersonal relationships, and it is not the same for our body dynamics in all its dimensions because the courses that our lives follow in our continuous body change and transformation, are at every instant contingent on our awareness, or lack of awareness of our actions. We can be aware of this now.

Human life is involved upon itself in the flow of the recursive dynamic coupling of language, emotioning and bodyhood: whatever we language as we flow in our emotioning becomes our bodyhood and the world as we live as human beings, and our recursive consensual co-ordinations of actions in the flow of our emotioning as we live the world we live, constitutes our languaging. Due to this, human life appears open to any historical course that we may imagine in this recursive involvement. Literature, written in novels or stories, or played in theatre or cinema, appears as an indication of what is possible. This wide-openness, however, is possible only in literature; our biology as human beings constitutes the extension of our living by specifying what is possible through the conservation of the manner of living that constitutes us as human: male co-operation in child care, sharing of food, concern for the other, recurrent interactions in sensuality, mutual acceptance as the basic manner of coexistence, and languaging. In other words, we shall remain human only as long as our operation in love and ethics is the operational basis of our coexistence as languaging animals. Indeed, living in the negation of consensuality, of love and of ethics, as the grounding of the different manners of our coexistence, constitutes the negation of humanity. Of this we can be aware now.

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ABSTRACT

It is said that we human beings are rational animals. On account of this, we devalue emotions and exalt rationality so much that, whenever we see some complex behavior in a non-human animal, we want to ascribe rational thinking to it. In this process, we have made the notion of objective reality a reference to something that we deem universal and independent of what we do, and which we use as an argument aimed at compelling someone to do something against his or her will. As an analysis of this, the article concerns the ontology of reality and is a reflection on the social and ethical consequences that understanding such an ontology may have.