

# Chapter 1

## INTRODUCTION

*Entwickeln wir, machen wir unter Anlegung eines  
topographischen Planes eine kleine Reise ins Land der  
besseren Erkenntnis.*

*Let us, by drawing a topographical map, make a small  
journey into the land of better knowledge.*

—Paul Klee, *Schöpferische Konfession*

## UNDERSTANDING AN EVOLVING WORLD

The challenge of this work is that of trying to understand the fundamental unity and diversity of everything—including ourselves—that exists and continues to emerge within an evolutionary framework. That framework is not intrinsically or exclusively biological in nature. Biology, as I will argue throughout this book, is part of a more general ontological framework that, by definition of ontology, embraces every single discipline and that is explicitly interdisciplinary in nature. Biology, of course, is the discipline par excellence where one can find well-defined and elaborated models of evolution, including a good amount of established and more or less commonly known terminology. Biological evolution could therefore be thought of as a metaphor describing the totality of the world in terms of a general structure of relations among parts of the world that are themselves studied by more specific disciplines. However interesting such a verbal exercise might be, it would nevertheless also keep some of the most fundamental aspects of interdisciplinarity out of our

cognitive reach. Interdisciplinarity, I will argue, cannot be a reduction of our knowledge to a single discipline—either as a metaphorical extrapolation of a discipline, or as the quest for a single formula from which the totality of the world would emerge.

I understand that the study of an individual discipline can be very rewarding and stimulating. However, such an endeavor does restrict the scope of our perspective on reality. Of course, it is quite obvious that it is no longer possible for an individual to possess all the knowledge in the world. As a matter of fact, most disciplines can no longer be known in their entirety by a single scholar. It appears as if a reduction of all knowledge to a single formula or at least a very restricted set of basic principles is indeed our only hope to be truly interdisciplinary one day.

By the time I finished art school and started thinking about college, I found it very hard to find one discipline more interesting or more appealing than another. “An eclectic mind” was what a counselor called it. I never figured out whether he meant it as a compliment or not. Anyway, in the end I decided to enroll as a philosophy student at the University of Ghent, because they offered a program that allowed students to select at least a part of the course work from other disciplines taught at the university. As a result of that approach I was able to study a variety of seemingly very distinct subjects, including mathematics, biology, African literature, and aesthetics. What struck me most, however, was how similar all those subjects were, not in the sense that African and Western literature could be substituted for one another, but in the way two paintings—two landscapes, for example—can recall each other even though they are made by very different people in very different times. I guess that similarity was not what the professors were trying to get across to us, for most of them engaged in an introduction devised to illustrate how specific and different their field of study was. I tried to be a good and respectful student, but I could not help it: My thoughts kept wandering across the borders of the disciplines. As I got (a little bit) older and (a lot) less respectful, similarity and difference became my main point of attention. How? Why? When? These were the major questions that, while I could not readily answer them, gradually shaped my thinking about an interdisciplinary ontology—by which I mean an ontology focusing on the grounds for the division of the world into distinct, but nevertheless related, parts that are studied by specific disciplines.

It seems reasonable to think about ourselves—humanity—in terms of being such a distinct part of the world. As a matter of fact, it is even tempting to think about ourselves as belonging to a *privileged* segment of the world, which leaves us with some fundamental questions about the relation between ourselves and the totality of reality. But before we can consider possible answers, we must ask and answer the basic onto-epistemic question: How can a part understand the totality to which it belongs?

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Crucial to an interdisciplinary ontology and how we can know about it—what we might call an “interdisciplinary onto-epistemology”—is the notion of self-reference. Self-reference is fascinating: Do we not regard our ability to think about ourselves as one of our most powerful and meaningful cognitive features? Are we not puzzled by the question whether our brain, probably the most complex piece of matter in existence, will one day be powerful enough to understand itself? Do we not consider computers to be inferior to us, because lacking the reflexivity of our own thoughts, they supposedly are not aware of what they are doing?

Descartes’s dictum, *Je pense, donc je suis*, is a reflexive statement about our cognitive powers. Regardless of whether Descartes is right, his point of view reflects upon an important matter, because our ontology is only as good as it is epistemically accessible. In other words, an ontology, if it is to be of any cognitive significance, must guarantee that we can know something about it. That means that it must be possible, from an epistemological point of view, for the ontic level to refer to itself. An ontology must contain its own epistemic agent, its own spectator. In chapter 6 it will become clear how important that condition is, as it makes it possible to assume that the quantum-physical level of reality must in principle—ontically—be able to refer to itself and therefore contain its own observer, an observer so crucial to the specific interpretation of quantum physics.

Self-reference entails self-similarity. Even an extremely simplified version of chaos theory tells us that much. It makes good sense, too. A thought about a thought is still a thought. As a matter of fact, it would come somewhat as a surprise if thinking about thinking were to be completely different from thinking. Were we to find out that thinking, on the one hand, and thinking about thinking, on the

other, are indeed two fundamentally different processes, we consequently would have to give up the reflexivity of our thinking. Our winning cognitive act would instantly lose much, if not all, of its glamour and collapse to a level comparable to talking about eating or dreaming about sex—nice to do when on a diet or alone, respectively, but definitely not as interesting as the real thing.

If self-reference entails self-similarity, does that mean then that reference implies similarity? Talking about a recipe for lasagna, for example, bears most certainly at least a structural resemblance to actually preparing the real thing. We can list the ingredients, add them in the right order, and put dinner in the oven for a specified amount of time without as much as moving a finger. A slight movement of the tongue and some other parts involved in producing sound will suffice. Mentally rehearsing the recipe, we could even get by with some neurochemical imbalances in our brain.

The question concerning reference and similarity is this: If our language and our knowledge refer to the world, does that mean that they are somehow “like” the world, that they structurally resemble the world? In the case of the recipe for lasagna, that claim is not so hard to defend. But what about a poem, an abstract painting, or a paradox? Can chemistry refer to physics?

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I am, or at least so I am told, a fundamental optimist. I spend a great deal of time thinking about thinking, and I do like to think that those thoughts are not just a pleasant but unreal dream. On the other hand, however, some epistemic modesty might be called for. Why would I be so different from the rest of the world? By “rest of the world” I do not mean just “other people” but literally everything else in the world. Elaborating on that structural similarity, should I not admit that since I can reflect upon myself, the world too can reflect upon itself?

A traditional version of this thesis has it that the world is reflexive because we, as human beings, are reflexive. After all, we are a part of the world and not some innocent bystanders who just happened to be in the neighborhood. The argument grants us a monopoly on reflexivity but allows the whole world to participate in our glory.

I think we should do better and acknowledge that reflexivity—including epistemic self-reference—is an essential operation

throughout reality and not just in our human cognitive realm. We have thoughts that reflect upon thoughts—that is one layer of reflexivity—but those other thoughts reflect upon the world outside our thoughts—that is another layer of reflexivity, a layer that is definitely not exclusively human. Granted, the two types of reflexivity are not identical, but that, I believe, is precisely the point: Reflexivity changes in nature as it continues to emerge as one of the most powerful cognitive features. Given this humble realism (only realists can be truly optimistic) we might start looking for reflexivity outside the human realm. We no longer need to assume that reflexivity and what it entails (for instance, paradoxes) belong exclusively to the language we use to describe the world. Our language, rather, is reflexive, but it belongs to a fundamentally reflexive world.

## GROUNDS FOR AN INTERDISCIPLINARY ONTOLOGY

If the world is indeed in essence a self-similar, chaotic structure, it becomes very hard to consider one level of reality to be more important than another, even when we consider a preceding level to be essential for the next level. Chemical reactions, for example, are a necessary condition for biological entities, but that does not mean that biology is more important than chemistry or vice versa. Every discipline, and not just biology, should therefore in principle be able to provide the necessary metaphors to describe at least partially the world beyond its own subject matter. In trying to give such partial descriptions, we discern an admittedly fuzzy image of an evolving evolution. That image, I believe, provides us with a key to understanding the dynamics behind the increasing differentiation of the world into domains or levels that are studied by specific disciplines. Evolving evolution and the structural differentiation generated in the process are therefore essential to an interdisciplinary ontology.

Is it too ambitious an undertaking to try to make such an ontology explicit? Maybe, and even probably, so, especially within the scope of a single book. Nevertheless, nobody should be misled into believing that disciplines belong to sanctioned experts—sanctioned by whom?—and that nobody but those experts has the right to talk about the relevance of any specific discipline for humanity. But then, of course, that is easy for me to say: I am not an expert.

I am, however, human—in the most literal sense of the word. Though it might sound trivial, it is nevertheless essential to point out

that human beings are confronted with a number of questions, problems, and perspectives that are inherently linked to the boundaries within which the human race exists. These boundaries and the cognitive and other restrictions they imply relate to and must be specified for each of the different levels on which we exist: the indeterminate quantum world, the physiology of our body in general and especially the neurochemistry of our brain, the social and cultural environment in which we live, to name just a few. Some of the questions that are of the utmost importance for humanity—questions concerning guidelines for our behavior, questions concerning the validity and scope of our knowledge—relate to several, if not all, of those levels. They cannot and should not be answered by experts qua experts in a specific domain. These questions concern the grand scheme of the world; these questions concern how we fit into the big picture, not just on one single level but on all levels simultaneously.

To the extent that these are real questions, they deserve real, if perhaps necessarily incomplete, answers. Not just any answer will do. Answering these questions is not just a matter of individual conviction, as we are sometimes led to believe in the name of a naively understood “plurality,” “democracy,” or “freedom.” Even when we accept that everybody is “entitled”—but by whom?—to his or her own personal beliefs and answers to these questions, that does not imply that all those answers are equally valid, not even if it were possible to prove that we cannot, in principle, know exactly which answers are true and which false.

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A major purpose of this work is to investigate the grounds, if any, on which we can answer these fundamental questions, as well as the tools to do so. It turns out that such an investigation, in a reflexive movement in which the investigation turns to itself, answers the very questions it attempts to deal with: The grounds to answer the questions turn out to be the answer to the questions. Evolution, specifically, is a ground as well as an objective for our actions. Everything we do, think, or feel is necessarily subjected to the general rules of evolution. At the same time, we determine, select, or even adapt specific evolutionary rules to what is happening on a larger scale. Whenever we get the impression that we are breaking the rules and that we are outsmarting nature, we are actually just changing

the rules of a game that has changing rules as its principle. Sometimes we win, sometimes we lose—and we do not decide on that. We can only play the evolutionary game and try to be creative at it: Evolution decides if we are or not.

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That grounds for answers turn out to be the answers themselves does not mean that the answers are just begging their own questions, at least not in a way that would trivialize the project of interdisciplinarity. One could think about it as dealing with problems raised by language, in language. Although this reflexive movement will certainly impose certain limits on the scope and possible results of such a project, it does not mean that it should be abandoned altogether. I will argue, as a matter of fact, that precisely the restrictions related to self-reference allow us to proceed with these investigations in the first place.

Not only might one think about using language to deal with problems raised by language as similar to the reflexive nature of this interdisciplinary project; I believe that this is exactly what the reflexivity is about: reflexivity of language.

Obviously, the reflexivity of our human language can hardly be considered as a ground for what is going on at the level of physics, chemistry, or biology. However, at those levels, too, we might discover a fundamental reflexivity, accounting for the reflexivity of our own language, which has evolved out of the preceding levels, out of the preceding languages of the world.

In my attempt to formulate a minimal ontology based on the reflexivity of the world, I never felt as if I were stripping reality from its flesh, laying bare a bony structure too meager to be of any cognitive significance whatsoever. Crossing the borders between disciplines and languages, I discovered an incredibly rich but also incredibly simple framework in which variation and differentiation are provided and accounted for by the intrinsic nature of the evolutionary concepts and processes that are maintained as building blocks of reality.

I believe that the strength of this work lies in the unyielding way in which it takes processes and concepts such as language, evolution, and performance beyond the scope of humanity, beyond culture, even beyond biology, chemistry, and physics. It takes them to the

world in all its aspects—as far as we can take them before being confronted with the unavoidable and intrinsic limits of our human perspective.

## THE REFLEXIVITY OF LANGUAGES

Reflexivity is essential to what we can do within the boundaries of our language. Not only do we refer to and reflect on other people's words when we use language, but we also reflect on our own words. This book was not written in a straight line leading from the first word on the first page to the last word on the last page. It was, rather, layered, as one would layer paints. Unavoidably it interferes with itself.

This text is not as much a review of existing research as it is the account of what Paul Klee calls "a journey into the land of better knowledge." It has been, and still is, a reflexive journey full of unexpected panoramic views, déjà-vu experiences, dead ends, circular movements. There is interference with other minds, with words spoken by other people, with images, odors, and sounds. The interference patterns caused by those encounters are recorded; the specifics, however, are often forgotten.

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A fragment of a text by Paul Klee and a reproduction of one of his paintings illustrate strikingly how reflexivity operates as chaotic iteration. They do so as well on the level of each of them taken separately, on the level of their mutual interaction and interference, as on the level of how they were brought together.

Klee himself has published only a minor part of his work. After his death, Klee's wife handed over most of Klee's intellectual estate to Jürgen Spiller, at that time still an art history student. In 1956, Spiller published *Das Bildnerische Denken*, a collection of previously unpublished texts. While Spiller certainly reproduced all of them, he inserted paragraphs and drawings from other periods of Klee's work and teaching, going as far as adding some of his own drawings and interpretations without explicitly identifying them as such to his readers.<sup>1</sup> Although subsequent editions have been annotated to some extent, this somewhat unorthodox approach quite obviously jeopard-



dizes the usefulness of Spiller's edition as a source for scholarly work. However, during my research at the Paul Klee Stiftung in Bern, Switzerland, it became clear to me that Spiller had done exactly what I believe that Klee himself would have appreciated most. Spiller had interacted with Klee's world and reported on that encounter. True, Klee's work deserves to be made available in its original form, but the only way to do so would be the publication of a facsimile edition of the three thousand or so pages with notes, sketches, and so forth. The manuscripts are so rich in their visual organization—layout, calligraphy, the use of color, etc.—that any alternative would be even more “untrue”, and definitely less interesting, than Spiller's. The key here, I think, is that the nature of the specific questions Klee tries to answer invites such an interaction. Even stronger: Such an interaction is the only appropriate, authentic response to those questions.

Notes in Paul Klee's own copy of his *Schöpferische Konfession* indicate that he used this text (which he started to write in 1918 and first published in 1920 in *Tribune der Kunst und Zeit*) in his teaching at the Bauhaus. Of the five sections of the text, which in total is not longer than about four pages, I have translated the second, which describes—or, rather, undertakes—“a journey into the land of better knowledge.” The text as it appears in Spiller's edition is an exact reprint from the original publication, although Spiller included two of Klee's paintings from that period to illustrate the essence of the text. Although strong connections can be found between the text and the paintings, the choice has been Spiller's and not Klee's. However, Spiller's choice is far from arbitrary. In the catalogue at the Paul Klee Stiftung in Bern, I have looked at reproductions of almost every single painting made by Klee in the period relevant to this text (1918–20). Klee meticulously kept records of his work, so the extent of his oeuvre is well defined, and Spiller's choice can be described as more than adequate. I include *Landschaft mit dem Galgen*, which relates to the section of the text translated here. (See figure 1.)

Let us, by drawing a topographical map, make a small journey into the land of better knowledge. Beyond the still point, the first active movement takes place (line). After a while we rest, take a breath (interrupted line or, when we stop more than once, an articulated line). We look back to see how far we have come (opposite movement). We mentally dwell upon the way to that place and again to that place, which is now different

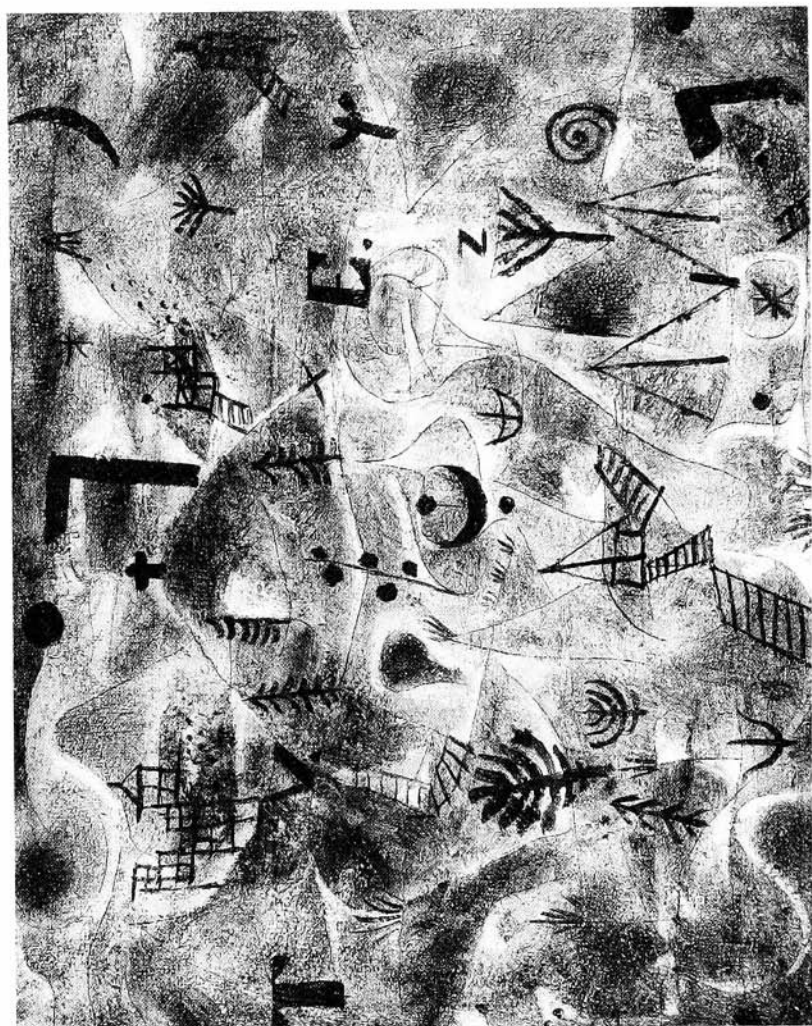


FIGURE 1.  
*Landschaft mit dem Galgen*, Paul Klee. 1919/1115. Oil on cardboard. Private collection, New York.

(a bundle of lines). A river will hinder, we take a boat (wavelike movement). Farther up there would have been a bridge (a series of arcs). On the other side we meet a kindred soul, also trying to get to the place where more knowledge is to be found. At first united in joy (convergence), we find ourselves more and more diverging (two lines following their own course). On both sides, a certain emotionality (expression, dynamic, and soul of the line).

We cross a ploughed field (a surface crossed with lines), then a dense wood. The other gets lost, hunts for the way, making the classic movement of a hound looking for a trace. But I am also losing my self-confidence; mist is hanging over another area, crossed by rivers (spatial element). Yet it will be soon clearing up again. The basket weavers are on their way home with their cart (the wheel). Traveling with them is a child with curly hair (spiral movement). Later the air gets sultry and nocturnal (spatial element). Lightning on the horizon (zigzag line). Above us still, some stars remain visible (a seed-bed). We soon reach our first quarters. Before we fall asleep, memories will cross our mind, as even such a small journey leaves us full of impressions.

A diversity of lines. Spots. Dots. Smooth surfaces. Rough-hewed, striped surfaces. Wavelike motion. Hampered, articulated movement. Opposite movement. Weaving, fabric. Brickwork, scales. Unison. Many voiced. Fading, thickening line (dynamism).

After the serene regularity of the first part: restraints, nerves! Restrained tremors, caresses of the soft wind. Insects get nervous before the thunderstorm. Anger, murder. The good cause as a guide-line, even in thicket and twilight. Lightning recalled that fever graph. Of a sick child . . . then.<sup>2</sup>

In this text, Klee takes us on a journey that, when read from the first sentence toward the last, is not linear in nature. The normal direction of causation has come apart. The first sentence and the last happen simultaneously, but also they do not: We cannot simply read the text twice as if we had not made the journey before. Neither can your eyes move over the canvas and reach the same spot twice without triggering some sort of remembrance. The text is not a translation of the painting, nor is the painting an illustration of the text.

Nevertheless, they exist in a close relationship to each other, in a complex and figurative, nonlinear relation that reflects the complexity and the nature of the very world they refer to and reflect upon.

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For a long time, I implicitly assumed that most of the concepts that I was dealing with—entropy, chaos, order, evolution, and so forth—were essentially figurative, visual concepts that I used in my own paintings. I did not think of them as discursive verbal terms embedded in or constituting scientific theories. It is only later that I started to investigate the discursive verbal aspect of the concepts I had been using all along. Since those concepts also constitute the spine of this book, a figurative, visual perspective on reality is essential to the ideas developed in it.

However, figurative visual thinking cannot as such be present in this text, which is, rather, the record of the interference between a discursive verbal, a discursive visual, a figurative verbal, and a figurative visual thinking—similar in nature to Klee's verbal description of his both verbal and visual journey to the land of better knowledge.

To the extent that this text is verbal and discursive, I believe that some of the "leaps" in it cannot be resolved. They are, in fact, not really leaps. They are a pattern resulting from the interference of figurative simultaneity with the linearity of the argumentative structure of the text. Although it is something the reader should be aware of, I do not consider this to be a problem. On the contrary: I think this interference, while admittedly taking away from the discursiveness, allows me to talk about things that cannot be talked about in any other way.

Of course, the figurative aspects of my work should not be allowed to contradict a discursive understanding of the world. I will argue, as a matter of fact, that coherency is a fundamental ontological value. However, coherency does not and should not imply reduction: The coherency of figurative and discursive language does not imply that figurative language can be completely reduced to discursive language.

This work, then, rather than attempting to present a carefully balanced and systematic account of the relations and differences between verbal and nonverbal, and between discursive and figurative, language, uses those relations and differences to make a more gen-

eral onto-epistemic point about our language in relation to the other languages of the world. As such, this work is as much a philosophical investigation of language as it is an attempt to establish a language of philosophy. That reflexive movement is crucial, I believe, to any authentic use of language. Reflexivity is a condition for evolution and therefore a condition for existence. But not only is it a ground for evolution, it is also an intrinsic goal: Reflexivity is an emerging feature of the universe.

This approach to interdisciplinarity imposes certain fundamental restrictions on what I can hope to accomplish—not only within the limited scope of this work but also as an onto-epistemic system in general. But I will present these restrictions as essential to the possibility of saying something meaningful in the first place. If I could say just anything whatsoever, or if I were able only to say what is true, what would be the point in saying something in the first place? In the first case, my language would be completely arbitrary. In the second case, it would be totally useless and probably nothing more than the expression of the extreme boredom of being an omniscient creature.

## THE VIRTUES OF REALISM

In this work I argue that a fundamental realism is a necessary condition for the nontriviality of our thinking—a point I will take as far as a claim for mathematical realism. While such a realism, in general, imposes restrictions on our cognitive abilities and our freedom, I believe that such restrictions are what make understanding and freedom possible in the first place. Such realism—in the sense of reference to the world and as opposed to an endless loop of references among signs on the same level, as some contemporary philosophers would like us to believe—is the only thing that can make our constraints meaningful.

Realism, however, should not be confined to discursive verbal statements. One of the important steps toward interdisciplinarity implies precisely that we start taking both verbal and nonverbal figurative language seriously, that we start granting nonverbal and figurative language the same cognitive status as discursive verbal language.

Artists live in the world of reality, a reality in which they have to orient themselves. Art does not, therefore, free humanity from

reality, but rather is an important tool for comprehending reality. At the same time, however, art contributes to the world, to the development of our environment. The history of art, in Charles Biederman's terms, is a series of statements about reality. Progress in art can be accomplished by eliminating fantasy and replacing it with ever-greater correspondence to the actual world. This does not imply that an academic "realism" can or should be put forward as the final goal of art. "As with our comprehension of nature," Biederman defends his position, "art is a never ending process of new discoveries and new realization—a matter of development, growth—a natural growth."<sup>3</sup>

Not very often does one find such a strong and confident expression of not only the cognitive nature of visual language but also the evolutionary power of art. This is the evolutionary mentality that I hope will come across in this work: an approach that focuses on the crossroad between what is and what can be, an approach grounded in a fundamental history of previously fulfilled conditions that have led to the world as we know it and the new possibilities created thereby.

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As far as my own work is concerned, I can only hope that it meets some of the conditions for further evolution of our human understanding that were previously unfulfilled. I have attempted to indicate some elements that I find important—interdisciplinarity, an explicit integration of verbal and nonverbal, and discursive and figurative, language, and so on—based on an analysis of the most general ontic processes and concepts—evolution, paradox, chaos, probability, interference, and others. The terminology that I have used to build that universal, but minimal, framework relies on a metaphoric extension of a more discipline-specific terminology that, by necessity, has to reflect the basic ontic structure as well as the more level-specific aspects. Also, while this work explicitly deals with the ontic and the onto-epistemic structure of the world, the epistemic question itself—How can we know those structures?—is addressed only implicitly, namely, in the simultaneous and thus necessarily figurative look at a multitude of disciplines and in the attempt to discern the pattern that links them all together. In that sense, this work is irreducibly artistic, in that it could not have been written without

that attitude. That is the answer to the question I presented earlier: How can poetry or an abstract painting refer to the world? In its overall coherence, the world itself is artistic—a poem or an abstract painting bringing together the most diverse disciplines.

I recognize that this work inscribes itself in a growing intellectual and cultural tendency toward integration. It participates in the quest for unity in diversity and, as I will argue, diversity because of fundamental unity. Such a program, I believe, is more than just academic. It investigates on the grounds of the most essential conditions for our existence—as we can trace them throughout the history of evolution, not only of biological and cultural evolution, but of the evolution that started when time and space were first created—which options, if any, are open to us. Is that important? Should we even care? It is obvious that we can live our lives without even once bothering to ask, “Why?” I believe, however, that for the very first time we are in a position from which we can start to discern a possible answer or the conditions under which an answer to that troublesome question could be suggested, especially as we are finding out how to rephrase the question. That, ultimately, is what this work attempts to do: contribute to rephrasing the fundamental question that we cannot escape from—the question about ourselves.