Josef Šmajs

Evolutionary Ontology

Reclaiming the Value of Nature by Transforming Culture

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EVOLUTIONARY ONTOLOGY

Reclaiming the Value of Nature by Transforming Culture

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EDITORIAL FOREWORD

It has become the exception, rather than the rule, that philosophers take care of the fate of this world, notably of the planet Earth and its inhabitants. The majority of philosophers still see their mission in the analyses of highly abstract, purely theoretical and conceptual issues of thought and language, reasoning and argumentation, mind and consciousness, epistemology and methodology, history and interpretation of ideas, and the like. Another way of doing traditional philosophy has been to delve into the idiosyncratic issues of personal "micro-worlds" in the form of developing anthropological and psychological concepts. Needless to say, this still is a quite attractive philosophical area. But if we remind ourselves of the almost inherent skepticism residing within philosophical minds – even a kind of self-skepticism toward the possibilities of philosophy in influencing the world – there is no wonder that in our days we find philosophers mostly either chewing their cud in self-centered academic circles, or impotently lamenting at the periphery of the global course of events.

This is by no means the case of the philosophical work of the Czech philosopher Josef Šmajs. His main intention is substantial and twofold: 1) in the realm of philosophical thought – to provide the grounds for ecology by reconstructing ontology; and 2) in the realm of philosophical practice – to reclaim the value of nature by transforming culture.

Ontology was once declared *philosophiae prima*. More recently, it has been declared unnecessary and obsolete. But can we conceive of serious philosophy without ontology, even if an "implicit" one? Certainly not. If we take ontology as the most general and fundamental theory of reality, there is much-too-much to it, despite the evasive concept of "reality" itself. And although the idea of "evolutionary ontology" is neither new, nor original, the concept presented in this book by J. Šmajs has several merits and innovative aspects. The most important of these is his account of the "dialectics" between what he takes to be the two most general but radically different, even opposite, spheres of being – the two "ontic orders" of natural being and cultural being; or simply, the dialectics between nature and culture. This also is quite a well-worn topic, but the evolutionary approach adopted and developed by J. Šmajs brings us far beyond many traditional concepts. Even though the vocabulary in which he presents his understanding is to some extent complex, difficult, and a bit academic, readers who will take the effort to get through author's arguments and expositions, will be rewarded by his radically innovative insights. Šmajs's own overall efforts are aimed at showing how culture evolved out of nature and, moreover, how culture has become "anti-natural" in its orientation and operation. The idea of "anti-natural" culture is, no doubt, the most challenging one in the whole book.

The fundamental ontological understanding and criticism of culture, based on the understanding of "the place of culture in nature," is another important contribution of J. Šmajs in this book. There are countless cultural phenomena, which we humans should be ashamed of rather than proud of. The book provides an argument against the common understanding of culture as "the continuation of natural evolution by other means", that is the exclusively positive view of culture as cultivation. Rather, cultural evolution strikes against terrestrial nature, which brings us not only to the endangerment of nature by culture, but also *vice versa*, to the endangerment of culture by nature, since there are natural limits to which nature can absorb the anti-natural strikes of culture. Human culture involves negative, that is destructive or "de-cultivative" (even devastative) trends with its implications not only for nature but also for humans. The author sees the chances and hopes for resolution of this global conflict between nature and culture in the global transformation of culture towards one that embraces its nature-friendly and biophilous character, which is a sustainable human culture in the long run. In general, this should include the naturalization of culture in the broadest sense.

The value of the planet Earth not only for us humans, but also for other natural species and, possibly, also for the Earth as the "live planet" and the "subject" itself, which is capable of creative activity and evolution – such is the philosophical message, and a quite urgent one, of this book.

Emil Višňovský
Editor, Central-European Value Studies

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In addition to taking a degree in philosophy, I have also graduated from a technical university. The idea of evolutionary ontology, as an attempt at the most general concept of evolution, including all active being, has arisen as a side-effect of my struggle for a philosophical understanding of technology. The first impulses in this direction have come from Prigogine's studies of nonlinear thermodynamics. By the end of the 1980s, I had come to realize the following: the profound intrinsic relationship between the evolution of technology (culture) and the evolution of both abiotic and biotic nature; the ontic opposition between cultural and natural evolutions; the "crystallization" of the spontaneous ontic activity of the Big Bang within the structure of the Cosmos and of the biosphere of the Earth; and the ontic role of the intrinsic information (intellectual culture) in the open nonlinear system of culture. Writing on these issues further demanded studies in fields in which I have not taken a degree– such as biology, systems theory, information theory I have had a fortunate chance to collaborate for years with my younger colleague, Josef Krob, whose interests in cosmology and ontology have provided flourishing opportunities for discussions and even joint publications.

Another crucial fact that has contributed to the current state of evolutionary ontology has been my keen interest in global ecological problems. The relationship between evolutionary ontology and these problems has proved to be so close that I have decided to further develop its theoretical concept while working on the book *The Threatened Culture* (Czech editions published in 1994 and 1997, English in 1998, and Slovak in 2006). Over the past few years, ample suggestions for the development of the evolutionary ontology concept have arisen from discussions with my students at the university and my colleagues on different occasions. It has become evident to me that more and more philosophical issues, both traditional and innovative, could be approached within the evolutionary ontology framework; such as axiological, epistemological, and anthropological topics, problems of science and technology, education and public policy. The structure of the present book, whose first edition was published in Czech in 2003 (co-authored with J. Krob) is intended to show just the outlines of the evolutionary-ontological concept. It appears to me that it is the first concept integrating ontology and ecology into a single system, and including the subject of cultural being, rejected until now, in the subject-matter of ontology.

It is my great pleasure to acknowledge here my gratitude to all those who have been supporting me in my efforts to handle the complex topic of evolutionary ontology within a single book. My foremost indebtedness goes to Tomáš Vais for his hard work on the English version of the text and to Marek Timko for his assistance in proof-reading, selecting, and processing invaluable

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My word of gratitude can by no means evade my wife Božena Šmajsová-Buchtová, who has shown great patience and understanding for my writing, thereby relieving the enormous burden involved in it.

Josef Šmajs
Brno, Czech Republic, 18 December 2007

Introduction

FROM INTELLECTUAL CONSOLATION TO THE CONCEPT OF BIOPHILOUS CULTURE

The two-and-a-half thousand year long development of European ontology has recently been going through a crisis. Despite worries from the damage caused to the natural habitat by the irreversible processes of the global anti-natural culture, humankind has no credible philosophical theory of the world as a whole at their disposal. The processes whereby the economic, technological, and information pathways of local cultures interconnect, stimulated by the growth of fractional knowledge, will not themselves result in the growth of the planetary human wisdom. Schools, including universities, following short-sighted politics, shut themselves away from philosophy; and they are far from spreading the kind of widely incorporating scholarship that would confront the uncontrolled growth of a culture with long-range values and possibilities available to the Earth's host environment. Also, information spread by the mass media and selected for its attractiveness and so-called balanced view of the world, on the one hand, meets human curiosity while serving economic growth, consumption, entertainment and advertising, on the other. It encourages the human mind, emotions, and willpower neither to undertake intellectual activity, nor to respect wisdom, responsibility and morality. It appears that both origination and dissemination of a generally understandable theory of reality – a new planetary *ontological minimum* – must be initiated by philosophy itself.

There appears to be no guarantee that this historically unprecedented initiative, whose urgency follows from the requirement for human survival, is to be necessarily successful. Considering that the central "construological" principle of all evolution is the species-based selfishness (including the group and individual-based selfishness), each species, including our own, necessarily lacks a general picture of planetary life at its biological level. But the survival of the human species requires on the cultural level what we cannot find within the biosphere: not only the ability to provide a planetary ontological reflection of life, but also a purposeful attempt to exclude species, group, and individual-based selfishness.

Yet the skepticism of philosophy toward the possibility of creating a new scientifically-based ontology that would stand the criticism of both the humanitarian and the natural-scientific intellectual circles, has reached a point at which philosophers themselves consider it good manner to talk of nothing else but an anthropocentric existential or analytic ontology. Great authorities in current philosophy – probably due to the fact that their views cannot be easily verified by life itself – fail to agree upon an understanding of reality that

would give us hope that we will be capable of establishing a sustainable culture in the long run. This is apparently because neither culture nor ontic opposition between culture and nature have become the subject matter of the philosophical search for reality. This situation can be illustrated by the work edited by Loux (2001); none of the contributions is devoted to ontology of nature or ontology of culture. Also W. V. O. Quine (1969), the leading figure of analytic philosophy, dealt primarily with ontological relativity and relegated ontology itself into transcendental metaphysics.

Ancient Greek philosophy, as we all know, was predominantly based on ontology; it was primarily a cosmological speculation. It may have dealt with some other problems as well, but only in close connection to the primary ontological problem. Its primary human purpose was individual consolation. Just like a contemplative approach to the world, it encompassed both its meaning and goal within itself. Since it considered humans, including their minds, to be a part of the natural order, and since it did not see human culture as a special ontic form of being, its theoretical interpretation of the world resolved only a few human intellectual questions. This, in particular, applies to the Miletos School: Empedocles, Heraclitus, Pythagoras, Democritus, Epicurus, and the Stoics. The idea of the structural and functional unity of the world and humanity was later abandoned. Following Socrates' anthropological turn, the later, anthropocentrically focused philosophy mostly studied the differences between humanity and surrounding nature, which made humanity subsequently superior to nature.

The Greeks could not have yet known who we humans are, how we came into being, and in what sense our origination is significant for the Earth. Only more recently have we begun to realize that humans are not just contemplative observers of the surrounding world, but its conquerors. They are a highly active animal species who, as the only species to do so, have managed to ignite still another – no matter that both life-dependent and species selfish – type of ontic process within the biosphere – *the anti-natural cultural evolution*. We are discovering that cultural evolution has started not only a remarkable human epoch but also a critical period in the history of the Earth. The expansion of cultural forms of being results in the suppression and disappearance of natural forms of being and causes the critical stage of the mass extinction of species. On this question, scientists have already reached a tentative agreement:

> Perhaps the best single indicator of the Earth's health is the declining number of species with which we share the planet. The number of plant and animal species has gradually increased throughout most of the evolutionary history of life, giving us the extraordinarily rich diversity of life today. Unfortunately, we are now in the early stages of the greatest decimation of plant and animal life in 65 million years (Brown 1999, p. 13).

The design of a biological species that represents not only a precious evolutionary memory of our planet but also a proof of the power of life to save energy, that is to say to slow down the degradation of the solar energy captured by means of photosynthesis into useless waste-heat, corresponds to the level of development of the natural order of the Earth that led to their creation. Since they barely change during their existence, and because of the slow natural evolution of the biosphere, they also gradually grow morally old (like discontinued manufacture of cars and computers in the changing culture). The culturally provoked destruction of natural ecosystems that causes both local and global instability of the biosphere either directly destroys the biological species or speeds up their moral aging.

Even though this "allergic reaction" of the biotic system of our planet is caused by the activities of the human species, we can see a higher and abstract justice in the fact that even humans as a species are subordinated to the inexorable logic of preserving the stability and integrity of life. Thus, *humanity is becoming an endangered species*. For the first time throughout history, humans and their culture are being endangered by the maternal planet environment, which long ago nourished their emergence (see Šmajs 1998). The central motifs of philosophical thought, which were in Ancient times astonishment, in the Middle Ages humility, and in Modernity doubt, should slowly turn to a feeling of responsibility and guilt. Even politicians, who are mostly interested in power and maintaining economic growth, will soon be forced to make decisions under pressure from the endangered future: not to achieve the greatest good, "but only to avoid the greatest evil". We can agree with H. Jonas that, under such conditions, "…the prophecy of doom must be listened to more carefully than the prophecy of success" (Jonas 1984, pp. 70, 79).

The biophilous planetary culture that could not previously have been built directly due to our biological predisposition to an aggressive adaptive strategy must now be established on the basis of our negative experience with the anti-natural culture. We must build our efforts not only upon the new philosophical concept of being but also on the theoretically substantiated reconstruction of the spontaneously established culture of our times. The global character of this historically unprecedented task implies that its solution can be sought only with the help of an adequate ontological upgrade in the wisdom of philosophy proper; only with the support of a comprehensible philosophical reflection of the crisis by the broad public. A transparent view of terrestrial existence – the ontological and axiological minimum adjusted to the current world – is required because the environmental transformation of culture must proceed both from above and from below by means of a coordinated expert and civic efforts. This is probably one of the exceptional social situations requiring not only unity of scientific truth and public opinion but also practical competencies and a long-term structural compatibility of our cultural activities with nature.

The traditional philosophical ontology that originally examined *arché* and other general problems of being and that in Modernity (in relation to the critique of ontological dogmatism and naive naturalism), began discussing human existence, in particular, has failed to establish grounds for the inclusion of the global environmental problem. It can be recognized from orientation of analytic metaphysics to analysis of language and a myth of representation (see for instance Strawson, 1992). Charles Hartshorne, the proximate student and fellow of A. N. Whitehead, did not follow in developing the process ontology, which is based on science, but focused on theological aspects instead. Traditional naturalistic ontology could probably still consistently explain the new particular scientific theories but not the global conflict between the natural evolutionary creativity of nature and the opposing evolutionary creativity of culture. Also, the previously influential anthropological ontology, developing the intellectual heritage of M. Heidegger, is apparently barely able to present a general philosophical view of the world anymore.

Since it cannot or does not want to see the unprecedented destruction of the unique natural being, and since it insists on traditional questions, existential ontology dwells on speculations and is becoming isolated. For the environmentally-aware public, existential ontology has ceased to be interesting. The character of the global environmental problem requires that the emphasis be shifted from the abstract level at which existence is experienced, that is to say from the view of the world created for the satisfaction of a curious individual, to a more fundamental, and, apparently, a less noble level of reflection; to a terrestrial existence that – being destroyed by the human anti-natural culture – fails to be consistent with the existence of humans proper. Here we have to agree with O. A. Funda:

> This is the so called priestly service of philosophy when a philosopher representatively expresses for everyone else those things that many people experience, feel and think about in an imprecisely articulated and insufficiently conceptualized way – and maybe even those things people have not thought of yet at all (Funda 2000, p. 9).

We have learned from ethology that no perceptually-neuronal image of reality, no matter how well it suits the strict requirements of animal self-preservation activities, can be an isomorphic representation of reality. We cannot naturally consider our sociocultural conceptual interpretation, which is also built using the nervous systems inherited from our animal ancestors, to be such a representation either. All our conceptual interpretations are tainted with our interests, not only individual and group ones, as is generally understood, but also with the species-selfish, general human interests, that are not discussed. Hence, not even experience defined by ethnic languages can ever describe the

world in terms of its soft atomic and molecular architecture, of its fascinating evolutionary creativity and balance. The world for us has always been simply that which our conservative biological equipment has been able to mediate to us in a particular historical era and which we have been able to understand due to our ancestors, training and education. In his interpretation of quantum characteristics, R. Feynman (1967, p. 147) explains that the reason we are unable to predict something is not because of the lack of detailed information. When dealing with the passage of an electron through an aperture, he summed it up as follows: "Someone has said it this way – 'Nature herself does not even know which way the electron is going to go'".

The gradual fragmentation of philosophical questions (reminiscent of the distribution of work in natural sciences) is understandable, although just one of the possible reactions to the problems arising from the synthesis of partial knowledge. Also the current popularity of philosophical epistemology may indirectly support the idea that we do not need ontology. Yet, the opposite is true. By means of ontology we do not attempt to understand human thought processes, procedures, texts and the meanings of various authors but rather the natural ontic structures, processes and relationships that we are ourselves a part of and that we destroy through our cultural activities. We use ontology to understand culture, which we have created within the biosphere and which has started to threaten itself.

Particular scientific theories, especially as far as nature is concerned, may also describe being within the sense of philosophical ontology, yet due to their narrow specialization concerning some aspects of reality, they cannot appreciate the roots of the planetary conflict between culture and nature. Even detailed analyses of knowledge or the search for more universal interpretations of texts, as the activities performed by many philosophers today, will not result in the full understanding of the current environmental situation. The roots of the crisis are not based on the fact that the surrounding reality or philosophy texts are insufficiently or ambiguously understood. Putting it emphatically, the roots of nature' s threat to culture are determined by the relationships within the world itself, and they are independent of the question of whether we understand reality (or "the text of the world" or the text of another author) or not.

Nonetheless, the current crisis is related to human knowledge. How close this relationship is can only be stated here in part and as a generalization, since this is the focus of this whole work. Due to the fact that the crisis is connected with the expansion of the global anti-natural culture, it is also necessarily connected with the sense and role of the human neuronal knowledge that supports this expansion as a part of the intellectual culture. Humans as a species – in contrast to a narrow group of intellectuals and scientists – do not cognize primarily to enjoy the truth but to create culture to be used in taking possession of the world. Yet it is necessary to admit here that this important ontic role

of cognition is increasingly being covered up by the complicated institutional structure of culture, the less evident division of labor, and interpretations of the world from the top of the social pyramid by politicians and intellectual elites, especially after the historical separation of physical and intellectual labor. Without a sociocultural form of human neuronal knowledge, encoded by ethnic languages, there would have been no aggressive cultural adaptation; indeed, there would have been no environmental crisis. In the chapter on ontology as epistemology, we will show in detail that both living and cultural systems know about the external environment at several different levels of interpretation and reading.

The secret of the relationship between human knowledge and the global crisis is thus covert in the process whereby culture is established through human activity. To put it more systematically: human individuals, culture, and the biosphere are open, non-linear systems with internal constitutive information (memory). If culture, as an expanding artificial system is supposed to adapt to its external environment (natural host system), it must cognize it, change it, and exploit it. It must draw (naturally, through live people) information, material and energetic nutrition, from the environment. Hence, the internal constitutive information, encoded, accumulated, and utilized by the cultural system, consists of human conceptual knowledge, social-intellectual culture.

Each particular piece of knowledge of a live or cultural system (all information revealed within the environment) is not just information about external reality or just an attempt at a compacted reconstruction of its structure. *Knowledge is ontically creative;* it is generated in order that an ontically active system can use it for its survival, reproduction and evolution. Within live or cultural systems, the information acquired from the environment may not only be inscribed and compressed into internal memories; it may also be retrieved and embodied in ontic structures (in biotic or cultural structures). We can see that, considering the similar ontic function of knowledge (information, memory), both the live systems and culture grow analogously; elements of the external environment are incorporated into their systems. Their knowledge is materialized and their internal information is ontologized. We could even extend this analogy: natural biotic knowledge (genetic information) divides the terrestrial nature into animate and inanimate sections; it integrates the biosphere and provides its evolution. Sociocultural knowledge (conceptually encoded human information) in fact, though temporarily and without drawing attention to it, ontically divides the existence on the Earth into culture and nature. This knowledge integrates culture, and it is able to provide its reproduction and evolution within the whole era of human biological existence.

Yet, despite these similarities, the most important facts remain obscured. Knowledge of a particular system – as described above – is generated to allow the existence of such a system and its adaptation and evolution. Biotic

knowledge, neglected by traditional epistemology, is objective (due to its viable applications compatible with the environment) to such an extent that it is able to participate in the creation of the biosphere as the natural ontic layer of reality interconnected with the abiotic universe by means of substance, energy and information. Through the animation of inanimate terrestrial structures, the natural biotic and abiotic evolutions establish co-evolution that produce a live, ontic being in accord with the inanimate universe. Although sociocultural knowledge, whose objectivity and precision were pretended by the modern culture, has provided the origination of a new emerging ontic layer of terrestrial reality, so far, it has failed to include the abiotic cultural structures (for example the automated and microelectronic technologies) in the biosphere system (it only appears to have "animated" them). Even worse, so far it has not been able to channel them in the direction of life as a biotic process, but only against it.

Even though sociocultural knowledge is ontically as constitutive as biotic knowledge, without human participation it is unable to "connect" in a permanent and positive way the cultural structures to the residual activity of the Big Bang, to the natural material-energetic and information processes of nature. It is by no means an "altruistic" biophilous knowledge "read" by terrestrial life, but rather a human, purposeful, neuronal knowledge "read" by the anti-natural culture. It is the sociocultural knowledge that makes culture possible, whereas the biosphere is unable to take advantage of it in its objectified form. This knowledge is specifically dependent information whose episodic ontic role will end along with the demise of human as a species. Not only the specialized memory structures of culture (books, sheet music, floppy disks, and CDs of current computers and players) but also objectified, embedded, sociocultural knowledge will eventually be erased by the spontaneous, entropic processes of nature, because natural activities are unable to reproduce these artificial structures without human support.

This general reminder of the significance of the ontic role of knowledge as a grand philosophical problem that we will elaborate on below does not necessarily mean that we consider traditional epistemology to be unimportant. Epistemological and hermeneutical analyses are naturally irreplaceable even for evolutionary ontology.

Alas, no traditional epistemological analysis can describe the direct ontic influence of culture upon nature, namely the undesirable physical effects of the utilized form of sociocultural knowledge upon the live environmental system of the Earth. This problem, which is an ontological one due to its substance, is to be analyzed by evolutionary ontology.

Evolutionary ontology puts forward a thesis that the epistemological critique of knowledge and science that is traditionally limited to the field of adequacy and logical faultlessness of theoretic interpretation can never be sufficiently radical enough. The crucial problem is not so much the fact that

scientific knowledge interprets cultural and natural features in a partial and inadequate way, but that it blends them and fails to distinguish them ontically. Without their distinction, that is without understanding the constitutive role of information, we can explain neither the causes for the ontic opposition of culture to nature nor the dangerous decrease of forms of natural being compatible with human being. Hence, traditional ontology was unable to realize that human knowledge as a part of the constitutive cultural information ontically divides the world and structures it in a new way. Yet, the fact that all human knowledge is a potential constitutive element of the super-individual, non-biological system of culture may be discovered and explained by evolutionary ontology.

Throughout this book, we will develop and specify the idea that common human knowledge, starting from the level of the hunter-gatherer culture, that is to say from the worldview level of myth and magic, has been culturally constitutive, ontically creative. It has shaped what was historically the first "genome" of the cultural system, which gave rise to the hitherto uninterrupted evolution of culture. Thus, common knowledge together with scientific knowledge has participated in the formation of culture with its aggressive-adaptive strategy. Independent of the epistemological critique of science by philosophers, it has also been objectified in material culture, technology, and other structures of the cultural system. Thus, it also helps search, directly and by means of the sociocultural selection of its applications, for the "optimum" direction of the anti-natural cultural evolution.

A quite different, yet important, topic is to deal with the fact that the anti-natural focus of culture, which we have mostly inherited from our ancestors and which is probably based on the conservative human nature, cannot be dealt within a traditional philosophical approach, since such an approach is partly responsible for this focus. We witness a quite absurd situation: philosophy has radically criticized science and conceptual, object-oriented thinking for decades, yet it has hypocritically approved of the resulting cultural structure that dangerously consumes irrecoverable terrestrial structures and occupies space originally reserved for life. Philosophy, despite the serious environmental threat, is blind to its contribution to the threat.

We have already mentioned that ontology, by posing the traditional question of being in the context of global and existentially endangered culture, with the purpose of searching for the origins of the current crisis, will necessarily abandon not only the framework of anthropocentric ontology but also the original intellectual horizon of philosophy. Such an ontology will no longer provide a traditional "consolation from ontology". Even though the new ontology should also answer the traditional worldview questions, it cannot deal with the abstract subject/subject and subject/object issues.

The latest natural-science theories provide philosophy with the opportunity to discuss being as a process; as a real Heraclitian creative process. Ontology

can, thus, restore the "world-in-itself", the "common", subject-independent material reality (that is the matter-energy), which as an indestructible activity spontaneously creating complicated structures, systems, and shapes (including rules for their creation and reproduction) long before human existence. It is finally possible to show, from the viewpoint of evolutionary ontology, that the often questioned objective reality, or quite natural evolution, is ontically creative, divine, and sacred. Even though it is unable to create matter or energy that is ruled by physical laws of preservation, it is capable to create live systems and natural information that are not subject to these laws of preservation. This objective evolution gave rise to what we call the natural order (orderliness, memory) and what finally brought the blind spontaneous creativity of the universe all the way to us, the species of Homo sapiens. The evolutionary-ontological reflection of human beings does not just emphasize their intellectual superiority to nature. Quite the contrary, it emphasizes both their symbiosis with the biosphere and their power to initiate and develop the competitive cultural evolution. It provides an analysis of the previously undiscussed ontic role of sociocultural information; it looks for the roots and means of the solution to the ontic conflict between the natural and cultural evolution.

Considering the wasted opportunities of traditional ontology, we suppose that it is currently being tested not only by the development of theoretical components of the intellectual culture. Indirectly it is being tested by reality itself – by the conflict between the two opposing systems of terrestrial existence. In other words, the evolutionary destiny of culture, whose intellectual component is partially shaped by philosophical ontology, will finally be decided by the extent to which the planet Earth is habitable. The structure, adaptive strategy, and compatibility of culture and nature are being tested by a system, which is oppressed and devastated by culture. Culture, including philosophy, is, thus, tested by an environmental situation despite the fact that traditional ontology has neither considered it an ontological problem nor a falsification of its abstract concept of being. Hence, even a critical, ontological reflection of a crisis should not be the goal of theoretical analysis. Namely, evolutionary ontology is able to offer a concept of the world providing not only a diagnosis of the crisis but also a contribution to the value-based assessment and justification of decisive cultural changes and human activities that will have to be theoretically prepared to preserve the habitability of the Earth for as long as possible.

These represent the main grounds for our view that the period of traditional ontology's dominance is over. Modern ontological concepts (such as those of Hegel, Husserl and Heidegger) are certainly highly sophisticated and still attractive to humanitarian-oriented philosophers and intellectuals. Their means of abstraction, speculative terminology and excessive emphasis on humans and their existential experience are unable to take into account the central ontological problem of our times presented above. Anthropocentrically

oriented ontology, as illustrated by the still influential existential ontology, subordinates ontology to anthropology, that is to say to the illusion of the privileged position of humans on the Earth with its decisive though unfortunate idea that human and culture are superior to nature.

Ontology, which shall unnecessarily overestimate its abilities, exclusiveness, and tradition while representing the highest level of philosophical abstraction, and, thus, shall withdraw too far from the corrective incentives of life and natural sciences, will necessarily betray the role it might play within the system of culture. If it fails to recognize that the rape of the Earth by the global culture should become its current central subject-matter, it cannot see and discuss the implications of this historically unprecedented situation – of the fact that the spontaneous expansion of culture, which is rapid and efficient via its building upon particular, production-oriented science and environmentally unfriendly ethics and politics, shall need a planet-wide evaluation and correction quite soon.

It will be shown in what follows that local cultures, while also being foreign structures to the biosphere, were able to grow and prosper, since their development was sufficiently slow and could be corrected by the negative feedback provided by the surrounding environment. Yet the *global culture* as a strong economically integrated system of differently developed local cultures – a system that managed to limit the beneficial correction by nature through mutually advantageous cooperation between its individual parts – *cannot exist in such a way on a long-term basis*. This global system, for example, will not be able to grow extensively, but, like the biosphere, it will be forced to develop through organizational changes without any growth and to remain in a state approaching maturity or the climax. It can exist long enough only by making it possible for its host system – the current Quaternary biosphere – to reproduce and evolve again in a non-reduced way.

By stressing the philosophically overlooked problems of evolution, order, orderliness, and information (memory), evolutionary ontology attempts to rehabilitate terrestrial nature, devalued by the Modern subject/object thinking to a mere objective reality: to mass and extension. Taking into account the same approach that grants nature some features of subjectivity, it constitutes a status of the second-order ontically significant, planetary system – the human anti-natural culture. The attempt to understand the Earth in its dramatic encounter with human culture is based not only upon philosophical ontological tradition but also upon the analysis of the particular results of natural and social sciences. On the one hand, evolutionary ontology criticizes science for its perfunctory ontological views, yet, on the other hand, it listens carefully to contemporary science. Above all, it does not cast doubt on the neglected ontic effect of science on the constitutive information embedded in culture and provides an ontological assessment of it in an appropriate way. We appreciate that it is only by virtue of science that we have got knowledge of the being and functions of the protective

ozone layer of the Earth. Further, only on the basis of open, non-linear system theories have we acquired arguments for the philosophical explanation of the spontaneous growth in the natural orderliness of live systems and culture. Only due to science do we know about the dangerous warming of the Earth's surface, about the frightening speed at which the irreplaceable, biological diversity of life on the Earth is vanishing.

This is another reason why evolutionary ontology abandons the concepts that have been characteristic of the philosophical way of thinking for almost two millennia, namely the interpretation of the world from the viewpoint of philosophy as the queen of sciences. With reference to Descartes' viewpoint, this position was characterized by E. Husserl (1991, p. 44).

Philosophy is just one of the many forms of human rationality and by assuming a superior position it has pointlessly distanced itself from science and ordinary human life. Nevertheless, it has been building its independent tradition, whose careful studying and knowledge have been considered to be a part of philosophers' professional training and frequently also the discussion bases for considering theoretical problems. This strange separation of philosophy from life and an orientation upon itself may cultivate a style of thinking and bring about its solemnity, an attractive vagueness, doubt, and a special aesthetic dimension. It may even attract young people to philosophy. Yet, on the other hand, it makes its way for empty speculation, covertly misleading arguments, and the strange know-it-all behavior of rebelling individuals. Yet what is important is this: the *vagueness of philosophical formulations makes any external control of philosophy* impossible and prevents the changing and forging of important philosophical ideas. Extensively withdrawn philosophy becomes incomprehensible to the public and dubious to the other components of the intellectual culture, or it turns into a self-centered intellectual game.

There is still another ontologically significant aspect. It is hard to deny that there is an increasing number of natural sciences that try to interpret complex natural and cultural structures by searching for a deeper understanding and explanation of partial phenomena of reality rather than for mere immediate pragmatic applications. These sciences seem to correct the old mistakes of mechanistic natural science; they leave behind the Newtonian-Galilean paradigm and arrive at conclusions closer to contemporary philosophy. If we manage to understand their results in their totality, we may see not only a puzzling mass of isolated statements, but also a valuable source of information for philosophy, which, in the contemporary era of global culture, has no other source of reliable theoretical knowledge.

Nevertheless, the European intellectual tradition is markedly anthropomorphous and sociocultural in a purposefully selfish way, and, thus, the acceptance of evolutionary ontology's "objective concept" may be hindered also by the fear of a possible underestimation of the human individual's

uniqueness. In human-centered philosophy, in which humans have always represented the highest value, it is quite unusual to reflect on a wider framework of natural conditions that provide the life and culture. For some philosophers of an anthropological orientation, it is simply unacceptable to talk of matters in an objective-systematic way without formal courtesy to, and admiration for, human subjectivity.

Probably due to their negative experiences with fascism, the current religious fundamentalism and so-called real socialism, the current humanitarian-oriented public is quite over-sensitive or "allergic" to general theories. The result is an uncritical overestimation of discourse, narration, and philosophical pluralism, which brings a requirement for maximum specificity and subtlety of partial philosophical analyses. This, on the other hand, distorts the core and role of philosophy, which, in contrast to science, must strive to know and understand the whole, which is the phenomenon that science purposefully does not examine. This missing general concept of being or existence, the low level of ontological philosophical thinking adequate to the current state of the world, may evoke the sociocultural paradox mentioned above. Concerning humanity and society, the advocates and supporters of post-modern philosophy welcome the soft and tolerant theories; yet when it comes to nature, they do not prevent the development and employment of dogmatic and hard-line theories supporting economic growth and senseless consumption, which completely ignore the relationship between human and live systems.

Evolutionary ontology, on the other hand, via its criticism of the anti-natural culture, may challenge both philosophy and politics to check the spontaneous power of globally mobile capital, abiotic technologies, and science, and to assure a more careful incorporation of culture into the complex of biotic association. In terms of its social character, it is tolerant, humanistic and pluralistic as well. It favors nature and the natural; it worries about the more distant future and views globalization more strictly; it defends the right of live systems to survive and promotes the conditions required for the Earth to remain a sustainable habitat. It highly praises the plurality of cultures and liberal approaches in opinions and politics; it rejects the arrogant and life indifferent anthropocentrism, especially that which is applied and covert and that has been implemented in the material culture (for example in the structure of the consumer technologies and large cities), which philosophy has never sufficiently discussed. Taking into account this very fact, we defend the view that technologies and material culture (for instance the structure of large cities) characterize a particular society in a much better way than its ideological self-presentation.

This outline of evolutionary ontology is a challenge to our professional colleagues to start a discussion on the most suitable current ontological concept of being. We suggest that it is necessary to provide such testable concepts to overcome the global crisis.

Without any relevant philosophical concept of being and just declaring – as it is often done today – that the world is "complicated", "diversified" and "non-transparent"; that even the ontological form of its reflection cannot be authoritative because everything is different from that which it appears to be, we would have never dared to resist our biological fate. We would have not been able to approach the knowledge of what the real state of affairs is. In spite of the different interpretations of reality, we humans, together with other live systems, ontically live within this reality. We are born and die in this reality and this reality is the place where the ontical conflict between the natural and cultural structures takes place.

The fateful inevitability of the demise of civilization is clearly defined, especially by the biologists: "This is not about forecasting the future, just about expressing the opinion that our civilization will inevitably encounter its genocide, if the current development continues" (Wuketits 2001, p. 248). The same author writes: "Even if this is not true, it is high time to acknowledge that one day there may occur (and it will) the end of humanity without any new beginning and that human himself will be the cause of this end" (ibid., p. 253).

Evolutionary ontology tries to alleviate the current loss of communication between philosophy and politics that unnecessarily deepens the crisis. People and their political representations need to study and educate themselves with the aim of being capable to intervene in reality itself in an adequate way. As long as we do not know what reality is like, the number of interpretations may grow, but the culture continues to spontaneously structure and globalize itself and irreversibly destroy the system it depends on. Political representations simulate the control of culture, but, in fact, they spend their time in power struggles and follow the "carriage" of its spontaneous movement. If there is no ontological level of our knowledge, neither people nor institutions can find intellectual support in any relatively true concept of reality. Hence, politics, law and ethics cannot protect the endangered culture; they must rely on tradition, wisdom, destiny, supernatural forces, or the invisible and blind market forces. In such a situation, the symptoms of crisis may still worsen and the destruction may go beyond the imaginary limit of reversibility.

Evolutionary ontology is radical and provocative only from an environmental viewpoint: *it offers the controversial idea of two opposing ontic orders* of terrestrial existence, namely the concept of an environmentally endangered culture and its objectively necessary reconstruction according to biotic principles. It wants to remind the public with its faint grasp of biology that, in natural evolution, organisms optimize themselves in slow and long interaction with the environment and that this general construologic principle – *the principle of coevolution* – must also be taken into account by a *sustainable culture*. Human knowledge, including philosophical thought, may still bring good to humans and to the Earth; even though it separated once singular

terrestrial nature into two great opposing ontic systems – nature and culture – it now has a historical opportunity to alleviate and resolve this opposition.

Human theoretical knowledge and thought have achieved such relative autonomy and such a level of the representation of reality within the current anti-natural culture that it may aspire to become the primary agent of a *nature-friendly, biophilous* culture. The initiative of evolutionary ontology within the process of this objectively necessary transformation anticipates the role of philosophy within a system of sustainable culture.

PART I

TRADITIONAL AND EVOLUTIONARY ONTOLOGY

One

PROBLEMS OF TRADITIONAL ONTOLOGY

1. Ontology as a Theory of Being

The term "being", first used by Parmenides and subsequently adopted in the history of European ontology, was presumably established to emphasize the grandeur of philosophical interest in universal problems and to denominate the subject matter of philosophy as superior to all other knowledge. The term itself, as "the most universal and the emptiest of concepts" (Heidegger 1962, p. 21), which has never been easy to define, was supposed to elevate the philosophical way of thinking about pure being high above all empirical knowledge and practical human activities. When it is said "that ´Being´ is the most universal concept, this cannot mean that it is the one which is clearest or that it needs no further discussion. It is, rather, the darkest of all" (ibid., p. 23).

Since the term "being" encompassed a whole range of differentiated entities, it could not have any correlation in human sensory experience and, as early as in the Ancient World it represented a covert unity of the world instead of its visible exterior. As to its meaning and scope, it was approximately identical to our current term "reality".

In Antiquity and Medieval times, that is in the period preceding the Modern philosophical emphasis on humanity, "philosophy" was primarily ontology; it was a discipline about *being qua being*. The problem of being was simplified as early as in the Ancient philosophy by understanding this term to refer only to the empirically undifferentiated natural being, which sometimes quite awkwardly included also the human being as its part (mostly moral and political activities).

The Presocratic philosophers posed almost the very same question about the *arche*, or the primordial matter. It was Parmenides who criticized the term arche as excessively connected to change and perceptual experience; he emphasized that being as a principle of the world, as the most proper subject of philosophy, must be single, permanent, and stationary. This question about *arche*, which was later so abhorred by Aristotle, who only related the material principle (*hyle*) and not the forming principle (*morfe*) to it, was consequently the question asking about what it was the world came into existence from and to what it would return after its demise. Even though we know that the term "arche" could not yet have been the full-fledged abstract philosophical term, the anthropomorphous thought of the Presocratics had correctly understood the deeper ontic basis of this problem; that is the fact that the real world must be constructed out of something that has the concurrent character of a

"baker and his dough" – something constituting an integrating principle and a natural material-energetic basis of both the animate and inanimate worlds. The essential correctness of this intuition is also indirectly confirmed by the very contemporary argument of the physicist R. Feynman: "The same kinds of atoms appear to be in live creatures as in non-live creatures; frogs are made of the same "dough" as rocks, only in different arrangements" (Feynman 1967, pp. 149-150).

A. Aristotle's Influence

Due to Aristotle, this ontological question was later specified in a slightly nobler way: what is being qua being? Yet this statement not only specified the ontological problem but also made it much more complicated. Aristotle holds Parmenides' (and partly also Plato's) viewpoint of identity between thinking and being but he overlaps the term "being" with the term "existence". It has therefore never been evident whether Aristotle's statement sufficiently differentiates between being and existence. M. Heidegger, for example, thinks that it does not, and he established the well-known term "ontological difference" for this distinction. N. Hartmann, on the other hand, believes that Aristotle's statement provides such a distinction and that the problem of a precise difference between being and existence is, to some extent, a false one.

Concerning the above-mentioned difference between being and existence as understood by Aristotle and later authors, we should simply declare that it is of importance, especially for a true reconstruction of traditional ontology. For our purposes it is sufficient to claim, in accord with Aristotle, that existence is that which has being (that is the unity of substance and existence), and being is that which encompasses the unity of all differentiated beings and whose meaning comes closer to such related terms as reality and order.

Ontology, as the original philosophical theory studying being, was also an explicit formulation of the ideas held then on the whole of reality, the being and principle of the world. In Greek philosophy and also later, during the period of undeveloped natural sciences, philosophical ontology was barely adequate to the ontic structure of the world. Even though it was a rigorous intellectual performance of a large group of philosophers who based their thinking not only on ontological tradition but also on the knowledge of their times, it was still quite speculative and consolatory. Its terminology consisted of modified intuitive terms of ordinary ethnic language of the Greeks. As a relatively undeveloped theory, it lacked a sufficiently structured conceptual system and a sufficiently unfolded capability to distinguish between ontic layers and structures of reality. A striving for a philosophically direct understanding of the world in its totality, not mediated by other forms of knowledge, made it

the paramount wisdom on the one hand, yet on the other, it had degraded it to a fairly useless product of the metaphysical abilities and personal fondness of philosophers for abstract theoretical problems. With regard to the level of natural science development, in ontological thinking, not only was the effort to objective description of reality dominant but also something that had been well-demonstrated in the work of Plato and that philosophy has never jettisoned since – the speculative aestheticizing motives of philosophical discourse that emphasize the originality, literary skills, and ingenuity of the author instead of the structure of an external reality.

As is widely known, Aristotle believed that philosophy starts with wonder. Yet, this wonder does not mean that the resource of philosophizing in Antiquity was the self-confident human subject. Philosophical thought during Antiquity (and also partly in the Middle Ages) was certainly strongly anthropomorphous and unsystematic, yet its ambitions appeared modest and humble; it conformed to its subject, identified with it, and dissolved itself in being

In Aristotle' s original concept of ontology as the examination of being due to our reference to it, it was a science about the being of existence; it was the study of both the forms in which we think of being (that is the analysis of philosophical categories) and metaphysics, namely the search for what is beyond appearances, beyond the sensory perceptible forms of physical reality. The theoretical concept of being was understood unanimously neither in Antiquity nor in Medieval Times.

The ontic weakness and temporality of a human individual, repeatedly confirmed by real-life experience, brought Ancient philosophy to the idea that even the special human being must belong to a cosmic order of being, which is more powerful than the powers and will of humans, and which is transpersonal and objective. Until the end of Medieval Times, humans had never intellectually resisted the transpersonal order of being; they did not consider themselves the masters of being; they did not feel a species-superiority over nature.

Both the Ancient and Medieval philosophies did not discuss the problem of the subject especially for two reasons: First, under the influence of Parmenides, philosophy was permeated with the attempt to describe just some type of universality – today we would talk of permanence, constants, and invariants – that continue in the middle of changes. Second, humans still did not have the courage to declare themselves to be the center and the purpose of both natural and sociocultural activities. Human activity was weak and indistinct in comparison with the powers of nature. The opposition between culture and nature was of the same state. Culture was a subject matter of ethics and politics but by no means a subject matter of ontology. Remember that during Antiquity, as noted by M. Heidegger, philosophers were unfamiliar even with the term "image" of the world that necessarily involves a conscious, constitutive subjectivity.

The Ancient orientation toward the necessary and invariable, undoubtedly influenced by the popularity and authority of geometry and mathematics, certainly also had some evolutionary and anthropological (psychological) reasons, but it was mainly controlled by the sociocultural illusion of the period: the generally accepted notion that the world was of an invariable principle and that time flowed in a circle. Ancient humans certainly lived alongside the rhythms and changes of nature, which appeared to return to its initial point every day and every year. The philosophical concept of a linear time flow, without which it is impossible to define evolution, was philosophically defended by Augustine in the 5th century A.D. (Augustine 2002, Book Eleven, pp. 214-239). Hence, neither the evolution of nature nor the evolution of culture (society) could have been studied in Antiquity. Nor could the ontological problem of the creation of human and world by God, so typical for Medieval philosophy (for example for Aquinas) was clearly delineated in Antiquity (for example by Aristotle), have been studied.

For Ancient philosophers, who naturally overestimated the role of human reason and who believed in its accord with the world order, the idea that the human being might cognize inadequately through his reason, was apparently unacceptable. They believed that as far as the character of things is concerned, human beings could be betrayed just by their senses, since different illusions and demonstrations of the senses that could testify only to the variable surfaces of things were already known at the time. On the other hand, reason was able to understand, correctly, the invariable character of things (according to Aristotle, the form contained in the matter; the idea, substance and order). Since reason was the attribute of the human being as a rational social animal – namely, reason differentiated humans from all other live beings and approximated them to gods – this must have been identical to or harmonious with the natural cosmic order; order as a concept expressing the unity of the world in its diversity; order as an all-permeating logos, to which it was impossible not to assign the stable and irrevocable cycle of nature as well, appeared to be invariable, in accord with reason and thus also understandable by reason.

Neither Ancient nor Medieval philosophy simply claimed that the principles of being were identical to the principles of thinking. As an exception may be listed for instance Gorgias. Nor did they emphasize and discuss the difference between reality and its human reflection; but they did discuss quite different linguistic oppositions, such as essence/appearance, possibility/actuality, matter/form, substance/attribute In comparison, the Modern ontological dualism between being and existence has not been so auspicious, in our view, either. This opposition indirectly implied, setting aside the meaning of the insufficiently apparent ontological difference, the troubled viewpoint of philosophy' s theoretical superiority (just like that of metaphysics) to science. This was the very viewpoint from which philosophy later refused to take into account the development of knowledge in the particular natural sciences.

For almost two and a half thousand years, setting aside the different forms of Medieval ontological argumentation, the philosophical ontology that had previously substantialized the universal has been searching for real being beyond existence. This ontology only unwillingly admits it has failed theoretically, and we will need not only different conceptual means and a different level of philosophical abstraction for an adequate ontological understanding of being but also a different concept of reality, a different ontology. The current sciences, which managed to "descend" into the micro-world, and "ascend" into the mega-world, do not give philosophy any right to propose any kind of invariable metaphysical principle of reality. On the other hand, it appears that what traditional ontology has searched for beyond existence as its real being could only have been its hidden, natural implicate order; we are still unable to correctly translate into our conceptual language (into the sociocultural implicate order).

After the rise of fundamental ontology, which is concerned with true human existence, even this attempt does not seem to have brought about philosophical advance. By contrast, the self-centered philosophizing invites doubts whether such a philosophy is theoretically competent in the current globalized culture, whose sweep reaches the very borders of the planet Earth. This leads to the question of whether it makes any sense to study, following Aristotle's example, whether there is any deeper metaphysical principle beyond the variable physical surface of reality. In defense of Aristotle, it must be noted that he did not understand this principle simply as an invariable substrate but as an active principle shaping the relevant existence; namely its internal structure and design.

B. The Problem of Identity of Thinking and Being

A belief in the identity of thinking and being was so strong and tempting even following Kant's criticism of limits of human reason, that it was formidably brought to life by Hegel in Modernity. In its covert form, this idea can still be found especially amongst some logicians and mathematicians. Great Ancient and Medieval philosophers established a tradition in which universal problems were considered by means of special philosophical reasoning, which was quite particular about its independence from empirical and natural-scientific knowledge.

This special philosophical reasoning, which contemporary philosophy students learn about through studying the history of philosophy and reading classical philosophy texts, still holds, frequently in contrast to the current systemic theories whose abstraction is close to philosophy, that there are two levels of reality: *essences and appearances* or, in other words, *substances and accidents.* On the other hand, Modern philosophy quite correctly assumes, in line with Kant, that there is yet another, still better-stated binary opposition:

reality-in-itself and reality-for-us. We also acknowledge this anthropological opposition – in terms of the difference between ontic and ontological reality, that is theoretically interpreted; since it must be characteristic of all vertebrates having an "internal image" of the external world; yet we will not deal with its philosophical reflection here in any detail. It appears that this strict dualism is a historically conditioned, rationalistic construction. It is quite apparent before any philosophical analysis that reality as revealed by our senses and our reason, can be neither different than nor identical with the reality that we ontically reside in; namely with reality not mediated by our senses and reason. Mere breathing, the activity of the heart, the intake and digestion of food, sleep and every-day activities persuade us that we, as live beings, belong to a special world and that we closely and systematically cooperate with this world. Furthermore, an astronaut's view of the planet Earth from space has reliably confirmed the principal correctness of a part of the current knowledge about the world itself. A non-critical follower of Kant's heritage could still object that this knowledge has never transcended the images of human perceiving, namely the limits of the world of appearances.

Nevertheless, Kant's differentiation between the world-in-itself and the world-for-us did not solve the problem of the adequate delineation of the subject matter and form of Modern ontology. Quite the contrary, Kant turned the attention of philosophical theory (metaphysics) in a quite different direction: to the subject, the criticism of apriorism and of capabilities of human reason.

Humanity, as an animal species that is a part of terrestrial reality and that must continually know this reality to adapt to its changes, has no other option but to use their genetically reproduced, and thus *a priori*, set knowing structures – a biological, perceptual-neuronal system or central nervous system. It has already been proved that the internal image of the external world becomes a more complicated and more structured image in evolutionary superior organisms, and thus in a cultural being such as a human, it might achieve the form of a conceptual image of the world for us. Using biological terminology, we may also say that, while the genome directly places us in ontic reality somatically and physiologically, our sociocultural knowledge (including contemporary science and philosophy) indirectly places us in the same reality, in terms of the psyche by means of its neuronal image.

Setting aside the pseudo-real ontological problem of the relationship between being and existence, we can see that the evident and articulate distinction between the two above-mentioned forms of reality made it possible for Kant to part with the metaphysics, "…of the celebrated Wolff, the greatest of all dogmatic philosophers" (Kant 1855, p. XXXVIII). Kant, also in accord with Aristotle's idea that the existence of finite things cannot result from their essence, presents his amazing critique of the so-called proof of God's existence.

Though Kant's intellectual performance partly clarified the problem of reality, his message also complicated it in another way. The emphasis on complex, abstract analyses of human reason, which are supposed to prove that our *a priori* forms of knowledge excessively distort known reality even before the acquisition of any knowledge, continually discourages some philosophers from dealing with ontic structures – with the world-in-itself. This demanding conceptualization of reality-for-us, together with the anxious endeavor to separate it from reality-in-itself, has limited ontological thinking for a long time. The limitation of the validity of human knowledge to phenomena has opened the door to the *epistemologization of ontology,* that is to the development of subjectivism and narrow anthropological existentialism. Independently from both the different ontic order (different system unity) of natural and cultural being and the ontic opposition between culture and nature, phenomenologically oriented authors have agreed upon the fact that the unity of the world is determined by the subject. For instance, J. Patočka, the leading Czech phenomenologist of the 20th century, wrote that the, "... unity of the world is not the unity of the material comprising the world, but the unity of the mind creating and maintaining it" (Patočka 1992, p. 11).

Both of the above-mentioned linguistic oppositions – being and existence, reality-in-itself and reality-for-us – whose theoretical relationship, as far as we know, has never been satisfactorily explained, indirectly show the usefulness of philosophy's interest in its history and the legitimacy of its efforts to cope with its heritage. It is necessary to state that not only Plato's differentiation of the world into the world of forms and the world of things, but also Parmenides' identification of thought with being, were in part legitimate. The identity of thinking and being and the dualism of these complementary worlds (in Bohm's terminology the "implicate" and the "explicate" orders) implied not only the capability of human reason to arrive at an understanding of universal and invariable relationships within the predominantly variable reality but also its capability to describe and define the relationships and structures and make them the subject of theoretical argumentation, logical thought, and finally of technological implementation.

Aristotle's emphasis on the fact that the universal (principles, ideas, forms within the matter) is located within rather than without things, unlike what he was taught by his teacher Plato, has never been fully exploited. This notion is often unnecessarily devalued in the teachings of the history of philosophy, since it is simply memorized and understood only within the meaning of the prevalent didactical tradition, that is within the narrow framework of the timeless material-energy paradigm of physics. Should we maintain the principle of this courageous anti-Platonian idea, we have to approach it from the viewpoint of the system-information paradigm, which is evolutionary-ontological.

The evolutionary-ontological standpoint elaborated here and further below shows that even ordinary inanimate things may have their interiors,

if understood as an activity. What is invariable and universal in natural macroscopic structures, what is their essence (the invariable internal base, substance), does not have to be a real material or ideal core but it may be a constitutive set of rules indiscernible by human senses, created by evolution and maintained by construological principles, laws, inserted information, and memory. As will be shown below, natural evolution does not produce any matter or energy but only forms, orderliness, information and memory.

We can definitely see the contribution of philosophical thinking to the development of theoretical intellectual culture in Plato' s forms and Aristotle' s substances. Both Plato and Aristotle were probably the first to understand and designate the subject matter acknowledged nowadays, even though termed in different terminology due to the acceptance of the process paradigm of reality. Schematically speaking, their "being", "essences", "universal ideas" and "substances", despite having been understood slightly differently, are currently interpreted with reference to the physicist D. Bohm, as items of the implicate order of reality. By contrast, real things and processes registered by human senses are considered to be items of the explicate order (Bohm 1987, p. 13.). We will develop our understanding of the two orders (implicate and explicate) within nature and the two analogous orders within culture, in more detail below in Chapter Two: Ontic Orders.

C. Evolutionary-Ontological Approach

Yet human, stone, city, and computer are apparently differently ordered and independent ontic structures. How can we distinguish them correctly? Reality – and let us explicitly declare that some Ancient philosophers were most likely aware of this even before Plato and Aristotle – is active, ontically creative. Its spontaneous constitutive activity appears to continually crystallize in the macroscopic, sensory perceptible structures of animate and inanimate nature. Natural reality is not just a set of things distributed in space, as we might infer from common experience or from a non-critical understanding of high-school physics. Reality (being) is, rather, a set of ontically creative processes, systems, fields and states; it is an activity or an event that is controlled by some, relatively stable rules.

Rules (such as the four well-known physical interactions – strong, weak, electromagnetic and gravitational – including the binding information-biological principles) influence the behavior of galaxies, molecules, and atoms, the behavior and reproduction of live systems. Thus, internal constitutive principles (rules) help to form the ontic sensory perceptible structures, for example rocks, countryside, live organisms, and ecosystems. Structures and the rules of their creation are the products of the same activity and the same evolution; yet the rules and structures we find on the Earth today decisively

do not belong to the products of a single evolution. They owe their origination either to natural evolution or to cultural evolution: there is no third option.

The analysis of the constitutive principles and rules shows that they do not appear to be fixed in designated information structures (constructed and functioning as a specialized abiotic memory) at the level of the natural abiotic evolution, but they are directly present (built-in) in the physical, evolutionary created structures, that is in things and processes themselves. For an interesting analysis of this issue, see Stonier (1990). At the biotic and cultural levels, as will be described in greater detail below, the rules and principles (information accumulated through cognition of the system, memory) are contained (stored) in special information (memory) structures appropriated for such a purpose. For the sake of clarity, we would like to point out, without further argument, that humans, like all multicellular animals with central nervous systems, are the bearer of two completely different memory structures: the genome, which contains the phylogenetic experience (in the words of Kant, a priori forms of perception and understanding), and the neocortex, which contains the ontogenetic (*a posteriori*) experience).

We have already argued that most Ancient and Medieval philosophers (and some Modern philosophers, such as Ch. Wolff and G. W. F. Hegel) simplified the problem of an adequate ontological reflection of reality by subordinating reality (natural being) to concepts and formal rules of thinking; by identifying them with consciousness; and by assuming identity between thinking and being. We have only recently been able to form the arguments proving that the Ancient and Medieval belief in the identity of thinking and being was false. Contemporary anthropological studies show that human reason, linked to the evolutionary youngest part of the brain, the neocortex, is too late an evolutionary creation to be in such harmony with the surrounding nature, as for instance the much older motorics, emotionality, or the control of vegetative processes in the organism. The rational predispositions of humanity could only fully develop, select, and specialize in a culture in which reason became not only the tool of emotions and will, but also the main tool of the aggressive, adaptive strategy of culture.

Since we know that conceptual thinking came into existence only during cultural evolution, that is as an abstract correlate of human sociocultural activities, the assumption of its identity with being may have been factually incorrect (it mixed up the implicate order of culture with the implicate order of nature) but, to some extent, it reflected the universal relationship between the macroscopic structure of external reality and the internal structures of human neuronal knowledge.

A larger part of the problem has remained covert. The relationship between theory and reality has not been defined sufficiently radically. Proper philosophical understanding does not simply depend upon the fact that it is necessary to respect the difference (ontologically sometimes confusing) between reality-in-

itself and reality-for-us, and the difference (always confusing in the mechanical paradigm) between relatively *a priori* and relatively *a posteriori* knowledge. Clarifying the relationship between human knowledge and reality assumes such an explicit concept of being, which would neither exclude live systems – the biosphere or humans with their cognitive and practical (constitutive) activity – nor culture from its ontic structure. Yet even N. Hartmann's ontology, which was closest to evolutionary ontology, did not manage to include culture in its layered form. For Hartmann (1953), the problem of the internal organizational unity of the world is simply a matter of including the mind in the world, because, in his view, the mind has the same reality as the world.

The Earth, as an open system, which is functionally interconnected with the universe; as a great, planetary super-organism, which is more often referred to by Lovelock's term *Gaia* (Lovelock 1990), is the host environment not only for its biosphere but also for the relatively young and strange, ontically differently ordered culture. We know that the natural activity that spontaneously constituted the universe, Earth, life, and the biological ancestor of modern humans, necessarily produces two mutually complementary forms: structures of the explicate and implicate orders of nature.

The traditional philosophical concepts of essence and appearance, substance and attributes, and being and existence appeared at different times and under different conditions; and different theoretical senses of them cannot be mechanically compared. We can praise philosophy for the fact that these concepts are finally, with the cooperation of science, finding their approximate ontical correlates.

The explicate, temporarily existing structures, registered by our senses and partly understood by our reason, are not the complete natural reality; they are not identical with natural being; they only constitute its more easily discoverable part, its externally manifested materialization. The other side of natural reality – its atomic, molecular, cellular, and somatic activities, the great ontic game according to its evolutionary rules and even these rules themselves (the implicate order, information, memory) – seemed to be deliberately hidden from human sensory perception, and to some extent, also from human reason. Genetics, molecular biology, cytology, and other biological disciplines had so conclusively returned us to the order of live, terrestrial nature; and modern physics, non-linear thermodynamics, and cosmology have similarly returned us to the order of cosmic nature. Afterwards, it appears that the current, systematic philosophy should also change its inadequate, anthropocentric image of the world.

The philosophical problem of being and its adequate reflection (ontology) are further complicated by one level of magnitude. This is not simply that the above-mentioned binary opposition between explicate and implicate orders as a universal principle of building terrestrial structures must be valid for culture

as well. There is another, still much more serious fact that the relatively young and nature-opposing system of culture is not generated by the universe (by the residual activity of the Big Bang), but solely by humans as a temporarily existing biological species. This implies that the implicate order of culture, namely the force that integrates and orientates it against nature, can be constituted solely by special human interests, values, forms of knowing, and the non-biological rules of human sociocultural activities (the constitutive information of culture as distinct from nature).

Thus, not only everyday experience with the world-in-itself but also the standpoint of the implicate and explicate orders of culture make it possible for us to understand culture as an open non-linear system with its internal information. We also claim that the relatively young cultural being must be a part of the subject matter of ontology. Without culture this subject matter would be incomplete. The fate of the contemporary ontological problem is also related to the fact that this being, purposefully created by humans, is less independent but no less ontic than the real natural being. Independently from the uniqueness of the slow natural construology, it deprives the live natural system of its most sophisticated products, the rules of their creation (memory, constitutive information), and also of the more general conditions of its reproduction and evolution. By the term "construology," we mean not only the process of the spontaneous formation of natural, abiotic and biotic structures but also the process of the intentional and spontaneous formation of cultural structures, that is, including processes giving rise to material culture and technology. Current ontology must focus on those things that traditional ontology has never dealt with: *the ontic conflict between culture and the older, greater, maternal system of nature.*

Since the above claims are in notable accord with the knowledge of contemporary science, they entitle us to say that the epistemologically useful opposition between reality-in-itself and reality-for-us was ontologically confusing. It may have warned us of ontological dogmatism, but it has also deformed and weakened the seriousness of ontological arguments; and it has done so in a confusing way. Kant' s approach was not only epistemological but also extremely anthropocentric. He studied the question of how metaphysics as a science was possible, instead of the question of what reality is (Kant 1855, pp. XXXVI, 183). Every narrowly focused epistemological approach immediately closes any access to an ontological analysis of the current, crucial conflict within the world-in-itself, namely the existential, ontic conflict between culture and nature.

The finding that not only the external forms of nature and culture (their explicate orders) but also their "internal forms" (their implicate orders) are different and mutually incompatible, is of decisively practical significance. Evolutionary ontology shows that the ontic incompatibility between culture and nature, which is secured by information, has become a serious culturally-

axiological, political, and existential problem. The expansion of temporary cultural being – barely compatible with nature and human – suppresses and absorbs the irreplaceable natural being. This less appealing statement should also be a part of the new ontological basics for the contemporary public. We will substantiate in greater detail the fact that the natural diversity, integrity, and homeostasis of the planetary biosphere, its state of health (albeit disrupted by culture), participates in the decision-making process concerning human beings on the Earth.

But, since systematic philosophy has not provided the public with either a plausible concept of being or a process-oriented ontology of life and human culture based on science, most people are not even aware that the animate and inanimate parts of nature belong together; that both live systems and rocks constitute a single system integrated via natural internal information.

> It is a remarkable fact that recently discovered fossil forms of life appeared almost simultaneously with the first rock formation (Prigogine and Stengers 1984, p. 176).

Unfortunately, even the majority of philosophers feel that the well-known, semantic (conceptual) opposition between animate and inanimate nature is not as significant as the little-known, ontic, and, thus, also potentially dangerous, opposition between culture and nature. Our language simply uses too archaic a code and vocabulary; and the increasingly backward school education that the mass media tend to reflect, continues to consider nature to be merely an expanded, objective reality or mass, and culture, no wonder, to be an intellectual culture.

The analysis of the existential, ontic opposition between culture and nature, presented in this work, entitles us to establish a point concerning the traditional philosophical question of being: "being" is a noble name for reality and *the concept of being*, if it is to be preserved, *should be internally structured* just like evolutionarily shaped reality itself. Hence, we carefully distinguish between natural being and cultural being. *The Modern ontic difference between existence and being is useless for the purposes of evolutionary ontology.*

2. Ontology as Epistemology

The Ancient idea of being as an order was easily compatible with the Medieval idea of the being of an independent God as a creator and guarantor of order. I. Prigogine reminds us of what Joseph Needham has emphasized, in particular that, "Western thought has always oscillated between the world as an automaton and a theology in which God governs the universe… (This is what Needham

calls the) …characteristic European schizophrenia" (Prigogine and Stengers 1984, pp. 6-7). During the Renaissance as the period of growing human self-confidence, this opinion was gradually supplanted by the idea of secularized nature and humanity as an active element in this nature. Not only did some equalization of God, human, and the world arise; there was also a distinctive shift in creative capacities from God to human. The concept of "creation" that was traditionally applied only in connection with divinity started to be increasingly applied in connection with human beings. The Renaissance thinkers attempted to solve the Ancient and Medieval questions from a new perspective. Nicholas of Cusa no longer used the Neoplatonic term of emanation, which included the aspect of ontical submission of the world to God. Natural science did not simply search for an order within nature, that is for what unites nature and a humble human, but searched for what provides the human, instrumental knowledge and control of nature – algorithms and laws.

This was the very period when the metaphor of the image of a world unknown in Medieval Times appeared, and this meant the end of the *a priori* dogmatic ontology of being. In this metaphor, we can feel a self-confident human subjectivity capable of building an intellectual image of external reality independent from God, but, on the other hand, we can see in it elements of a specifically human, theoretical hypostasis. In building the ontological concept of being not only the need for verification of the philosophical image of the world arises but also the much more demanding requirement to explore – before any cognitive process begins – what kind of means we have for knowing and what kind of knowledge may be reliable.

A. The Problem of Adequacy of Human Knowledge

The growing awareness of human epistemological activities has created the great Modern problem of the adequacy and indisputability of human conceptual knowledge. This fact significantly "expands", modifies, and complicates the subject matter of ontology since it is not easy to combine two different philosophical questions – what being is and how we know it – in a single treatise on ontology. From the evolutionary-ontological standpoint, the above doubt appears paradoxical at first sight; it is concerned with the highest (most recent) known level of knowledge. But if we take into account that this is the first level of sociocultural, conceptual knowledge unknown to nature, this doubt still appears completely valid. The higher or lower level of knowledge has no direct relationship to its correctness, objectivity, or adequacy in this context, as we will explain below. See also critique of Kant's apriorism by K. Lorenz (1983, p. 276).

Considering the elegance and high authority of Newtonian mechanics, the educated European public has felt that the question of what reality is, is not so

sufficiently, philosophically pressing that it could not be answered by a science such as physics. This illusion, as noted by the well-known physicist F. Capra, has survived up to the present day (Capra 1996, p. 13).

Yet physics – possibly under the influence of a gradual mathematization – has described reality as a once-created world of bodies and trajectories, that is, in a way that did not raise principal doubts until Kant, except where the process part of reality was suppressed. Even the human being, the knowing subject, could not, within this approach, have become a part of the world he interpreted. Newtonian science may have partly supplanted the theological-philosophical interpretation of the world created by God, but only to such an extent that it has withdrawn not only from knowing the theoretical sense of its concepts (for example gravitation and power) but also from knowing of "…becoming, natural diversity, both considered by Aristotle as attributes of sublunar, inferior world" (Prigogine and Stengers 1984, p. 305).

> The radical change in the outlook of modern science, the transition toward the temporal, the multiple, may be viewed as a reversal of the movement that brought Aristotle's heaven to the Earth. We are bringing the Earth to heaven. We are discovering the primacy of time and change, from the level of elementary particles to cosmological models (Prigogine and Stengers 1984, p. 306).

It is generally known that 17th and 18th century science abstracted from qualities, order, values, and meanings. In favor of mathematically formulated relationships, natural reality was reduced by physics to an idealized world of bodies, powers, and trajectories, ultimately, to a single organizational level. The unified mechanics of both the cosmic and terrestrial movements quickly supplanted the thousand-year old metaphor of the nature book with a fascinating mathematical description and the metaphor of a functioning machine. The metaphor of a machine probably came from the old magic of algorithm and also from the early mechanical clocks in church towers.

Although Kant first saw in mechanical natural science the example of scientificity, which he thought metaphysics should also approach; after Hume's objections to causality, he started to doubt even the universality and necessity of theoretical knowledge. He probably realized that even natural science cannot be the basis for philosophical knowledge and that an adequate concept of metaphysics (ontology) must start with the criticism (the delineation of borders and possibilities) of reason. Kant, although this is not typical of him, stated this almost suggestively: "For whence could our experience itself acquire certainty, if all the rules on which it depends were themselves empirical, and consequently fortuitous?" (Kant 1855, p. 3). He apparently felt the compulsion to abandon the Ancient and Medieval expectations of identity between being

and thinking, since he arrived at the opinion that the traditional dogmatic metaphysics, striving to describe the world-in-itself, is impossible.

The scientific description of reality that had not first verified the way in which reason operates (namely, the process of human knowing), was declared dogmatic by Kant. Only from the distance of time do we find that this statement was right but unnecessarily demanding and confusing. It left out other significant demands of plausible theoretical knowledge: the need for an ontological concept of reality, including the role of the knowing human; the reflection of a process of the idealization of reality excluding time and change; the consideration of the conversion of a multi-level reality structure into an organizational level of concepts; the rightfulness of excluding the knowing subject. This author of three poignant critiques of human reason may have had some intuitions of thermodynamics; as a scientific discipline it maintained later, in the last third of the 19th century, the irreversible development of physical systems toward entropy, but not the insurmountable limits of human knowledge on the part of both human and external nature. It appears that he devoted his time to analyzing the a priori knowing forms; partly because he knew nothing about the human genome, about Einstein's terminal speed of light, and about Planck's constant of the least quantum of transferred energy.

The nature of the epistemological turn is often explained as follows: in Modernity it is the human subject who is the resource of ontological reflections instead of being itself. This is no doubt connected with the fact, mentioned above, that the crucial incentive of Modern philosophizing is no longer wonder, but – especially after Descartes – doubt. Modern rationalism, informed by Ancient and Medieval traditions, could have begun in no other way than by doubting the credibility of the rapidly developing, empirical knowledge. Kant resumes the ideas of Descartes not only by connecting the *a priori* need (presumption of inherent ideas, according to Descartes) to human knowledge and expecting that an external instance (probably God) guarantees the correctness of our *a priori* knowing forms but also by assuming that the existence of an external world, of things themselves, cannot be the primary reason of our philosophical doubt. Recently, we know quite reliably that the ontogenetic experience of a live system (any process of learning and knowing over an individual's life) is possible due only to its a priori neuronal structures and a phylogenetically acquired program. It is interesting that Plato was the first philosopher to reliably identify the need for inherent, general concepts (ideal forms).

Since knowledge is not the subject matter of ontology, Kant's attempt at its resurrection by means of criticizing reason (and criticizing both physics and metaphysics) was unproductive. According to Kant, scientific and philosophical knowledge is possible (certain and generally valid) only if its subject matter does not consist in the world-in-itself but in the world of our experience (the world-for-us). This philosophical notion is quite correct and it is hard to disagree

with its intention. It is impossible to arbitrarily mix up the way in which we, humans, perceive the world and the way we think about it with our external reality. Also, problems of logical consistency and implication which relate to the physiological functions of the human brain, cannot be mechanically transferred onto the objects of the world-in-itself. Traditional metaphysics was dogmatic; since it considered the world to be its direct subject matter, and it did not simply study the objects of our experience.

Kant's emphasis on the fact that only structures of human reason can constitute the subject matter of science and that this reason, besides all experience, contains *a priori* forms of perception and understanding that organize sensory perceptions and provide the science (and possibly even metaphysics as a criticism of pure reason), was intuitively correct but it was of little help to ontology. It was a purely epistemological warning that limited objectively valid knowing to phenomena. Kant also never explained who had passed the *a priori* forms of perception and contemplation on to human beings. We can only surmise that this was God or the great, godlike, human Reason of Modern rationalism.

From the viewpoint of the subject matter of evolutionary ontology, in which we also include culture created by human activity, Kant's arguments were conditioned by the era in which he lived, and they were unnecessarily radical and confusing. We will explain below that human reason, that is the culturally developed capability of a specific form of the neuronal adaptation of our ancestors to the environment, cannot be something simply biologically determined, culturally acquired, or obtained from God. In accord with the potential multi-functionalism of the evolutionarily created neuronal structures (the human brain), thinking may be a sociocultural product, but the neocortex – the gray matter of the brain (that developed fastest during anthropogenesis) – remains its biological bearer. Hence, the substance that Kant and most of his current followers are unable to explain, that is the question of the origin of human *a priori* abilities, was quite correctly uncovered by the ethologist Konrad Lorenz in 1941. It was he who noted that Kant's *a priori* was a phylogenetic *a posteriori*. K. Lorenz returned to this problem in his discussion with K. R. Popper: "At the beginning of the 1940s I said that what Kant had considered to be "*a priori*" were genetically fixed theories. Absolutely nothing in reality corresponds to substantiality and causality. These are boxes where we have to store the results of our research, no matter whether we want to." Popper fully approves of, and further develops, Lorenz's idea: "I think that all hypotheses, all theories are genetically, as far as their origination is concerned, *a priori*, no matter whether they were originated sooner or later, whether they are a part of a species history or a part of our individual lives" (Popper and Lorenz 1985, pp. 30-31). See also Lorenz (1981, pp. 221-222).

The crucial problem of the *a priori*, which Kant drew attention to, can be preliminarily explained by the terminology of evolutionary ontology as the indirect proof of the cooperation between two different memory structures, separated in terms of information and found in all animals that are evolutionarily close to human beings: the conservative genome and the flexible, genetically preset CNS. Each memory serves a different purpose and accumulates (encodes) a different type of knowledge. Phylogenetic information used for the biotic structuring of organisms that comes from the long-term and slow evolution of a species is written into our genome in the language of the nucleic acids. Ontogenetic information (perceptions, emotions, knowledge) acquired during the particular life experience of individuals is "written" in the ethnic language into the neuronal memory, which is the bearer of sociocultural information. The narrow emphasis put solely on the analysis of the process of human neuronal knowing, which disregards the fact of its general subordination to the human genome, that is to both the phylogenetically created genetic memory of humans and the phenotype structures of the human CNS, must necessarily be the cause of many theoretical misunderstandings.

Even though we agree with Kant's dismissal of the traditional preconception about the unity between thinking and being, which Hegel would again claim 30 years later, we cannot agree with Kant's belief that the world-in-itself must only be thought but not known and that human reason prescribes laws to nature. Kant's account appears to be logical: if we do not know the world-in-itself (it can only be thought, according to him) but only the world-for-us, then the laws that we find in the world-for-us, must be transferred into objectively existing nature by ourselves; we must "give them to nature". A problem arises not only if we encounter an area of being that we can have no direct experience with but also if only human thought is the area of the applicability of the known laws. K. Lorenz (1981, p. 68) wrote of the second problem: "No less a scientist than Werner Heisenberg (1969) has pointed out that the laws of logic and mathematics are not inherent to the extra-subjective universe surrounding us but, quite the contrary, are inherent in one particular cognitive function of man which, although it is by no means the only one, is a quite great help to our understanding of nature."

Throughout this book, we emphasize the fact that people know the world-in-itself not only in an *a posteriori* way, that is in a generally accepted perceptually-neuronal way, but also in an *a priori* way, that is by means of its biological anticipation in our individual, yet phylogenetically created genome. As far as the laws of nature are concerned, we will show in the chapter on evolution, below, that terrestrial nature (including ourselves) originated because of the spontaneous, ontic creativity of natural evolution. Ontically creative evolution creates both the visible and the temporary explicate forms and also the covert and much longer lasting implicate forms. It thus produces the emergent phenotype structures of reality, including the rules for their

establishment, reproduction, and functioning. It produces sensory perceptible forms of things and the covert natural laws that Kant – since he did not think of the world-in-itself as ontically creative – attributed to human reason in line with anthropocentric tradition. Regarding the general philosophical characteristics of evolution, we will state in greater detail below that evolution does not in fact produce either matter or energy (these are subject to the laws of preservation); but it produces forms, orderliness, and information. It produces limits on the variety of spontaneous, active reality; on the rules of operation and laws.

As we have stated above, we live, create, and reproduce in the world-in-itself. This world has been correctly "known" and anticipated by our genome for millions of years, since, as we know, genetic memory anticipates our morphology, physiology, ontogenesis, and, in part, also our behavior. Not only our genotype but also our body and the structure of our psyche, that is our phenotype, must be compatible with this world to the extent that makes it possible for us to have more or less healthy children who are able to mature, learn, and live in our particular culture. In contrast to the term genome, which usually designates the genetic information of a species or population, the term genotype designates a particular individual version of a genome (of the genetic information of a species).

All our knowing – common, scientific, and philosophical – no matter whether it belongs to the implicate order of culture (this is what Kant probably sensed) and no matter how it is encoded by the limited number of words in the ethnic language, still expands and specifies our knowledge about the world itself. Even though nobody knows how the codes of our ethnic languages came into existence (how words were once assigned to things), we do not convince ourselves of the ability of concepts to represent and theoretically reconstruct the world just through sensible philosophical contemplations but, rather, also through life itself: by a strict examination of the adequacy of our behavior and the mutual compatibility of the cultural and natural structures. This examination may be indirect and tedious, but it is much more conclusive than any strict philosophical criticism of pure reason.

Since Kant managed to express and prove the validity of the epistemological doubts of many Modern rationalist philosophers, it is no surprise that the attention previously paid to being has gradually been disappearing and fragmenting into many different epistemological questions and problems. Intellectual development in the field of traditional ontology has almost stopped, and, even two centuries after Kant, we have yet to arrive at a satisfactory conclusion as to what being actually is. If we leave aside the unresolved question of constancy and variability of being (the relationship between being and process), then any current discussion about the problem of ontology is complicated by the fact that we do not know whether the particular author, who usually does not go beyond the framework of Kant's heritage, is interested in the being-in-itself (in what is

the reality we belong to) or in the being-for-us (in the way we understand reality, experience it and endow it with meaning).

Yet Kant evoked two additional problems that can only briefly be mentioned here: First, the distinction of the thing-in-itself and the thing-for-us may have been in accord with the Modern emphasis on human activity, but the way in which this question was interpreted implied that Kant was not an ontological philosopher, since he accepted this reality only intellectually in a narrow, epistemological way and not practically, vitally, ontically. Second, the means of our reasoning supported the illusion of human superiority over the world instead of reminding us of the relationship between humanity and nature. The fact that humans were able to reflect theoretically upon the world and even produce a critical self-reflection of their reason implied the conclusion of some later exponents that the human, lordly attitude toward the world was legitimate. Recently, though, we know that the *epistemological opposition cannot be the ontic opposition*. The center of epistemological perspective, which is located in each of us, is not the peak of the ontic structure of the universe or the Earth.

Other live creatures know their environment too and carry the center of the "epistemological perspective" inside their organisms. They are also born with a relatively *a priori* "image of the world" that they correct and specify through their life experience; they also know their environment correctly and adequately; they learn from their mistakes and behave to survive and prosper under normal conditions. The blind, divergent evolution of life, considering those facts we know about it, does not head for a single peak. The focus of our theoretical reflection is identical only with the significance and location that was assigned by us, by human beings on the Earth. K. Lorenz also noted this anthropocentric tendency: "Human likes to regard himself as the center of the universe, as something that does not belong to nature but stands against it as something else, something higher" (Lorenz 1963, p. 311).

The one-sidedness of the post-Kantian epistemological orientation in philosophy has had different consequences for ontology, both positive and negative. Among the positive consequences of Kant' s epistemological initiative is the fact that the uncritical trust philosophers had in the capability of human perceptual knowing to adequately describe reality began to collapse. It was only after Kant, despite the fact that he studied neither the biological nor the sociocultural basis of human knowledge or even its role within culture, that the concordance or homogeneity of the order of thinking with the order of being became philosophically untenable. The predominantly negative impact consists of the general decrease in the interest in metaphysics and ontology (in connection with the later influence of positivism, neo-positivism, and analytical philosophy). This is probably the reason why the current theory of knowledge is studied in epistemology connected with a particular science; in a specialized branch of analytical philosophy (Russell, Carnap, Austin); in hermeneutics

(Gadamer); in biology-oriented philosophy (Bateson, Maturana, Varela), and also in the evolutionary theory of knowledge by the German authors (R. Riedl, G. Vollmer, F. Wuketits), who follow the inspiring heritage of K. Lorenz.

The departure from ontology and metaphysics (that is the striving for further epistemologization of philosophy and so called "deconstruction") is also supported by postmodern philosophy (F. Lyotard, M. Foucault, J. Derrida, P. Feyerabend) that questions the universalistic claims of science. It usually calls for a multiplication of perspectives when describing reality; for the resurrection of non-scientific forms of knowing and for the acknowledgement of partiality and incompleteness of every theoretical interpretation. Despite the fact that these requirements are legitimate, from the natural science point of view the post-modern criticism of science is mostly a misunderstanding. For example, a plurality of interpretations is natural for the physicist R. Feynman (1967, p. 168): "Hence, psychologically we must keep all the theories in our heads, and every theoretical physicist who is any good knows six or seven different theoretical representations for exactly the same physics." Also I. Prigogine notes on several occasions that the richness of reality, "... overflows any single language, any single logical structure" (Prigogine and Stengers 1984, p. 225). It is no good for philosophy and a failure, since this is the orientation toward highly specific problems and ignoring of other, more important questions concerning science and society; for example, it is a disclaimer to study the ontic structure of reality, the role of natural and sociocultural information; it is the abandonment to reflect the problem of the compatibility of knowing between the constructed, cultural structures and original structures (the natural order) of the Earth. Post-modern arguments are often unwelcome even among renowned scientists. "The philosophical postmodernists, a rebel crew milling beneath the black flag of anarchy, challenge the very foundation of science and traditional philosophy. Reality, they propose, is a state constructed by the mind, not perceived by it" (Wilson 1998, pp. 79-80).

We believe that the current reduction of systematic philosophy into a narrowly understood epistemology and hermeneutics is a passing fashion instead of a real option for the future. The reason is that the traditional *epistemological analysis,* that is the analysis that does not even attempt to leave the field of conceptual interpretation (this, for example, is carefully performed by mathematics and logic) and does not take into account either the biotic process of knowing or the character of the process in which reality is ontically established according to system-acquired information narrows the problem of knowing and, thus, *cannot be properly philosophical*. This reduction of reality may have several forms as follows: 1. Reality is understood inadequately, that is to say in our terminology, merely as an implicate order of culture, as a reality of ideas, information, conceptual structures, and theories; 2. Inadequately

understood reality – both natural and cultural – is placed within the subject, and the world external to humanity is declared to be irrelevant, for instance due to its structure and values. General ontological problems are declared to be insolvable, and, thus, only those aspects of reality that do not make ontological synthesis possible are studied.

B. The Ontic Role of Knowledge

We will try to explain the apparent contradiction in the term "ontology as epistemology", which we have employed as the title for this chapter, by means of a brief description of the two following statements: 1. Human perceptual knowing is not the only knowing that is a part of (occurs inside) being; and 2. all knowing is potentially ontically constitutive, because open non-linear systems (both live and cultural ones) never develop knowing merely for the sake of accumulating knowledge (information acquired from the environment) in their memories.

Long before the emergence of human conceptual knowledge (culture), the external environment had to be known by terrestrial, live systems from the monocellular level. This self-preserving method of biotic knowing, which is over 3.5 billion years old, has been helping to reproduce and differentiate the biosphere, the layer of animate being that exists in co-evolution with inanimate being and created humans as a biological species.

Various legitimate questions arise here: how much information (orderliness) does the external environment of a knowing system contain, where does this information (memory) come from, where did the information inside a particular live system come from? Considering the results of phylogenesis, it is possible to say that the natural orderliness of the abiotic and biotic environment (information) that originated through evolution is, in ontogenesis, both anticipated (for instance innate behavior patterns) by a particular live system; and it can also be decoded from the environment – it can be read and transcribed into its neuronal memory structures. This implies that no specific live system, and probably even no cultural system, has more information in its current memory than is contained in its aggregate environment.

Human conceptual knowledge, which is realized by means of the natural biotic structures of human beings but which we cannot claim to be biotic knowledge, is special for two reasons: on one the hand it provides the constitution of the non-natural ontic layer of terrestrial reality (culture) and on the other hand it originates only as its product.

These statements imply that not only cultural being but also a part of natural being (the ontic layer of life) exists only because of knowledge. Knowledge is a part of the ontically creative activity of live and cultural systems (open non-linear systems with internal information). As a means of acquiring relevant

information from the external environment, it is an irreplaceable existential need for these systems; this is the only way for them to adapt in a sustainable way and acquire matter, energy and information for their system activities in the environment, which may be spontaneously active but is subject to continual entropization. Through this activity they appear to reincarnate (include) the external environment into their systems, that is they grow and maintain their orderliness at the expense of exhausting material, energy, and information sources in the environment. They increase their orderliness at the expense of decreasing the orderliness of the surrounding environment at the expense of increasing entropy and disorderliness.

We consider the emphasis on the fact that human culture – in contrast to nature – also contains so-called intentional aspect (for instance according to the figurative statement of Marx about the difference between the worst builder and the best bee) to be rather a libation to traditional anthropology and sociology than a significant aspect of the evolutionary-ontological concept of culture. Human purposefulness and intentionality meet here not only horizontally (currently), in the mutual relationships of individuals, groups, and organizations but also vertically (historically); that is to say with the results of the legacies of past generations in the form of valid sociocultural regulations, social institutions, and items of material culture.

Evolutionary ontology does not systematically study the ontically constitutive role of natural information, since it is considered a problem of biology. It studies this philosophically disregarded question only as long as the systemic role of natural information helps it to understand the special character of natural live being and, also, the as-yet-little-known ontic function of sociocultural information. It attempts to explain to the professional public that human conceptual knowledge does not simply fulfill interpretive and communicative functions, as usually expected, but also a significant, constitutive-cultural function. *Cultural systems* also demonstrably develop knowing (naturally through human individuals), and they systematically and practically utilize the knowledge acquired; as we have noted above they *create a unique ontic layer of terrestrial reality, a culture*. Culture exists nowhere in the known universe, and after the possible demise of human as a species, it will not be preserved on the Earth either. It appears that N. Hartmann considered similar problems. He realized that knowledge belongs to the highest layer of reality, that it originates and develops in time, and that the mind may also extend into lower layers of being in some way. Since the laws of dependence do not allow their transformation, the power of the human mind may be based on the mere prescribing of purposes to the natural forces. "It cannot compel them to function differently than they do by nature. It can only exploit their natural functioning for its purposes… The elemental powers hold frail man in scorn" (Hartmann 1953, p. 102).

In the process-based understanding of reality, which is respected by both evolutionary ontology and the emerging evolutionary epistemology, *knowledge is not just an epistemological but also an ontic procedure*. Knowledge is a constitutive part of that layer of reality that expects, demands, and includes it; that is the layer that can exist only with the help of its internal memory (information acquired and stored by knowing). These are relatively fragile beings; the layers of reality that originate as a result of knowing, that is only under special (almost indoor) conditions that can be found on the appropriately "cooled down" planet Earth. The natural cosmic evolution did not stop at the level of atomic, molecular, and crystallic orderliness during the spontaneous formation of the surface of our planet, because, while using processes of decomposition, it discovered the procedures of biotic knowing and construction, that is both a new way of acquiring information from the abiotic environment and the means of its personalization in live systems (phenotypes). We might also say that natural evolution created highly organized monocellular systems that had to know the surrounding environment and interpret, evaluate and continually materialize the acquired information to be able to defend their acquired level of internal organization in competition with entropic processes. A self-organizing system (for instance a prokaryote cell), according to H. Foerster, does not import order from its environment, but it, "...takes in energy-rich matter, integrates it into its structure, and thereby increases its internal order" (Capra 1996, p. 84).

This is the reason why we have linked the topic of knowledge to the problem of the ontic character of reality and why we have titled this chapter "Ontology as Epistemology". In a departure from the tradition, we have illustrated the validity of the traditional statement that the ontological question of what reality is, is more serious from the philosophical viewpoint than the epistemological question of how we know reality. It would be more precise to say, though, that the fundamental and broader question of what reality is, must precede the derived and more specific question of what knowledge is within reality. Substantial parts of reality (both live and cultural systems) comprise knowledge. This fact evokes the unsettled philosophical problem of how and why knowledge arises and what purposes it serves.

C. The Metaphor of Three Types of Reading

The way in which knowledge becomes a part of natural and cultural being can be approximated by our metaphor of "three readings". Despite living in culture, humans as a normal biological species, know reality in a similar way to other live systems. They also know it nonverbally, that is during the first and second level of reading (or description). Both of these types of reading (or levels of description) are common to all live systems. The term of description may be less suitable for the first level, but it fits well with Lorenz's statement that:

"Phylogenetic adaptation and individual adaptive modification of behavior are the only two possible ways extant for the acquisition and storage of information" (Lorenz 1981, p. 58).

Since we also consider this question to be a problem of biology, we will limit ourselves to the statement that the *first reading* (the inscription of a biotic system's experience with a relevant section of reality to which the system is located) *may be biotically fundamental, but it is species-specific.* We know that this is an *a priori* reading, indirect, highly objective and uniformly encoded by the language of the nucleic acids (only archebacteria and mitochondria somehow elude the universality of the genetic code). Its results are stored in the genomes of live systems (genetic memory) as anticipative instructions (structural information). This reading, probably connected with a unified, biotic interpretation of the molecular level of reality, must be strictly information-construological. The construological function of genetic information may be conceived in a simplified way as follows: reality that is naturally active, even at the molecular level, directs a set of empirically discovered rules inscribed in memory of a particular live system. It assures a "manufacturing documentation" of viable individuals that is fully harmonized with the biosphere and that must not be extensively dependent on immediate changes in the external conditions. Only the behavior of the phenotype – as the unique realization of the genotype – must be generally described in the genome, that is in such a way that the live system can react flexibly to different external circumstances and that it can learn from its experience if its genome contains the specific program.

The *second reading*, which is highly selective, since it was harmonized with the genome of the particular live system as a support and auxiliary process, does not convert to signals common to all organisms (it has no biotically unified language code) and it cannot be written into the genetic memory of an individual throughout the individual's life. This is prevented by the still valid central dogma of molecular biology, established by F. H. C. Crick in 1957, claiming that the transfer from nucleic acid into protein is possible, but it is not possible in the opposite direction (in ontogenesis). Different authors have tried to weaken the validity of this "central dogma".

This reading, which we could designate to be perceptually-neuronal and partly *a posteriori* in multicellular animals and which is about 3 billion years younger than the first reading (which is about half a billion years old), probably creates an "internal image" of the animal's external world from the level of the invertebrate. This inherent, yet modifiable by individual experience image of the world (its model) is not only the basis for social communication between animals but also for their survival: it provides the behavioral adaptation to the conditions of the external environment.

The second reading is naturally species-selfish and significantly selective in favor of the survival and reproduction of the particular species.

Information acquired in this way can only be partially and indirectly, biotically construological through its share in the origination of the ecosystem that is not prescribed by information. This reading helps to establish specific ecosystems and consequently test the adequacy of all species-conditioned, biotic structures. The objectivity of the first reading is confirmed by the viability of the information-prescribed phenotypes within the spontaneously originated ecosystems. Yet even here you can find cultural analogies. A cultural system helps, for instance, to test not only all human artifacts but also the acquired sociocultural qualification of humans.

The human being who is the natural bearer of the first and the second readings as a biological species, gives rise to the *third reading* due to special circumstances. This reading may also be selectively perceptually-neuronal due to its biological character but not from the viewpoint of reproduction and survival of human in natural ecosystems, since it is encoded by the sociocultural language. The character of this reading is gradually established as an increasingly non-biological one, since the binding sociocultural "commission" operates as the decisive knowing interest here. This is a conceptually encoded reading (sociocultural interpretation) that, due to its sociocultural purpose, great memory capacity of the human CNS, and its openness to a wide range of external stimuli, provides a significant *a posteriori* form of knowing – understanding of reality via human ethnical language. It is a special interpretation of reality that primarily serves neither human survival as a spontaneous process of motoric and physiological adaptation to the factors of the external environment nor the process of the construction of environmental orderliness. K. Lorenz notes that, "...learning processes must be involved in every kind of behavior is entirely erroneous; but conversely, there does not exist a single case of teleonomic learning which does not proceed along the lines prescribed by a program containing phylogenetically acquired and genetically coded information... (... an open program, with its faculty to take in and exploit external information) ... does not require less, but incomparably more programmed information" (Lorenz 1981, p. 261).

The third reading, when compared to the first reading, does not prescribe a binding order of steps to the spontaneous activity of molecules to establish a viable organism but serves the completely different process of establishing culture through human activity. The acquired information is, via the character of its interpretation (a meaning), intended for two relatively independent means of establishing a cultural system: the technical construction and the social communication, motivation, and worldview orientation. This information, even though it has been old for several thousand years, has overshadowed the significance of the first and the second readings to such an extent that philosophy has not discussed these "lower levels" of knowledge in connection with humanity at all. This is to the detriment of this issue and the good

reputation of philosophy. Kant's analysis of *a priori* forms of the perception and understanding could not have been successful for the very reason that it was unable to cross the threshold of the third reading; it remained imprisoned inside the analysis of pure reason whose conceptual resources provide, according to Lorenz, a significant amount of "misleading information". A priori premises for human conceptual knowledge, which Kant speculatively analyzed although never finished, are not, from the evolutionary ontology's viewpoint, either hard to understand or the most important thing ontology should strive for. In a simplified way, this is a standard phylogenetic setting of the senses and CNS of an animal ancestor of modern human within biotic construology.

The arguments presented above consequently imply that the ontological status of culture represents the great question of evolutionary ontology, which is the key to many other traditional problems, including the complicated axiological problem. This problem appears similar to the one that the current biological, systematic sciences deal with: what is the biosphere and what is the ontic role of the natural biotic information within it?

In case of the cultural system, this is not only a human product, which is ontically comparable with the products of natural evolution but also a product that opposes nature and destroys, consumes and exploits natural structures. We know that in the background of the anti-natural character of culture, a different purpose of its constitutive information can be found, namely a different implicate order of culture. On the one hand, it is apparent that human sociocultural knowledge must fulfill an analogous, ontically-constitutive role with the historically older, biotic knowledge that is fully compatible with inanimate structures. On the other hand, as we will argue below, it is hard to miss the fact that the human sociocultural activity, which provides the cultural system including its constitutive information (perceptual knowledge, memory, rules), is in great disharmony with the activity of animate systems.

Here we can simply suggest what the essential difference between the biotic and sociocultural knowledge is. This difference consists in the fact that biotic knowledge (or rather both of the ways in which it operates, namely the *a priori* phylogenetic version that provides the establishment of the genomes of animate systems and the *a posteriori* ontogenetic version that provides the acquisition of knowledge from individual experience) is, in comparison to sociocultural perceptual knowledge, more adequate to nature; it is correct and highly objective. Of course, we can only indirectly measure its objectivity through the fact that it assures sustainable compatibility between animate systems and the natural environment of the Earth. The sociocultural means of human perceptual knowledge, whose objectivity (identity with being) has been discussed in philosophy from the very beginning, cannot assure any similar sustainable compatibility of culture with the Earth. Since this knowledge is perceptually neuronal, – it is preset to human survival by its genome – it

contains our phylogenetic selfishness and pragmatic purposes. The human mind can "control" causally ordered nature by setting purposes, according to N. Hartmann, " … if the world of things were not causally determined, man could neither direct events nor realize goals" (Hartmann 1953, p. 132).

This is the reason why in connection with the ontic role of sociocultural knowledge, we suggest that we are not just theoretical beings and that the relationship between our knowledge and reality is ultimately determined by life, which, as stated above, is compatible with the natural abiotic structures of the Earth because of the objectivity of natural knowledge. Hence, philosophy today should not be solely interested in the abstract problem of true knowledge or in the narrowly epistemological adequacy of knowledge. It is certainly interesting and exciting to know whether we know reality-in-itself or reality-for-us; whether we reflect it adequately, or whether we mostly create it through our hermeneutic schedule. Yet, this is just a small, academic, and less significant part of the problem.

Natural, evolutionarily constituted, and highly ontically ordered reality, of whose biotic layer we are a part by both our mind and body, should be reflected by contemporary ontology as a dynamic being established by "knowledge" (memory). The subject of ontology must not be narrowed, neither to abstract natural being nor to experience-based human being. It is high time that being, in all of its evolutionarily established forms, be acknowledged; in its cosmic and terrestrial whole and in its abiotic, biotic and sociocultural spontaneous activity.

Traditional analysis of the human, conceptual, knowing process, which does not take into account the fact that all live systems are knowing and that both biotic and sociocultural knowledge are analogous ontic activities with different purposes, structures, and strategic orientations, makes humans intellectually exceptional beings; but it significantly distorts the image of reality and human nature. It coverts not only the spontaneous, ontic creativity of reality but also the phenomenon that is most significant for humans. We do not think that the isolated, human possession of higher nervous processes (the mind), language-communication skills, and mental reflection of the world are the most significant phenomena. We believe that humans are fully characterized only through the combination of these skills with their biological pre-adaptation to an aggressive adaptive strategy simply by the fact that humans established themselves as the only ontically creative animal, *as a small and nature-opposing God*.

Thus, it is absolutely logical that, through this special activity, humans necessarily compete with ontical natural creativity – with evolution or God.

Summarizing our arguments, we can say that the Modern departure from ontology and movement toward epistemology (paradigmatically represented by Kant's attempt to save traditional metaphysics) ended somewhere in the middle. Real philosophical analysis of knowledge cannot be anything other than a return

to ontology from the other side: from the side of the ontically constitutive role of information in both the natural and sociocultural evolutions. Knowledge, information acquired from the environment and used as memory, ontically differentiates, integrates, and helps to develop reality – being. Biosphere and culture, these evolutionarily youngest ontic layers of terrestrial being, whose objective existence (and opposition) only few doubt, owe their origination to knowledge: to biotic and sociocultural information. Knowledge – and we know that human, sociocultural knowledge is not the only type – is a precondition for the existence of all open non-linear systems; a precondition for both natural and cultural evolution. Should evolution, as a principally blind ontically creative process, have any "serious meaning", then it is the fact that it can "know" and produce orderliness, emergent structures, *new information*.

But human knowledge, setting aside many other relationships, is also connected with the uncertain future of human culture. Cultural evolution, as we will argue below, has been irreversibly damaging and destroying the unique, natural being. Even though this evolution is principally blind, there is a hope in the fact that it need not be, in contrast to natural evolution, irreversible and absolutely fatal. If we want to live on this evolutionarily created Earth as its endangered species (by the current culture) for as long as possible, we must search for ways of carefully entering this cultural evolution by an adequate theoretical knowledge and in cooperation with philosophical ontology.

3. Critical Ontology of N. Hartmann

The critical ontology of Nicolai Hartmann, sometimes identified with the so-called layered concept of being or with the problem of the higher ontic layers being carried by lower layers, is probably the most advanced in terms of the development of an ontology that is principally based not on the subject but on the object. N. Hartmann is the second great ontological thinker of the 20th century, who – in contrast to the first one, Martin Heidegger – does not think that ontology can be built just from immanent, philosophical resources. By means of a turn to the onticity of the extra-human world, he takes into account not only the results of the latest achievements of natural science, the problem of variability, and the internal unity of the world but also the concept of a gradual building of being, where he courageously includes humanity (in the forms of psychic and spiritual layers of being) as well.

Hartmann, like Heidegger before him, attempted to overcome the predominant focus on epistemology in the philosophy of his time. He, again like Heidegger, strived to grasp the direct relationship between the human and the world – while Heidegger by canceling the traditional subject-object relationship, Hartmann did so by including the subject in the structure of real being.

Thus, Hartmann did not continue in the direction of Kant' s epistemological analyses. As an ontologist he probably realized the insufficiency and irrelevancy of every philosophical criticism of reason. Kant' s work was meant to be simply epistemological, and it only confirmed the limitation of human objective knowledge to phenomena. Within the same context, Hartmann (1953, pp. 40, 19) reminds us that the limits of knowledge are not the limits of being; that ontology is not interested in knowledge but in the subject matter of knowledge, and that theory of knowledge cannot be the fundamental philosophy. Elsewhere he argued in a similar way: "The thesis can possibly be formulated like this: The categories of being are not a priori principles. Only such things as insights, cognitions, and judgments can be a priori. In fact the whole contrast between a priori and *a posteriori* is only an epistemological one" (Hartmann 1953, p. 14). Also, his other arguments in favor of ontology' s supremacy in philosophy, even though the social demand of his times was probably less urgent than today, are sound. According to him, the new ontology is needed especially in anthropology, since it must be preceded by a universal idea about the structure of the world, from matter to spirit (ibid., p. 14).

In above statement you can see how indebted Hartmann' s ontology is to the Modern philosophical tradition. The human soul – in our terminology: theoretical thinking (structural sociocultural information) – by no means is the ultimate point of the ontical process of building terrestrial being. In the following chapters, we will argue that this process now appears to end in the ontic structure of the anti-natural culture; in its conflict with nature, which is both wider and evolutionarily older. The human soul, though an evolutionarily younger cultural creation, which will not stay here forever, is ontically constitutive and jointly responsible for the disappearance of the rare natural being from the surface of the Earth that accompanies the expansion of culture.

A. Hartmann' s Concept of Being

Despite these sympathetic discoveries, including the fact that Hartmann acknowledges the existential dependency of human upon nature and that he pays attention to the results of biology and anthropology, we cannot say that he is the follower of an evolutionary way of thinking. Many of his philosophical arguments indirectly prove good knowledge about the biological theories of the first half of the twentieth century. "To these phenomena – phenomena of organic life – belong the hereditary constancy of organic properties in the passage of generations and with it also the constancy of physic and intellectual dispositions. The older theories of the spirit all shied away from incorporating non-spiritual factors into the structure of the spiritual world. They feared thereby to fall a prey to materialism" (Hartmann 1953, p. 41). Hartmann is

excessively immersed in the tradition of German classical philosophy, which, via the concept of its leading representative Hegel, celebrated the creativity and exceptionality of the world spirit and consequently degraded nature (except for Schelling and Feuerbach) to a mere other-being; to a repeating cycle; to a Newtonian perpetuum mobile. In thus understood recurrence, nothing new can emerge, according to the very character of the matter. Probably due to narrow understanding of evolution or due to his fear of being marked as a materialist and speculative thinker, Hartmann refused to interpret the relationship between the layers of being historically:

> It is quite unintelligible how a lower ontological form should "produce" the higher without containing its categories. That would lead to an interpretation of the world from "below" and would come close to materialism. Again, if the higher form is supposed to "evolve" out of the lower one, it would have to be "involved" in it to begin with. This, applied to the whole order of strata, would mean that the highest categories must be contained in the lowest forms – which runs counter to the irreversibility of dependence and leads to an interpretation of the world "from above" (Hartmann 1953, p. 110).

Hartmann simply believes that "the task of mapping out the evolutionary process, cannot be the ontology's task, because that would mean its return to speculative constructions" (ibid., p. 109). But, despite this rejection of an evolutionary explanation of being and even despite the quite objectionable understanding of ontological categories and of the relationship between the real and ideal being, Hartmann's ontology – whose character is still subject-object oriented and "stationary" – shares many common features with evolutionary ontology.

Despite the fact that the author's concept of ontological categories is unclear and colored with Platonic features, it consistently rejects the main idea of the old ontology that universality (existence) has actual and true reality; that it is the driving and purposeful principle of matters (ibid., p. 9). The idea that the same reality belongs to the spirit (which was included in the realm of entities in the old ontology) as to the world, that spirit belongs to real being is also quite sympathetic. The spirit, according to Hartmann, "…does not stand outside the world of reality. It belongs completely to it, has the same temporality, the same coming into being and passing away, as material things and living beings" (ibid., p. 24). Yet, despite the fact that the author includes the psychological and mental layers of reality in the universal structure of real being, he *does not conceptualize the being of culture* (society) but, rather, keeping to the tradition, the special psychological and mental life of humans. Thus, we suppose that his layered concept of the subject matter of ontology, which is usually highly prized, does

not exceed the anthropological concept of reality enhanced with nature. His subject matter of ontology, putting it quite coarsely, is just the natural and the human. The layers of being – inorganic, organic, psychological, and mental – simply appear to structure this subject matter. Mental being (of the psyche) is not clearly and sufficiently delineated; it is a mere opposite to psychological being, a layer that carries the psychological layer, but that layer cannot be derived from it.

Hartmann uses the layered construction not only to emphasize the phenomenon of the "higher being carried by the lower" and the unclear difference between materiality and reality but also to criticize the way in which natural science at the time he was writing failed to understand the time dimension of reality. He rebukes the previous materialistic tradition for incorrectly identifying the real with the material, and construing the second as merely spatial:

> The true characteristics of reality do not depend on the categories of space and matter but on those of time and individuality. Ontologically considered, time and space are not categories of equal worth: Time is by far more fundamental than space. Only material things and living beings, including the processes through which their existence flows, are spatial. But spiritual and psychic processes, and material processes, are temporal (Hartmann 1953, pp. 25-26).

We will argue later that even this belief is an anthropological one and conceptually disputable. It takes advantage of a simplified idea about the being of a non-material and non-spatial, individual mind within the human organism; it works with the model of the mind that is carried by organic material as mere information. The spatial dimension, unlike, "temporality it does not penetrate into the psychic or spiritual spheres but "breaks off" at the border line between the organic and the psychic" (Hartmann 1953, p. 77). Hartmann's ontology removes something we believe to be relevant to current ontology: the human spirit may be carried by the three, lower natural layers of being (the inorganic, organic, and psychological), but it is not a natural but a social, that is a cultural product: it is not a spirit of nature but a spirit of culture. Its origination, reproduction, and evolution, thus, require not only nature in its entirety (a biosphere of the contemporary type, which is able to faultlessly reproduce a human as an animal, including the structure of the psyche) but also the "whole" culture. The spirit is closely connected with the being of the material and spatial system of culture; because it is a product of culture, and it represents (as a part of the social psychological culture) its single constitutive information – the integrating sociocultural genome.

Things and live beings, probably understood by Hartmann to be the inanimate and animate structures of nature, are also improperly selected ontic layers of being not only from the evolutionary-ontological viewpoint but also from the common-sense viewpoint. It is not important that we should understand them as spatial and time-related. It is important in ontology that we do not mix up natural and cultural matters. The naturally abiotic entities (structures and systems) are evolutionary products of a long-term, natural, constitutive process (cosmic evolution), while cultural entities (cities, consumer objects, technology, institutions) are the products of a quite young, differently oriented, and (with the activity of human as a species) existentially connected sociocultural evolution.

We would like to note, so far without any supporting arguments, that the structure of being, including its "psychological forms" (natural and sociocultural information) can be ontologically understood only if we acknowledge, in accord with the facts, that nature has a different implicate and explicate order than culture. The macroscopic structures of nature, perceptible to our senses, are memory records of the natural, evolutionary process, which "knows" the conditions of its spontaneous evolution, even at the inorganic level, and accumulates this knowledge in its structure. In case of the animate and cultural structures, it is possible to prove that this knowing is real and ontically constitutive and that its memory record must have two different forms: information – a genotype, and materialized – a phenotype. This problem will be discussed in greater detail in the chapter "Ontic Role of Information".

B. Putative Evolutionary Focus

It might appear that, due to the emphasis on the ontological significance of time, Hartmann's layered understanding of being best approximates the evolutionary-ontological concept. Hartmann, though, understands the time-relationship as an insignificant variability within uniformity; approximately like uniqueness, individuality, irreversibility. Individuality "... consists in nothing but singleness and uniqueness. The real is perishable and thereby also unrepeatable. The same sort of thing recurs, never the same identical thing. This holds true of historical events and of cosmic motions, of persons and of things. Only the universal recurs… This timelessness was once considered in the old ontology to be a being of a higher order, indeed, even the only true being. But, in truth, it is rather a dependent, a merely ideal being, and the universal has reality nowhere else but in the real particulars which are both temporal and individual. What once was considered a kingdom of perfection, the kingdom of essences… has proved itself to be a kingdom of incomplete being which becomes independent only through abstraction" (Hartmann 1953, p. 26).

Let us note that Hartmann understands neither natural activity nor cultural activity as spontaneously constitutive processes constituting emergent structures including the rules for their reproduction (implicate forms). In his understanding, a process is not an opposite of being – an old mistake made by the Eleatics. According to Hartmann, it only reproduces those things that were once created; that have merely been preserved by the process. Thus, the author creates an ontological concept in which being is not structurally ontically creative, but the final result is the same despite small aberrations; it is the means by which the being subsists:

> Everything real is in flux, involved in a constant coming into, or going out of, existence. Motion and becoming form the universal mode of being of the real, no matter whether it be a question of material things, living forms, or human beings. Rest and rigidity are only found in the ideal essences of the old ontology (Hartmann 1953, p. 28).

Hartmann differentiates between real and ideal being; however, he does so again, in a way that is interesting but unacceptable from the viewpoint of evolutionary ontology. If we understand the author correctly, then real being subsists in space and time. Thus, it is the being of nature and also of our psychological and mental being, our mental life, which is only time-related, according to Hartmann. Ideal being, though, is non-spatial and time-unrelated, it is constant and stagnant. It reminds us distantly of Platonic ideas or the implicate order of the universe without evolution. But Hartmann's ideal being is neither something outside real being nor a higher being than real being.

Despite the fact that Hartmann could not know anything about the general theory of systems and about the discoveries of the molecular-biological sciences, that he was unable to interpret the constitutive role of information in open, non-linear systems, he intuitively arrived at the requirement for a distinct differentiation between the biotic and abiotic layers of being. His differentiation between the layers of psychological and mental beings poses a problem. Hartmann confines himself to inexplicit statements about the opposition between the two layers; about the impossibility of deriving the mental from the psychological and the fact that the psychological isolates while the mental integrates:

> Thus the condition of being alive – understood as the complex life process of the organic – differs from the simple spatial-physical motion and, likewise, the psychic process from the organic, the spiritual-historical from the psychic. But all have the same mode of being, reality; they are all real occurrences, real life, and so forth (Hartmann 1953, pp. 28-29).

It is also unclear why Hartmann decided to arrange being into those four layers. We cannot discard the idea that he might have been influenced by formal symmetry. The gradual hierarchy of being corresponds, according to Hartmann, to the schematic (material things, plants, animals, human, society), but it does not appear to be sufficiently fundamental to him because each of these five grades, he believed, include two essential fields of being, but in a different way: the spatial-material and time-related, non-spatial. He then separated only these two essential fields:

> The spatial outer world is divided into two strata: on the one hand, that of inanimate things and physical processes; on the other, that of the animate beings. The realm of the non-spatial, first understood as the inwardness of consciousness, contains in itself another differentiation of strata-one not so easily grasped and actually grasped only late – that of the psychic and the spiritual (Hartmann 1953, p. 54).

The answer to the question of a more precise specification and differentiation between the intellectual (psychological) and the mental layers is not contained even in the works of Hartmann that deal with the layered structure of real being in greater detail (Hartmann 1949, pp. 120-144).

C. Hartmann's Ontological Contribution

Hartmann's ontology is naturally focused on the problem of an adequate, category-like description of being in its hierarchical layered structure. Setting aside the first two layers (the inorganic and organic), where he probably intentionally narrows the subject matter of ontology to natural being, the concept of the third and fourth layers (the psychological and the mental) could mean a theoretical advance with respect to traditional thinking. A proof of such an advance is hard to find. On the one hand, Hartmann appears to explicitly endorse the idea of the growth of natural "orderliness" (the principle of the increasing orderliness of nature), but, on the other hand, we must again emphasize that he failed to identify the ontic role of either natural or cultural information:

> Nature is clearly constructed on this principle of superimposition. The atom is the matter of the molecules but it itself a formed structure. The molecule is the matter of the cell, which in turn is the matter of the multicelled organism. But this rising series of forms does not continue unhampered. It does not run in one straight line through the whole stratified system of the world. Rather, there are incisions interrupting the sequence of superimposition. This happens, for example, on the border

> line of organic and psychic life. While the organism includes atoms and molecules, transfiguring them into new forms, consciousness excludes the organic forms, leaving them, as it were, behind it. The psychic life is a formed whole by itself, belonging to a higher type of form. Yet it does not superinform the organism (or its parts). Rather, with it there begins a new series of forms for which corporeal life with its material forms and processes is no longer matter. And one level higher, on the border line of the psychic and spiritual reality, the same relationship obtains. Psychic acts do not enter as material into the objective, spiritual structures. Rather, these disengage themselves from their substratum, winning a historical superindividual mode of being (Hartmann 1953, pp. 68-69).

We are intentionally setting aside the above-mentioned, problematic division of the world into things and live systems where we could easily prove, using the example of material culture, that the author's commentary on layer division cannot be valid; psychological and mental forms of being, materialized in supported with additional energy, demonstrably transform matter.

As far as the concepts of the psychological and mental layers of being are concerned, let us simply add that Hartmann understands both of these layers "substantially", as if they were to continue or inherit inorganic and organic being. He makes them a higher, independent reality that appears to follow the development of reality quite diffidently anticipated. And if he writes that, "... lower tiers of being are independent of the higher ones and do not need them, but the higher are dependent on the lower" (ibid., p. 36), and that the higher layers depend on the lower ones, then this form of dependence features a quite strange form of passive "carrying" represented, for example by the technical carriers of information found today. It simply appears that Hartmann does not even understand the psychological being to be a product of a sociocultural evolution and the core of the internal information (mental culture) of the non-natural, cultural system. In evolutionary-ontology terms, he does not consider either natural or cultural information as the orderliness (memory) that was established by either natural or cultural evolution, that is as an objective structure that is probably the most important phenomenon of evolutionary-established being, besides time and space.

In the evolutionary-ontological concept, the relationship between the psychological and the mental does not appear to be a contradiction (two layers of being) but, rather, an overlap of an evolutionary older and originally animal psyche (individual consciousness) over a younger cognitive structure; over the general sociocultural information. Coming to the defense of Hartmann, we should say that this complicated problem could not have been satisfactorily explained while maintaining the validity of the Newtonian mechanical paradigm simply via philosophical speculation.

We will argue below that to understand the ontic role of sociocultural information in the entirety of its real structure (including emotional-semantic, non-theoretical components) assumes the existence of the evolutionary-ontological concept of culture. Within this concept we have to distinguish the two following different types of cultural orderliness: 1. The strictly information-prescribed orderliness of social-material culture elements, and 2. The non-prescribed, slightly looser system orderliness that is materialized in organizations, institutions, cultural subsystems, and in the system of culture as a whole. Hartmann, understandably, would have been unable to establish such a concept and assumed that the contradiction between the psychological and the mental could be best understood by means of the form of the mental content, such as language, knowledge, evaluation, law. He believed that these content forms transcend an individual's consciousness and that individual human consciousness can never encompass their total being. According to Hartmann, though:

> there is no collective consciousness embracing the individuals. Such spiritual content then can no longer be characterized as a psychic phenomena. It belongs to another sphere with another mode of being (Hartmann 1953, p. 45).

Even though we partly understand Hartmann's motives in selecting the layered structure of being, we consider the means of being of the psychological and mental layers to be questionable. Hartmann probably follows both Aristotle and Kant (their distinction of two forms of reason), and he unwillingly accepts the suggestion by B. Bolzano that was openly promoted by K. R. Popper in his concept of the three worlds (see Popper 1992, pp. 180-187). It appears that Hartmann unnecessarily hypostatizes ontological categories, that he puts the timeless principles above reality, and that he considers them to be ontically primary:

> Then it is found that every one of these strata has its peculiar ontological categories which nowhere simply coincide with those of the other strata. It is the difference between the dominant ontological categories which distinguishes the strata from each other (Hartmann 1953, p. 47).

Hartmann's category-based analysis of being can be well adapted for other fields of philosophical activities: for example for the critique of scientific and philosophical reductionism. Remarkably, he draws attention to different problems connected with the schematic application of ontological categories to the whole of reality. He believes that some categories are common to all layers (the so-called fundamental categories); yet they do not fully correspond to them, and the relevant category-based analysis must proceed quite prudently.

Hartman demonstrates the violation of this principle both in the example of Greek atomism, where the principles and categories of the lowest layer were mechanically transferred all the way to the human mentality (which was understood to be a structure consisting of atoms as well), and in Hegel's system, which considered the "spirit" to be the basis of the whole world and attempted to explain everything through the categories of the highest level. "Herein Schelling and Hegel are closely akin to the old masters of Scholasticism… It is easy in this way to frame a unified picture of the world, but in no way is it a picture of the real world", claims Hartmann (ibid., p. 56). Hartmann summarizes the relationship between the fundamental categories and the specific features of the individual layers in five laws of layering as follows:

> 1. In the superimposition of ontological strata, there are invariably present those categories of the lower stratum which recur in the higher. But never are there categories of a higher stratum which recur in the lower… 2. The recurrence of categories is always a limited one… 3. With their encroaching upon higher strata the recurring categories are modified. They are superinformed by the character of the higher stratum… 4. The recurrence of lower categories never determines the character of the higher stratum… 5. The ascending series of ontological forms constitutes no continuum. Since, at some points of incision in the series, the categorial novelty affects many categories at a time, the ontological strata are clearly marked off against each other (ibid., pp. 75–76).

Hartmann strived to face reductionism not only from the top to the bottom but also vice versa. Regardless, we appreciate that he does not try to sacrifice the complexity of reality to a simple theoretic reconstruction. He understood the different problems faced by a non-schematic category-based analysis. "It is necessary to proceed cautiously. In general the sphere of applicability cannot be limited for all categories to that stratum in whose territory they were discovered…" (Hartmann 1953, p. 58). We believe that this is a crucial methodological warning, which Hartmann further specified and demonstrated in particular situations. He surmised that these transgressions of the rules for the correct usage of ontological categories repeatedly and unnecessarily harmed philosophy in the past, that they deprived it of the possibility to seriously and scientifically explain the world. "Through this sort of generalizing the world was made readily comprehensible and at the same time was cut to the measure of human reason. The law once found could be laid down as universally valid, and deductions could be made from it. Thus metaphysics became a deductive system… The generalized categories were taxed far beyond the limits of their usefulness. The new ontology tends to eliminate every deductivity of this type" (ibid., p. 59).

This approach of Hartmann would certainly be appreciated by many adherents of Postmodernism. We are interested in another sympathetic finding – Hartmann believed in the possibility of a non-schematic, category-based explanation of the unity of the world. The character of the unity of the world is not, according to his view, as prominent as its diversity, as its layered-structure. "In every quest after the unity of the world the categorial heterogeneity of the strata must be conserved under any conditions" (ibid., pp. 60-61). "It must be understood that the deepest heterogeneity does not preclude the unity of essential interrelatedness, both in regard to the single strata of the actual structures and in regard to the whole of the world" (ibid., p. 50).

Hartmann believed that critical ontology has decent future prospects. It can prove the unity of the world, in our terminology its natural order, which does not consist in a final base, in a unified material or mental principle, but in the unity of its structure. "The mere insight that the world is a kingdom of strata in whose higher forms all the lower ones are rediscovered, unmistakably points to a lawful order of the whole" (ibid., p. 61).

In accord with contemporary interpretations of open, non-linear systems, Hartmann correctly realized that every higher organizational level of reality appears to be carried by lower layers and that it is necessarily more fragile. Hartmann wrote of the previous teleological tradition spanning from Aristotle to Hegel that "...it makes the mistake of inverting the law of strength. It makes the higher categories the stronger ones" (ibid., pp. 89-90). Similar beliefs etaimed also M. Scheller:

> The same idea that I presented in my Ethics is quite clearly expressed by Nicolai Hartmann... Every higher form of being is comparatively weak in comparison to a lower one and it is not realized through its power but through the powers of lower forms (Scheler 1947, p. 66).

From our viewpoint, this was the anthropocentric tradition – a tradition whose negative influence can be seen in ontological thinking until now. Yet even Hartmann had realized this ontically destructive role of philosophical anthropocentrism:

> This corresponds to some dream image of the world, fondly framed by man at all times. It permits him to consider himself, in his ability as a spiritual being, the crowning achievement of the world. In this manner he misunderstands not only the world but also his own being; and, rightly considered, this is not even to his advantage. His task is to come to terms with a world not made for him… (Hartmann 1953, p. 90).

Also, this timeless idea brings Hartmann's brave ontology closer to the spirit of evolutionary ontology. This evolutionary ontology, despite the expansion of the global, anti-natural culture, searches for not only scientifically sound but also generally acceptable reasons and arguments for the means of preserving our unique terrestrial being that encompasses us all for future generations.

Two

EVOLUTIONARY ONTOLOGY

1. Two Ontic Orders

Evolutionary ontology is defined by two general premises: 1. The idea that following the rise of culture on Earth, two opposing ontic orders, two conflicting forms of the orderliness of being, have emerged; and 2. A presumption that even the being of culture must be included in the subject matter of ontology.

Yet the human need for order is quite ancient. In the everyday life of human beings, it is undoubtedly related to their temporary and uncertain worldly existence. People spontaneously adhere to some rules; they strive for psychological, moral, and technological safety. Even though they acknowledge belonging to their culture, they suspect that it is insufficiently self-independent; and that it is transcended and limited by the natural world (cosmos), which ultimately determines their destinies, biological existence, thoughts, and acts.

Projected onto the supernatural, cosmic area, the idea of order is related to the acknowledgment of the existence and activity of a Universe or God as a supernatural being. Setting aside the problem of God's existence and supernatural, ontically creative activity, we may consider the highly differentiated cosmos. This cosmos is not only homogenous and isotropic on a grand scale but also chemically and energetically unified, as not only the activity but also the materialization or a materialized proof of the presence of a single ontic order. On the planet Earth, where we are discovering much finer differentiation and orderliness due to peculiar conditions, that is to say a vast quantum of natural information accumulated by evolution; yet one more ontic order was emergently formed upon the birth of humans. Not only the physical but also the general system approach to reality, which overlooks the ontical peculiarity of culture, currently points to the general unity of the world. "Present-day research leads us farther and farther away from the opposition between the human and the natural world" (Prigogine and Stengers 1984, p. 4.)

The idea of two ordering principles (against the background of a single order of the universe) was both frequent and commonplace in the history of human thought. In the speculative form of chaos and order differentiation, this idea occurred as early as in mythology. We find it in Heraclitus, in the Sophist differentiation between nomoi/fysei; we identify it in Socrates, Plato, and Aristotle. In addition to the concepts of nomoi/fysei, ancient Greek had two more separate words for indicating two different kinds of order: taxis, for the order created purposefully by humans, and cosmos for the order that grew spontaneously. A similar problem is reflected by the Stoics in their theory of

knowledge and in ethics, and to some extent by the Medieval dispute between nominalism and realism. Human activity, approximately up until Nicholas of Cusa, has not established any alternative order; instead, it represents "continuation" – a manifestation of a cosmic order with its sacred nature. In ancient thought, order is the condition for all that exists. What surpasses order including humans who make claims for their order, is bad; nothing like this ever existed. The idea of several ontic orders is, from this perspective, a contradictio in adjecto. Let us recall the famous dualisms of Descartes and Kant and Hegel' s attempt to surpass the branching out of modern philosophy, in which the cosmos ceases to be "a live being" (as it was in Plotinos) and becomes a spiritless mechanism onto which human order may be forced. Even though dualism as a principle was later somewhat relativized (for example, conceptions of several worlds or layers of "being" have been proposed by Bolzano, Frege, Hartmann, and Popper), the issue of whether and how the duality of forms of being exists has yet to be satisfactorily resolved. The logician Pavel Tichý also indirectly points to this problem in one of his latest articles (Tichý 2004, p. 79):

> For all the work done recently in the field of linguistics, we are as far from cracking the natural-language code as we have ever been. But as I said before, what I find disturbing is not the lack of progress towards this goal, but the fact that linguists do not seem to be worried by it. … They rather content to stay within the realm of language itself, explaining linguistic phenomena incestuously in terms of each other.

A. Three Inspiring Approaches

We will set the long history of resolving the question of dualism aside and attempt, rather, a brief exposition of three philosophically interesting concepts from the second half of the 20th century. The three in question are the following: 1. F. A. Hayek' s understanding of *endogenous and exogenous order;* 2. D. Bohm' s *notion of implicate and explicate order;* and 3. K. R. Popper' s *conception of three worlds*. The idea of order contains otherness, differentiatedness, and multi-levelness; but it also contains a deeper general unity, which enables us to infer from the knowledge of parts to the knowledge of the whole. "Order is an indispensable concept for the discussion of all complex phenomena, in which it must largely play role the concept of law plays in the analysis of simpler phenomena" (Hayek 1982, p. 35).

F. A. Hayek, alongside the question of human freedom, also deals with the issue of the optimum organization of human society and uses the term "order" to differentiate between two different types of structures within a social system. The artificial order, deliberately created by humans, is called the exogenous order, while the natural order, spontaneously formed or grown, is called the endogenous

order. Hayek understandably does not attempt to develop a general philosophical concept of entity but deals with the problem of ordering and running a society in terms of optimizing human economic activity. He criticizes the widespread (and, in his opinion, anthropocentric) view that the "…order must be indebted for its formation to the conscious creation of a thinking being" (Hayek 1982, p. 35). It is precisely through this emphasis on social spontaneity and its ability to create spontaneously highly ordered and optimally functioning structures (institutions, cognitive and communicative systems, rules) that Hayek has applied the principles of non-linear thermodynamics to the field of social systems.

Even though Hayek does not judge sociocultural orderliness with respect to the chances of the terrestrial, natural environment in resisting the growing sociocultural burden, we cordially agree with his criticism of rational constructivism. Also, his justified differentiation between the natural and artificial order within the social system provides a significant theoretical inspiration. Our understanding of the artificial cultural order is roughly identical to Hayek's endogenous (spontaneous) order. We do not observe the problem of the spontaneous formation and dissemination of the sociocultural orderliness only with respect to economic efficiency but, as we have already suggested, always in relation to the sustainability of the conditions of habitability of the Earth, namely in relation to the ontically primary and more fundamental natural orderliness.

Another philosophically challenging solution concerning the existence of two different forms of orderliness of reality is provided by the concepts of implicate and explicate orders suggested by D. Bohm. Even though this author does not examine the contradiction between nature and culture either, he touches upon what is evidently the most serious evolutionary problem. He seeks to answer the following questions: what in fact are the objects and processes around us that are perceptible to the human senses; how and out of what are they formed; how are they sustained; where do they disappear to after their decomposition? His idea is exceptionally inspiring and theoretically close to the evolutionary-ontological approach. Provided we understand it correctly, D. Bohm wants to show that there is something ontically more fundamental than the empirical world registered by human senses. We know that it is the invisible but omnipresent activity of cosmic matter, induced by the overall dynamic imbalance of cosmos, which is also manifested on atomic and molecular levels. "The particle interactions give rise to the stable structures which build up the material world, which again do not remain static, but oscillate in rhythmic movements. The whole universe is thus engaged in endless motion and activity; in a continual cosmic dance of energy" (Capra 1975, p. 249). We can imagine it as a spawning ground, as a covert active field, formed by the flow of matter and energy, which ultimately generates all macroscopic structures. Bohm formulates this in terms of his apparently complicated terminology of implicate and explicate orders, but the substance of the problem is obvious:

> (That is to say,) ...the order of the world as a structure of things that are external to each other comes out as secondary and emerges from the deeper implicate order. The order of elements external to each other would then be called the unfolded order, or the explicate order (Bohm 1987, p. 20).

In Bohm's work we also find the no less thought-provoking idea of unfolding, which appeared as early as in the work of Nicholas of Cusa (Cusanus 1932). According to Bohm, "...the movement of enfolding and unfolding is ultimately the primary reality, and that the objects, entities, forms, and so on, which appear in this movement are secondary" (Bohm 1987, p. 12). From this very instance we can see that such an assumption corresponds well not only to the sense of the biological terms of genotype and phenotype but also to our idea of being and the ontic role of the sociocultural information in cultural system, that is to say to the more familiar terms of intellectual and material culture. The author specifies this idea further:

> I'll call this universal movement of enfoldment and unfoldment 'the holomovement'. The proposal is that the holomovement is the reality, at least as far as we are able to go, and that all entities, objects, forms, as ordinarily seen, are relatively stable, independent and autonomous features of the holomovement, much as the vortex is such a feature of the flowing movement of a fluid. The order of this movement is therefore the enfoldment and unfoldment. So we're looking at the universe in terms of a new order, which I'll call the enfolded order, or the implicate order (ibid., p. 12).

Bohm's reflections on implicate and explicate orders and the problems of convolution and evolution are theoretically inspiring and have the character of a partial ontological paradigm. Even though in the background there may be some anthropomorfization and sociomorfization, the emphasis on the spontaneous creative process of the universe, on the "creative evolution" in the sense of H. Bergson, which, according to special rules, produces specific forms of objects (patterns, orderliness, information) perceivable by senses, appears to be sufficiently, scientifically documented.

Nonetheless, for evolutionary ontology, whose aim is to provide a concept of reality revealing the conflict between the terrestrial nature and culture, this view is too scientific, inadequately universal, and does not take into consideration the special situation on the planet Earth: the presence of a non-natural orderliness of culture. Bohm's approach may uncover the secrets of the natural construology (especially the abiotic one), but it overlooks the expansive sociocultural construology, including the structural and functional opposition of culture against nature.

Bohm's view on the issue of the relative dualism of matter and mind (memory, information), which we find not only at the level of humans (culture) but also at the level of live systems (nature), is also interesting. This substance and information side of reality was, to some degree, also correctly reflected by the traditional conflict between materialism and idealism. According to D. Bohm, both mind and matter are included in implicate orders. According to the author, this opens up the possibility of acknowledging the difference between the mental and material side without putting dualism in danger. "That might suggest – this is something we'll go into – that the mental and the material are two sides of one reality" (ibid., p. 20).

We are also working with the idea that macroscopic, natural structures emerge for some time out of the aggregate activity of the Big Bang; out of the permanent flow of the universe in a thermo-dynamic descent – out of the covert natural order of reality. Likewise, we assume that after a temporary "worldly existence" they again humbly subordinate themselves to the second law of thermodynamics, decompose, and slip into the same process of the purely implicate, differentiated activity of the Big Bang. We should also mention the corresponding cultural analogy, whereby human artifacts, objects, technical systems, organizations, and institutions will similarly appear on the surface of the creative field of human labor. The purpose-oriented, ontic activity, subordinated to the easily accessible implicate order of culture, must co-operate with nature – with the covert implicate order of the universe. Hence, cultural structures also appear temporarily on the surface of the flow of history – they emerge out of the cultural implicate order and, after a period of social life, through moral and physical aging, they vanish in a similar way to spontaneously formed, natural structures.

Despite Bohm's interpretation being philosophically inspiring, it does not represent the essence of the crucial ontological problem of today. The essence of this problem is not the philosophical analysis of the ontic creativity of the universe as such, although this is a significant task from the perspective of the evolutionary ontology paradigm, despite that fact that it cannot be fulfilled by science itself. Nonetheless, we presume that the central ontological problem of this day is theoretically more challenging – the analysis of the means of protecting natural being from cultural being and preserving the long-term habitability of the Earth. This anticipates giving adequate, philosophical reflection to the ontical opposition of the two global constitutive processes: the natural, creator-like activity of nature and the destructive, since differently constitutive, activity of culture. Bohm's explanation of the formation, maintenance, and extinction of structures and his concepts of one implicate and one explicate order of the universe are not specific enough for the evolutionary-ontological analysis due to the following two reasons.

1. Explanation is needed as to why and how the natural differentiation of the initially homogenous structures of the universe emerged and why the divergent ontic creativity of terrestrial life occurred. There should also be a response to the question of why and how the formation and evolution of the sociocultural orderliness has emerged. Not even Teilhard' s general statement that, "whatever the domain – whether it be the cells of the body, the members of society, or the elements of spiritual synthesis – "union differentiates", that " in every organized whole the parts perfect and fulfill themselves", suffices as an explanation (Teilhard 1965, p. 288). The key to solving this problem, as will be argued below, relates not only to the tendency of the universe (including life on the Earth) to preserve itself for the longest possible period of time and to utilize its limited evolutionary sources most efficiently but also to the ontic role of information in the open non-linear system of the biosphere.

2. It is necessary to acknowledge philosophically and to clarify the issue of the principal structural differences between objects, processes, and systems formed by nature (for example, biotope of land, soil, live systems) and the artifacts and systems formed by culture (for example human dwellings, technology, institutions, intellectual creations). That is the only way to uncover the route to a gradual conciliation of the conflict between nature and culture; the route to a sustainable culture.

The third philosophically interesting concept of the existence of different orders is the idea of the three worlds suggested by K. R. Popper. This author, as an epistemologically oriented philosopher (a science theoretician), understandably does not aim to provide a common ontological concept of reality either, but he wants to demonstrate objectivity or the factualness of the gamut of theoretical scientific knowledge (the factualness of the objects of World 3). Obviously, this is precisely the reason why he maintains and defends in the majority of his work the conception of three worlds, which, as he himself points out, is not his invention.

> World 3 is not my invention. I came across World 3 for the first time in the work of the Austrian philosopher Bolzano… Bolzano talked about ' sentences in themselves' and by that he meant not only sentences which are on paper as being a part of World 1, but by sentences/statements themselves by which he meant the meaning of sentences which we can understand through our experience of World 2, that is to say a psychological experience. According to Bolzano, we have World 1 – that is written documents; World 2 – that is our experience, when we read such written documents; and we have World 3 – that is the meaning of what we read, mostly the meaning of sentences/statements (Popper and Lorenz 1985, p. 76).

Popper briefly and eloquently expressed the context of this conception in one of his many discussions with K. Lorenz:

> By World 1, I mean the world of glasses, instruments, spectacles, persons, tables and so on: the physical world. By World 2, I mean the world of our experience… By World 3, I understand the world of the products of human mind. Here it is getting more difficult. In my view, it is quite important, perhaps even paramount, that the center of World 3 is human speech with its particular characteristics: human speech with sentences/statements, which may be true or untrue. That is mainly what I mean by World 3 (Popper and Lorenz 1985, p. 75).

Let us first note that Popper does not categorize the objects of World 1 as being natural or cultural, but he understands them to be – as opposed to experience or volume of theories – in the sense of his abstract epistemic approach, "merely" physical structures. This apparently determines his urge to understand not only the objects of World 1 but also the objects of World 3 in a "mixed", that is ontologically vague, way. Popper himself explains:

> This glass is a part of World 1 as a product of the human mind – there may not be a lot of mind in it, but still a little – it does not belong only to World 1, but also to World 3. A book is something else. As a material object or a physical body, a book belongs to World 1; but as far as its content goes, its language content, it pertains to World 3. I do not think that there is any great difficulty in that (ibid., p. 75).

The ontological status of Popper' s epistemologically constructed worlds appears disputable, despite acknowledging that World 1 exists and that the mental (physiological) process of thought and the theoretical content of thought (Popper' s world of statements) could belong to two different worlds; because the content of thoughts and theories can be expressed through language (it can be encoded) as cultural information,. At the same time, we accept his argument, which claims that whoever is interested in science, must be interested in the objects of World 3. Even if all sociocultural knowledge not only has a share in truth but also is or may be ontically participative, unsolvable problems inevitably arise from the point of view of the narrow epistemological approach. It appears that Popper himself was aware of many of these, as he wrote:

> It means that World 1 and World 2 can interact, and also World 2 and World 3; but World 1 and World 3 cannot interact directly without some mediating interaction exerted by World 2. Thus, although only World 2

> can act immediately upon World 1, World 3 can act upon World 1 in an indirect way, owing to its influence upon World 2 (Popper 1992, p. 185).

Our main objection to Popper's standpoint, as stated above, naturally concerns not only the opaqueness of the boundaries and the questionable ontological status of his, thus understood, worlds. Each standpoint has its advantages and its pitfalls, and its choice ought to be left to the thinker alone. What we cannot accept from our standpoint is his apparently insignificant thesis that World 1 and World 3 cannot interact directly; that World 2 – the world of human experience – must mediate this interaction.

Let us specify this central objection. Such mediation would naturally apply, provided Popper understood thoughts exclusively by World 3, and nature exclusively by World 1 (he himself includes here objects such as tables, chairs and books). But, because he equally explicitly includes, for example, glasses and airplanes in World 3, that is to say human creations in which theories and thoughts are contained; he would surely acknowledge that even cities, for example, and other elements of material culture and technology, which contain thoughts and sociocultural information, should also be included here. Material culture and technology should be included only in World 3, and it should be clearly said that it affects World 1 (nature) mainly in a direct way – physically. It is exactly for this reason that we defend a view opposite to that of Popper, here and throughout the entire book. Airplanes and cities – provided we set aside the fact that airplanes are strictly informationally prescribed structures, whereas cities are formed mostly by succession – are the time-and-space ontical structures of culture; they are "physical" structures that natural ecosystems will not carry as easily as human thoughts without consequences. They oppress and abuse the biosphere directly by their objective, non-natural bodies, and through their anti-natural reproduction, growth, and functioning.

B. Evolutionary-Ontological Concept

The objections we have presented here in relation to the brief introduction of Hayek's, Bohm's, and Popper's concepts should sufficiently demonstrate that evolutionary ontology cannot simply follow the solutions suggested above. None of these solutions transcends the scope of traditional, pre-environmental ontology, in which human activity was significant only theoretically and morally but not systematically and constitutively, that is not ontically. We have seen that even the critical ontology of N. Hartmann did not pose itself a higher objective than proving the layered unity of the world, namely integrating mental and intellectual being into a single ontological system (together with abiotic and biotic nature).

Hence, we are determined to understand the issue of the existence of two different orders as a historically unprecedented question. Even though we acknowledge complementary forms of implicate and explicate orders (differentiable both within the system of nature and the system of culture), we prefer the ontical opposition in the conception of these orders. Thus, we are not concerned here with the traditional problem of the difference between human concepts and the structures of a real world, that is to say primarily with an epistemic stance that is often discussed and reviewed but that only diffidently recognizes the two opposite ontic orders. We are not concerned with the conflict between humanity and nature either, which exists only for those who self-willingly eliminate humans from nature and subsequently in reverse set them over nature.

Currently, it is generally accepted that there exists an epistemic dualism; that next to the structural similarity of theoretical knowledge and reality, there is also a fundamental difference between reality and its reduced and distorted image in different forms of individual and general sociocultural information (social consciousness). We are not disturbed by the covert, anthropocentrically formulated relationship between the psychological and mental, which emphasizes human superiority over nature. Not only the somatic structure of humans but also the psyche is the result of the long-term evolution of our biological ancestors, and it thus carries primary original structures – archetypes in the so-called un-consciousness, according to C. G. Jung: "Give an archetype to the people and the whole crowd moves like one human, there is no resisting to it" (Jung 1968, p. 184).

Because we are dealing with the unique human capability to create culture, we understand both orders to be two different forms of the ontic shaping of the world; two different kinds of the terrestrial system of creativity. While the first was formed naturally and slowly over a long period of time, and, thus, created equal conditions for all life forms, the second was formed purposefully and quickly through the species-selfish remaking of the Earth for the humans.

Our concept of order is a non-traditional one: because order is formed by activity, it includes not only the processes that maintain, develop, or lose all terrestrial orderliness, but also this orderliness itself. It includes both the visible and invisible ontical structures of reality, which is formed spontaneously (naturally) and through sociocultural human activity (because of the transformation of nature for humans). This concept implies the ability of nature and the ability of culture to form emergent structures and layers of reality; it implies the possibility of a historically prior or competitive level of orderliness to transformation and agency.

By order we understand not merely the covert, constitutive principles and rules of natural and cultural construology; not merely the corresponding processes of spontaneous self-organization with their insufficiently clarified

capability to create new (implicate orders of nature and culture), but also the overt result of this process with its phenotype forms (explicate order of nature and culture). This broad, dynamic concept of reality, thus, also includes the process of evolution. Hence, the differentiation of the two orders of terrestrial reality is associated with the acknowledgment and differentiation of two different types of evolution: genuine (natural) evolution and artificial (cultural) evolution.

We have already indicated, by the suggestion of acknowledging the existence of the two terrestrial implicate and explicate orders, that we advocate neither an apparent, ontically neutral parallelism of the natural and cultural ordering of reality nor the fact that culture is carried by nature. Quite the contrary, by this suggestion we aim to acknowledge the competition and conflict of the two terrestrial evolutionary processes. We are searching not only for a proper depiction of the parasitism of culture on nature but also for the conditions of its long-term possible compatibility and co-evolution with nature. Through analyzing the process of the ontic creativity of nature and the ontic creativity of culture, we are able to grasp the dramatic expansion of human culture on the Earth and its functional dependence on nature – its ambivalent role in the biotic community on the Earth.

An example of such a system may be, for instance, a city; a partial, natural or artificial ecosystem (a forest, lake or ploughed field); but also the whole biosphere; local cultures; and culture as a whole. All these systems, if we forget about the problem of information, maintain their orderliness at the expense of energy and matter, which they draw from their environment as a specific nutrient. The definiteness of a system is a problem at any level; also at the level of abiotic structures, which are not dissipative structures. Not only specialists but also some philosophers, such as A. N. Whitehead (1947, p. 105), have pointed out that, "The chair is perpetually gaining and losing atoms".

In the past, the solution to the contemporary ontical dualism on the Earth has been anthropocentrically reduced to the difference between the lower (natural) and the higher (cultural) levels of reality, namely to the difference between the blind forces of nature and the purposeful activity of human, or even – as we have already stated – to an epistemological problem. We consider this dualism to be the most significant ontological and axiological question of our time. Today, this is also a political question, because the justification of a new cultural strategy and new values for a long-term possible civilization are related to it. We deal with some of these problems in Šmajs (1998).

The main reason for this significance, providing we express it simply, is space. It is the limited surface of the planet Earth. The hierarchic (layered) models of being like Hartmann's or Popper's, which also include culture (more precisely the psychological and mental layers, or World 3) as a particular layer of reality, unreflectively overestimate not only the human but also the temporal

aspects. On the other hand, they underestimate or exclude the space aspect; there is evidently an anthropologically conditioned view in the background to the effect that all that is related to humans or has developed later is necessarily, structurally and axiologically higher and has no entitlement to space (a niche) on the surface of the Earth. From this point of view, human culture cannot appear otherwise than as "a mind carried by matter"; as a space that does not occupy the superstructure above the indestructible natural basis.

The absence of time and space concepts of the cultural system is quite common in current philosophy. We have already noted that the realist K. R. Popper, who considers the objects of World 3 to be the products of the human mind, is mainly interested in the way these objects (theories and statements) exist; namely whether they exist objectively. "I too was, like Bolzano, doubtful for a long time, and I did not publish anything about World 3 until I arrived at the conclusion that its inmates were real; indeed, more or less as real as physical tables and chairs" (Popper 1992, p. 183).

We assume that Hartmann's anthropological metaphor of the "carrying" of the higher ontical layers by the lower layers was misleading; and such an elevation of the time aspect, which the author ascribed to both the highest layers (psychological and mental), could not apply either within culture or within nature. Nature – and Nicolai Hartmann himself indirectly expressed this in the category of "transformation" – does not "carry" its higher levels (life) but transforms and functionally integrates them into a system. Thus, in the end, according to Feuerbach's admonition to Hegel, nature joins "…with the monarchic tendency of time at once always the liberalism of space" (Feuerbach 1970, p. 18).

C. Culture – An Order within an Order

Culture is a new and undoubtedly only temporarily existing system with its intrinsic, constitutive information; with its implicate order. It stands and falls with humans as a biological species, which forms and spreads implicate and explicate orders of culture through peculiar sociocultural activity. Culture could be ontically and axiologically higher than the original nature, if it spontaneously, that is to say without purposeful human activity and additional energetic nutrition, cultivated nature; if its constitutive information (intellectual culture) became a part of the natural implicate order of nature. The current anti-natural culture irreversibly destroys those natural forms on which it depends, however, its local energy sources and its partial, short-term purposes (implicate order) seem to be ultimately more powerful. We can verify this also indirectly, for example, by the fact that what today applies to natural niches does not apply even in principle to cultural niches: these are invented. Even though, during his discussions, Konrad Lorenz passionately agreed with Popper's argument that environmental niches "are invented by life;" we assume that both famous

authors would, in the case of the cultural niche, be compelled to acknowledge that culture does not invent its niche but alienates it. It literally steals it from other live beings. Compare Popper and Lorenz (1985, p. 21).

A relatively simpler order of culture derived (deducted) from the natural order may enforce itself and evolve in the biosphere only if it simultaneously conforms to the following three conditions: 1. Provided it retains its different intrinsic unity (integrity), which is able to resist the natural integrating force of the biosphere; 2. Provided it is able to co-operate effectively with the broader functional system of life to the detriment of which it is spread; 3. Provided it, from the beginning of its evolution, is supported by a sufficiently large energy input, the so-called additional energy, which is increasingly required with the growth and spatial expansion of the social material culture. Below, we will demonstrate that the capability of culture to satisfy these demands was in principle given by the fact that culture, as an artificial system, had from the beginning its intrinsic information, different from nature – intellectual culture.

The current, anti-natural culture meets all these conditions. The essential rate of its co-operation with nature is already secured by the fact that humans as a species generating the process of cultural evolution remain a functional part of the biotic community of the Earth. All contemporary humans are compatible with the natural order that manifests itself explicitly in their somatic structures (phenotypes), and which is implicitly (through information) recorded in their considerably conservative genetic memory (genotypes).

The cultural order is formed and stored in an implicate form (by means of culture acting on human behavior) mainly in the live neuronal memory of humans as a species (in the epigenetic memory of the central nervous system). This cultural order cannot explicitly (phenotypically) manifest itself in the human somatic structure. In an explicate form it can manifest itself only in the structures of the "body" of the over-individual cultural system. Because the laws of conservation of weight and energy apply here, its explicate structures repress, reduce, and break down the precious, complex structures of the natural explicate order of nature. They destroy the natural, abiotic and biotic, being including its covert, implicate forms. Cultural order is, thus, not only formed out of natural order but also at its expense. It is capable – for some time – to "consume" irreversibly the structures of the natural order.

The human mind generates the implicate order of culture (the dispersed intrinsic information of the cultural system), which is from the beginning linked to the biotic memory structures of the human brain. This fact can, at the same time, be the key to a positive system change. The *a posteriori*, neuronal memory of humans, which is formed by the third reading of the exterior reality by ethnic language, is in a much looser way assigned to the structures of the external world than the *a priori*, genetic memory. It is not as conservative, confined, and rigid as the human genome either.

Humans belong, in terms of their biotic structure (that is genetically), to the universal order of nature, provided we forget about the problem of domesticated animals. Despite this, in terms of the special part of their psyche, which controls conscious human activity and this activity itself (that is cultural-informational and socially-participative), humans belong to the artificial, cultural order. Cultural order is indeed partially recorded in the changed genome of domesticated animals and cultivated plants. It is not merely a positive phenomenon; it also brings problems. Natural species that have low economic efficiency for humans could exist in nature without any human assistance. By taming and modifying their genetic set through artificial selection, humans may have achieved their goals; but the biosphere has outwitted them: they must care for animals and assist them on a daily basis.

The ontical conflict between nature and culture cannot be resolved or moderated by such crossing and permeation of the two orders within a human being. On the contrary, through the planetary expansion of culture it gains the character of a primary, human-caused, existential threat on the part of the host system of nature. As historically constituted, dissipative structures, both live nature (the biosphere) and culture (the technosphere) have considerably developed their organizational, material, and informational constituents. The natural order currently has the form of the entire cosmic and terrestrial orderliness. This includes the admirable orderliness of the biosphere, which also comprises the somatic and genetic structures of humanity. The order of culture –relatively new, partial and derived from the natural order – is represented by the anti-natural orderliness and creativity of all present day cultures; it also comprises their memory, knowledge, and all the accumulated sociocultural information.

Both culture and live terrestrial nature, as large unbalanced systems with their internal information, exist in two united forms; namely information and materialized forms. Although that may well correlate with Bohm's view that there is no contradiction between the intellectual and the material, in a different respect this analogy is not ontologically too significant. Differences, as we will yet demonstrate, prevail. In the chapter on information and its ontic role, we will point out the fundamental difference in the acquisition, volume, storage, and function of sociocultural information (memory).

Previous findings regarding evolution imply that natural and cultural evolutionary processes could not have had an overall ideological project at the beginning. For both opposing systems, there was typically an initial simplicity and non-determinacy of all later development lines, forms, and results of the irreversible, divergent evolution. Also the new cultural reality – including the internal memory, which partly materializes and partly remains "free, dispensable"– is formed continually. Hence, even today, theoretical culture does not greatly precede material culture; both are formed together; their time

and space correlate. Although theoretical, sociocultural knowledge broadens the sphere of dispensable sociocultural information, we cannot understand it as a simple instruction or scenario for ontic cultural creativity and for the creation of culture itself. By that we do not intend to deny the so-called, relative independence of human and social consciousness from the overall conditions of the life of a particular culture. We also acknowledge a limited possibility in foreseeing evolution in the sociocultural area.

Social, material culture is formed simultaneously with intellectual culture; because culture, as a non-natural structure, would never be formed without its internal information (an implicate order). But culture, mostly at the beginning, is also tied onto natural structures, so it is, metaphorically expressed, formed, carried, and materialized by few transformed organisms, natural objects, processes, and reproductive relationships within natural ecosystems. In this context, we find a sort of a paradox; at the dawn of history, without science and theoretical knowledge, humans could culturally use and control not the most simple but the most complex natural structures: their substantive powers, the powers and qualities of animals, the processes of the metabolism of live organisms. This apparent paradox is easily understood from an etiological point of view. Human ancestors were evolutionary well-adapted to the structure of the original environment, and to other members of their species, as early as the time of primates and hominids.

It was only much later in the Modern era, in connection with the progress and more productive orientation of science, that conditions were formed for the practical use of sociocultural information in the area of relatively simpler abiotic structures and forces; the effective technical utilization of these simpler structures and processes was now possible. These forces were, according to Bergson's statements, more acceptable to the human brain than complex and mysterious organic nature, but they were turned into jointly functioning technical systems (machines) only after the industrial revolution. The human intellect, according to H. Bergson:

> …feels at home among inanimate objects, more especially among solids, where our action finds its fulcrum and our industry its tools… In fact, we do indeed feel that not one of the categories of our thought - unity, multiplicity, mechanical causality, intelligent finality - applies exactly to the things of life… (Bergson 1913, pp. ix–x).

Thus, there are only two ways on the Earth; there are two qualitatively different constitutive mechanisms through which new ontical structures are created (through the transformation of those that previously existed in a less or otherwise orderly form): 1. There is a natural way, that is the creative capability of nature, and 2. An artificial way, that is the opposing and, from the perspective

of time, episodic ontic cultural creativity. Nature and culture have similar capabilities (qualities) in ontic creativity. Their dissipative systems, as will be discussed in greater detail below, are capable in a different way (but also at a different pace) of knowing the environment; they can materialize knowledge in the form of their time and space structures, which they can retain, reproduce, develop, and destroy. The capacity of the human mind to partially reconstruct the world of nature and the world of culture in a theoretical way may serve as a proof of the information overlap of the intellectual component of the cultural order. Damage to terrestrial nature caused by contemporary culture may serve as a proof of the overlap and the ontical difference in the material component of cultural order.

Owing to different implicate orders, constitutive mechanisms and sources of creativity, nature and culture can demolish and transform even structures that are not their product and that belong to a different explicate order. Nature as the host system of culture has been "behaving" neutrally or tolerantly toward its existence and evolution for a quite long time. It depreciates and damages cultural artifacts (similar to its creations) but reliably reproduces the undisturbed biological structure of both the biosphere and the human being. Only after reaching some level of the sociocultural burden upon nature and the resulting damage to live systems caused by it, nature is forced to react differently. This enforced change of natural strategy, as will be demonstrated below, creates the most serious danger for the human race ever. Incompletely self-contained and persistent cultural systems can, unfortunately, react to this new situation with their regulative mechanisms only with some delay: if they do not accept the theoretical warnings, they will continue in their self-destructive strategy of oppressing and damaging the original nature.

The direct functional improvement of qualitatively different natural structures via culture (its natural implicate order) or *vice versa* of cultural structures *via* nature (the cultural implicate order) have so far, it appears, been delusive. Traditional breeding, modern biotechnology, genetic engineering, which try to bypass the withdrawnness of live system genomes and directly enter the workshop of natural construology (its implicate order), may be relatively successful attempts of humans; but their future problems cannot be correctly predicted by science either.

2. Orderliness

By order we understand not only the intrinsic constitutive structures controlling the process of ontic activity (rules, memory, information), that is the implicate order; we also mean the external result of this process with its phenotype forms, with an observable similarity in the structures of the ontical ordering of reality

– the explicate order. Hence, the category of order points to the covert and the overt unity of the diversely shaped reality – it provides diversity for the time and space relevance, a purpose that humanity can appreciate.

The related category of orderliness, on the contrary, points to both the evident and the covert diversity; it points out what the general unity of reality (rules, order) made it possible to create; what ontically "dominates" its uniform scope at the appropriate level of organization. By this category we mean not only the overlooked interior architecture of specific structures (abiotic, biotic, cultural), in which it appears that the ontic activity of their constitutive processes has crystallized, but also the processes which retain the identity of such structures within specific range of external and internal conditions. Hence, natural orderliness is not only a historical product of a spontaneously active reality (its "evolutionary memory"), but it is simultaneously also an actual "product" of its internal dynamic state. In other words, each structure, even if it is a phenotype record of the different time phases of its evolution, is able to keep a temporary explicate form (quality, name) in accordance with its latest version. Within the ontological interpretation of reality, it is necessary to observe that precisely the ultimate organizational level is correctly understood and appreciated. For example, the difference between abiotic, biotic, and cultural structures does not consist "in the building material," which is always the molecules (and if we move two levels further toward the micro-world, then eventually quarks and electrons); but it consists in the way of ordering and in the character of the integration of their elements.

The category of orderliness is ontologically significant, because it turns human attention, biologically set, to the distribution of bodies in space. Orderliness also turns the registration of mechanical movement toward the history of reality, toward its "anatomy and physiology;" because it transfers its cognitive emphasis in the direction "from being to becoming". In this way, it simultaneously warns of the frailty and temporality of natural structures– their long evolutionary history, high value, and principal irreparability by differently constituted cultural structures.

A. Natural Orderliness Supremacy

Humans as a biological species may have been able to stimulate and develop culture; however, they have been equipped by nature to perceive, utilize, and prefer biologically significant results of evolution These results represent a mere segment of the macroscopic level of the ordering of terrestrial reality. We know, due to scientific knowledge, that noteworthy structures of micro- and mega-worlds exist objectively; despite being certain that evolution, as the covert continuous transformation of the natural and cultural environment, in fact

runs at many levels. Even so, we can directly register through the senses and healthy brain neither the course nor the results of evolution occurring outside the macroscopic level. This does not concern merely the fact that we are left to rely on the educated brain and the theoretical imagination. It also concerns the fact that because of our biologically limited cognitive outfit, we are not able to acknowledge and appreciate easily the evolution or orderliness of reality; that our relationship toward them is indifferent in terms of values. The theoretical intellect and imagination are considerably value-unreliable in the case of the structures and processes that we did not imminently need for survival and for which we did not have to be evolutionarily adapted: these are mainly structures, whose "interior" is inaccessible to us, and processes whose pace of change is too quick or too slow for us. We cannot, for example, imagine and appropriately appreciate the fact that photons allow us to see and acquire nearly all the non-genetic information about the external world.

Evolutionary biologist S. J. Gould (1992) presents, for the sake of illustrating the scientific difficulties involved in correctly understanding the processes and results of evolution, an interesting argument of the pre-Darwin evolutionist R. Chambers:

> Suppose that an ephemeron [a mayfly], hovering over a pool for its one April day of life, were capable of observing the fry of the frog in the waters below. In its aged afternoon, having seen no change upon them for such a long time, it would be little qualified to conceive that the external branchiae [gills] of these creatures were to decay, and be replaced by internal lungs, that feet were to be developed, the tail erased, and the animal then to become a denizen of the land (Gould 1992, pp. 304–305).

Gould further adds:

> Human consciousness only spotted the light of the day in the last minute before midnight on the geological clock. And still we, mayflies, try to adjust the old world to our image of it and perhaps we do not understand the message hidden in its old history (ibid., pp. 304-305).

Evolutionary ontology is indeed an attempt to uncover such a message. It is made possible by its working, scientifically supported concept of evolution. We have already mentioned that from the point of view of the new evolutionary paradigm, the philosophical reflection of natural or cultural orderliness is not considered the main problem. The aim of evolutionary ontology is to philosophically rehabilitate natural orderliness as a high cultural value; to apprehend the process of parallel creation, conservation, and the rivalry of natural and cultural orderliness on the planet Earth.

It is a remarkably significant task because no law of the conservation of orderliness (information, memory) – an analogy to the law of the conservation of weight, energy or momentum – applies either under terrestrial or universal conditions. At the same time, the current scientific and philosophical knowledge allows the assumption that *the category of orderliness could become a central philosophical category*; that it could become the key to an adequate ontological understanding of reality itself; that it will be necessary to specify better the term "orderliness" and to confer upon it a specific philosophical sense.

Accordingly, reality is an activity that not only always reproduces the same structures, but sometimes also spontaneously produces emergent structures, new orderliness, and information. For that reason, being is orderly and diversely shaped at all the levels of organization that we are able to distinguish: at the levels of elementary particles, atoms, molecules, abiotic macroscopic structures, live systems, and human culture. Under terrestrial conditions, reality is highly ordered and creative mainly where it has had sufficient evolutionary time and a continuous flow of free energy at its disposal, and where a weak bonding between molecules or elements of open non-linear systems has occurred. Thus, it is not human culture but terrestrial life that is the most organized and, hence, also the most precious ontical level of terrestrial reality.

Complex organic molecules are the components of the unbelievable intricacy of live systems. This could perhaps be demonstrated not only by the fact that, for example, a single cell can contain millions of molecules of water and millions of molecules of nucleotides in a single giant molecule of DNA; but perhaps also by the fact that cellular biologists are forced to differentiate primary, secondary, and tertiary structures of proteins, and primary and secondary structures in DNA. In this context, it is interesting to note that the Nobel Prize Winners for 1962 (F. H. C. Crick, J. D. Watson, M. Wilkins) were awarded precisely for the discovery of the secondary structure of the DNA (the well-known double helix).

The expansion of culture in the biosphere, which is directly being challenged by the volume of our formal education in the science of physics, *irreversibly destroys precisely that most precious biotic orderliness*. Given the ability of live systems to know, hand over, and utilize knowledge (accumulated information), the majority of natural information is materialized – and indirectly written through the language of nucleic acids – in their structure. But can someone who correctly adopted secondary school physics with its mathematically, elegantly expressed law of the conservation (equivalence) of weight and energy: $E= mc^2$, be persuaded by the above-stated verbal thesis of the irreversible destruction of natural biotic information? Secondary school physics has so far barely even accepted the negative direction of irreversibility within the evolutionary process – the entropy growth law. So can secondary school physics accept this thesis, when it does not sufficiently teach students about this sole "law of non-

conservation" either? Nor does it emphasize, for example, that when we use the energy released from coal, oil, gas or wood, we can never get the coal, oil, gas or a live tree back.

Instead of the prevailing concept of nature as an "unstructured" and value neutral matter that we have at our disposal as food, as "recyclable raw materials" or available cultural niches, we defend the view that the terrestrial nature is neither matter nor a niche but, rather, a highly ordered structure; it is a "live, autopoetic, being," Gaia. It causes us no problem to accept Lovelock's idea of the Earth as a live being, Gaia. The Earth has clearly been evolutionary-formed, internally integrated and finely balanced as a natural system; this natural system, as the only possible home of humans, cannot be unworthy of human protection, humility and respect. Nothing can easily change the sad fact that the present day abiotic culture intensively intervenes in this system; that it locally subordinates it and does not respect that this system transcends it and includes it as its temporary subsystem. H. Skolimowski systematically defends a respectful relationship to nature as a condition for creating a new environmental consciousness: "Thus we need to transform our present mechanistic consciousness so that it becomes ecological consciousness. Reverential thinking and reverential perception must pervade our system of education, our institutions and our daily lives. Only then will ecological consciousness become a reality" (Skolimowski 1992, pp. 2-3).

We have already mentioned that the application of the evolutionary point of view in ontology has not been easy until recently. First, a conservative philosophical tradition has been at work, in which ontology has never been primarily concerned with features and processes but always with principles and being. Second, thanks to Darwin's discovery, it seemed that it cannot be concerned with the world as such – eternal and unchanging cosmic being, reality as a whole. This is true even though evolution can take place in a specific area of live nature, where analogous activity such as the struggle for life and so-called natural selection, like that in society, exists.

B. Non-linear Thermodynamic Inspiration

Setting aside the ideological influence of new cosmological theories that explained the formation of elementary particles, atoms, molecules and other cosmic structures, the role of the missing link in the comprehension of evolution as a spontaneous, constitutive process on the Earth was performed by Prigogine's work in the field of non-linear thermodynamics published at the end of the 1970s. A pioneering act in this field is represented by the work of the leading figure of the so-called "Brussels School," Ilya Prigogine (Prigogine and Stengers 1984). Prigogine's non-equilibrium thermodynamics and Haken's related synergetic theory (Haken 1983; Haken and Haken-Krell 1995) identically demonstrated that the mechanisms of the formation

of complex ontical structures (open non-linear systems) – chemical, biotic, cultural – are surprisingly similar. These structures can be formed under some circumstances out of older and simpler structures owing to energy dissipation (energetic nutrition) in a spontaneous and emergent way. This has again proved what the quantum physics had arrived at earlier: that the unity of the differential, complexly structured natural world cannot consist in the presence of common substance but *in the activity* of the previously incorrectly understood matter-energy. The unity of the natural world, as already presumed partly by N. Hartmann, consists in the uniform character of its ontic creativity at different levels of the natural ordering of reality; in the unity of the rules of formation and the destruction of ontical structures; in a uniform constraint of the variety of spontaneous constitutive processes.

As before in the modern history of human culture, science has now challenged philosophical thinking to adopt a new system of evolutionary processes and, accordingly, to revise its stationary physical approach to reality. Philosophical thinking is challenged to pose different ontological, epistemological and axiological questions. Although we realize the technical difficulty of an adequate philosophical reaction to the evolution of knowledge in the natural sciences, it appears that philosophy is becoming increasingly delayed in this respect. Except for Bergson, Hartmann, Bateson, Maturana, Varela, Skolimowski; epistemology is still more or less "anorganic." H. Skolimowski (1992, p. 55), who has gone through his stage of analytical orientation as a philosopher working in the USA, warns us of such an orientation: "So let us not get caught in the toils of present epistemology and its different methodologies with their criteria of justification, evidence and validity, for they are all a part of the Cognitive Mafia, guarding the monopoly of the one-dimensional objectivist physical universe. These methodologies are but ornaments engraved on a tomb; they have nothing to do with life and with the epistemology of life."

Based on the latest scientific knowledge, we may presume that natural cosmic evolution, as will be argued below, began approximately thirteen billions years ago with the Big Bang. Subsequently, there followed an abrupt expansion connected to the cooling of the hot primordial substance associated with the Big Bang, resulting in the formation of elementary particles, atoms, and other more complex structures. Since then, the universe has been growing old, cooling down, and expanding in space; but its overall orderliness is further increasing through the crystallization of the "residual" activity of the Big Bang. There are even places where it appears to visibly "grow younger" because of the formation of remarkably organized emergent structures. The Earth and the evolution of the terrestrial biotic community are the examples.

Thus, the orderliness of the solar system, of the Earth and its biosphere including ourselves, could have been formed spontaneously via natural evolution. It is absurd to assume that the entire, present universe, consisting

of approximately 100 billion galaxies, each containing about 100 billion stars, is here exclusively for the sake of terrestrial life or even exclusively for human beings (just one of the animal species of the terrestrial biotic community). It is almost certain that all the essential abiotic and biotic prerequisites of culture were created by natural evolution.

It follows not only from the extension of the universe but also from the divergent (multi-directional, diverse) character of the cosmic evolutionary process that biospheric evolution cannot be the end point or the final goal; Rather, it is "a mere branch" and a part of the overall cosmic evolution. Current research of the cosmos shows that there may be many planetary systems suitable for life in the universe. But it is a branch – as will yet be shown – which is exceptional; a branch that is truly alive. It is a branch that will, unfortunately, shrivel up later as well. No potentially life-bearing star (that is a star on the so-called main track), including the Sun, can live as long as the whole universe. And perhaps "... the star episode in the universe will resume in non-star episodes..." (Grygar 1990, p. 359). Biospheric development is certainly time-constrained. On the one hand, it was constrained by the formation of the planet Earth 4.6 billion years ago; and, on the other hand, it will be constrained by its supposed collapse in approximately 5 billion years when our life-giving Sun will change into a red giant absorbing the Earth. The Sun is a thermonuclear reactor with a naturally limited fuel reserve.

Like both the existence of the universe and life on the Earth, the existence of human culture is an apparent fact. It is possible to object first that culture has not formed by the spontaneous activity of cosmic forces, but that it was triggered by human beings; and second, that it is not easy to differentiate spontaneity from the intentional activity of humans in its evolution. We must still acknowledge that even this process takes place on the Earth. Cultural evolution may build its structures from structures of the explicate order of nature; namely from previously "used material" and energy, but it builds a *fully fledged ontical orderliness*. This general realization complies with reality. Within the global, highly space-demanding biosphere, there has been developing a time-space structure as much as global – culture, technosphere; yet this development has been faster by several orders of magnitude.

The growing spatial expansion of culture will have to be prevented considering the need to preserve the natural orderliness of the Earth and especially the need to preserve the biological diversity of life, which is an irreplaceable prerequisite for the long-term existence of human beings,. This crucial problem, which has been neither understood nor resolved by the natural sciences, has so far been overlooked even by traditional ontology (including the critical ontology of N. Hartmann). This has been particularly so, because traditional ontology approached culture incorrectly. It approached culture as merely an intellectual culture (as a "knowledge sphere"); as a layer of reality

existing only in time that does not seem to structure space that needs no place on the Earth's surface and that will easily be carried by the so-called lower layers of nature as a human cultivation of natural structures. The creation of the so-called information society could perhaps be a promise of better times. If it was possible to reduce the current consumer oriented lifestyle of human beings, and if the sociocultural information was understood as a form of orderliness derived from nature and temporary in its existence; it could induce a value rehabilitation of the natural ontical structures (live systems) containing the greatest amount of natural information.

Only in the present day context is it sufficiently evident that Hartmann's terms of the "carrying" (of the psychological and mental layers by the layer of objects and life systems) and "being in time", which we have already criticized, were not only elegant metaphors, but also a historically conditioned illusion. Phenotype ontical structures of culture, which cannot be evolutionary-correlative with their mental forms, are approximately as space demanding a reality as the natural phenotype structures. Energetically and materially, artificial cultural structures are much more demanding than the energetically and materially self-sufficient live nature. By being forced to "exist" together with the natural structures, they restrict each other (for example, natural ecosystems and cities); they compete with each other for space, solar energy and the "material" of the ultimate Earth's surface. To understand this problem thoroughly, it is necessary to uncover the objective mechanism through which a new form of orderliness is being formed, intentionally and unintentionally, throughout cultural evolution. A reliable proof of the ontical difference of the cultural order is the repression of open terrestrial nature by culture. But, indirectly, it could perhaps also be the fact that the somatic structure of humanity, belonging to the order of nature, has hardly changed under the influence of the entire present culture. Culture, it appears, has so far influenced only the structure of human behavior and the content of our individual consciousness. "Homo sapiens arose at least 50,000 years ago, and we have not a shred of evidence for any genetic improvement since then" (Gould 1992, p. 83). It was previously non-existent in nature, and it is an order that is ontically different from nature,

Since the process of forming cultural orderliness out of natural orderliness is difficult to grasp without clarifying the essence and the ontic role of sociocultural information, we will attempt to explain it in the next chapter. Here we will restrict ourselves to the statement that even philosophy will be forced to accept in its own way what some synthetic scientific disciplines have already come up with: that matter, energy, and information (memory, orderliness) – as long as we choose an adequate differentiating level – can be understood as components (parts) of all complexly organized structures. "The structure of the universe consists of at least three components: matter, energy,

and information; information is as intrinsic a part of the universe as are matter and energy" (Stonier 1990, p. 107).

It will also be necessary to abandon the former, incorrect assumption, traditional for centuries, that the capability to create something new and the capability to transcend are exclusive characteristics of humans – of individuals or organized and controlled groups of people. Spontaneous ontic creativity on the Earth may occur anywhere there is activity and irreversibility (matter, energy, information); where open non-linear systems have been constituted. It may run spontaneously within natural and within cultural systems.

The cultural system does not follow live systems in using, in the process of creation, the elements of the collapsing abiotic and biotic structures of the Earth – the "flour" of inorganic and organic molecules. Quite the contrary, it creates the same way it knows via the human: from the finite products of the natural evolutionary process. Due to its capability to easily concentrate the energy of the natural ecosystem (mainly the energy of recent or fossil biomass) and the exceptional integrative force of its constitutive information (including the structural biological information), it comparatively easily transforms nature into culture.

It is exactly for this reason that evolutionary-ontological thinking cannot limit itself to Prigogine's original idea that order is formed out of "non-order", out of chaos or less organized states of reality (Prigogine and Stengers 1984, p. XXIX). Unfortunately, he stated that, under the conditions on the Earth, formation of "order out of order" is also under way. Culture, whose implicate order (intellectual culture) is capable of subordinating even the greatest phenotype structures of nature – for example human individuals, large animals, extensive biocenoses, mineral raw materials, fire, waterfalls, and the like. Culture dangerously modifies, reorganizes, and, as nutrition, consumes even that which it is existentially dependent upon: the unique, macroscopic orderliness of the biosphere.

Since matter, energy, and information, if understood at the relevant level of abstraction, exist either in a relatively free (dispensable) or in a fixed (materialized) state; and since they preserve themselves throughout evolutionary processes (with the exception of information) by continuously transforming themselves; they can simultaneously be (again with the exception of information, whose role is broader and more significant) categories of ontology. Let us set this complicated problem aside for the moment, and note that, only after the appropriate specification, we might include the traditional categories of time and space here. Time, in particular, should not be understood, in the traditional sense of ontology, as an independent, extrinsic parameter for the description of reversible processes, or merely as a category for expressing the peculiarities of human being; because time is imminently related to matter, orderliness and evolution. Many characteristics pertinent to

natural and cultural phenomena participate in the formation of an incorrect human concept of the separate existence and passing of time: the orientation of change, sequence of processes, periodicity, rhythm. This hypostasized concept of time is then implanted into reality in the form of an independent variable or an invisible hand, which not only moves the clock-hands but also compiles new ontical structures. It is the principal irreversibility of the majority of realistic processes, which condense in new emergent structures (in the evolutionary memory of reality), not independent time is the true cause of the fact that all complex systems have their past. The sub-atomic physicist F. Capra demonstrates the role of time in an apparently stationary world in a non-traditional way. To emphasize the meaning of rhythmicity and periodicity, he uses the metaphor of the dance of creation and collapse – the dance of cosmic energy. "Modern physics has shown us that movement and rhythm are essential properties of matter; that all matter, whether here on the Earth or in outer space, is involved in a continual cosmic dance" (Capra 1975, pp. 268-269).

This is how we must also understand Bergson's metaphor about the "truly admirable book" of evolution in which the time is recorded (Bergson 1913, p. 35). P. Teilhard de Chardin (1965, p. 240) also repeatedly referred to the meaning of time for the purpose of understanding evolution that "time and space are organically joined together so as to weave together the stuff of universe." N. Hartmann (1953), as we have already showed, overestimates the category of time to the detriment of the category of space.

Orderliness and the ontic creativity of reality closely relate not only to the time dimension of evolutionary processes but also to their space dimension. Hence, they are also related to the specific characteristics of a place that the spontaneous evolutionary process, as an "impersonal constructor" of reality, "needs," and that it structures in time. It is precisely due to these specific characteristics of the place that elements of the periodic table did not emerge (their synthesis required extremely high temperatures and pressures) on the Earth; nor were entirely new biotic molecular structures formed here (after the origination of life neither adequate conditions nor free niches existed for them). Natural evolutionary creativity of the Earth, leaving aside its abiotic activity, is realized most of all through reproduction and the slow evolution of new forms of orderliness in the sphere of life. Owing to special circumstances, which will be mentioned in more detail below, the non-biotic and anti-natural cultural orderliness on the Earth today is growing most rapidly.

It is surprising that the weakest bonding forces are able to integrate the most extensive and most imposing ontical structures. For example, gravitation keeps entire gigantic structures of the universe operating, including our planetary system (it can keep together all bodies with a diameter of over 500 km); live systems owe the exquisiteness of their architecture to quite weak electric forces between molecules; all cultural systems owe their being

and development to the sociocultural information connected with human existential forces. It is as if gravitation, electromagnetic forces, and the human mind were somehow all magically interconnected.

The complex orderliness of live systems, which from a thermodynamic point of view is highly unlikely, and the equally unlikely cultural orderliness are nevertheless related to two contradictory tendencies of the universe: 1. The universal tendency toward the growth of entropy, namely the tendency of reality toward the disintegration, disorganization, and extinction of structures, which was discovered in thermodynamics as early as the 19th century; and 2. The partial tendency toward the growth of orderliness and diversity, namely the opposite tendency, which is rarely considered philosophically – the tendency to create, preserve and develop orderliness and diversity in special conditions.

C. Natural Orderliness Growth Model

The mechanism through which ontic creativity takes place in different areas of reality is not easy to explain in a few sentences. Some relatively simple structures originated under extreme conditions immediately after the Big Bang (hydrogen, quarks, electrons). The more complex elements are being formed even today during explosions of collapsing stars. Different macromolecular structures originate under specific conditions in the cosmic space. Stars and their potential planetary systems are formed by gravitation out of the cosmic dust in the discs of future galaxies. We are most interested in how orderliness can be spontaneously maintained and increased on the Earth, at a room temperature.

The growth of natural orderliness under normal conditions is possible only in open non-equilibrium systems, in so-called *dissipative structures*. These can be maintained in a non-equilibrium state, which is far from a thermodynamic balance and which is favorable to the rise of orderliness (Prigogine and Stengers 1984, pp. 131-137), only by "incarnating" the environment into their system and by being "nurtured" with matter and energy coming from the external environment. Nutrition (the input of matter and energy), thus, allows the existence and evolution of highly organized, non-equilibrium systems. I. Prigogine has briefly indicated this as follows: "We can isolate a crystal but cities and cells die when cut off from their environment" (ibid., p. 127).

Nonetheless, besides the above mentioned conditions, some stimulations, such as small diversions called fluctuations, are necessary for the creation of new structures and a higher level of orderliness of an open, non-equilibrium system. If fluctuations in a system that is close to equilibrium are repressed by the homeostatic ability of the system, then fluctuations in a strongly non-equilibrium system can become the so-called organizing fluctuations; they can induce the formation of a qualitatively higher orderliness of the system. The

traditional philosophical category of contingency, thus, acquires a new, much more significant ontological meaning.

Creativity and the new orderliness, putting it more simply, are formed in open non-linear systems by means of fluctuations. At the so-called bifurcation point "... The type of fluctuation present in the system will lead to the choice of the branch it will follow. Crossing a bifurcation is a stochastic process, such as the tossing of a coin" (Prigogine and Stengers 1984, p. 177). Should it be possible to fix the newly formed orderliness, the system would gain a new stability (homeostasis) and, under some conditions, would not give in to enthropization. Fluctuations would then again be repressed and would not be able to induce either an increase or decrease in the orderliness of a system. It is evident that fluctuations can have an ambivalent effect on a system: if it is close to the point of bifurcation, then it acts as a stimulus in the growth of its orderliness; if it is close to thermodynamic equilibrium, it acts as a stabilizer on its structure.

Not only an increase in orderliness but also its decrease and collapse may represent a positive process in the evolution of a non-equilibrium system. Both these tendencies, as has yet to be shown, are nearly equally constitutive of the complex structures of the weak bonding forces (to which not only live structures but also cultural structures belong). Spontaneous disintegration is as significant for evolution as is spontaneous or deliberate construction.

The natural formation and extinction of biological species is a good example. If biological species were not dying out, if their life span was just the same as the life span of the entire biosphere; the evolution of life on Earth would necessarily stagnate at the level of prokaryotic organisms. Because no other free niches could be formed for more adequate biological constructions. It is then a somewhat different problem that complexly organized natural and cultural structures generally do not disintegrate completely, that is to say neither to some ultimate elements of early cosmic entity (to quarks and electrons) nor to the ultimate elements of terrestrial entity (atoms and molecules). We can see that they disintegrate into considerably complex subsystems, structural parts, and elements (populations, individuals, molecules), which under some conditions may again enter into other newly constituted systems as their partial components, as their specific "building material". Without multiple disintegration and multiple reconstruction, evolution could not take place; adequate rules of evolutionary process would not be formed, and intrinsic system information (memory) would not appear as its barrier against entropy. Philosophy has not yet appreciated the fundamental theoretical meaning of a natural restriction of the period of being of biotic and cultural structures. In this context, it is interesting to note the idea of N. A. Whitehead that, "If you get a general notion of what is meant by perishing, you will have accomplished and apprehension of what you mean by memory and causality..." (Whitehead 1947, p. 117).

If we return again to the serious problem of formal physics education, we must again state that it has not adequately equipped us in this respect either. In physics, there has been no reference to the creation, meaning, and value of the natural orderliness of the Earth. Secondary school graduates may know that non-orderliness and entropy grow in all real systems; however, they have no understanding of the purpose this important information serves. Just as they do not know, if we again refer to Einstein's equation of the equivalence of weight and energy ($E=mc^2$), what this general knowledge means; that, for example, a one kg book and a hammer of the same weight contain the same amount of energy.

Thanks to Prigogine's studies we know that the general tendency toward the growth of entropy (the so-called second law of thermodynamics) does not apply absolutely; that it applies fully only to so-called closed systems without a supply of matter and energy from the external environment. We also already know that complex spontaneous processes within the system, which are able to utilize free matter and energy from the environment as specific "system nutrition," are responsible for the preservation and growth of orderliness. If dissipation, that is diffusion and consumption of energy, is secured simultaneously then the proper rise of orderliness can induce an organizing influence of fluctuations under favorable conditions.

It has already been experimentally proved that fluctuations substantially affect the behavior of a non-equilibrium system to the effect that they can increase its orderliness:

> Fluctuations determine the global outcome. We could say that instead of being corrections in the average values, fluctuations now modify those averages. This is a new situation. For this reason we would like to introduce a neologism and call situations resulting from fluctuation "order through fluctuation" (Prigogine and Stengers 1984, p. 178).

The problem of spontaneous formation, development, and decrease in the natural orderliness on the Earth has not been completely solved even by Prigogine's non-equilibrium thermodynamics. That is to say, it concerns itself neither with natural non-equilibrium systems containing intrinsic information, that is live systems, nor with artificial non-equilibrium systems containing intrinsic information, that is cultural systems. Yet even atoms, molecules, crystals or rocks are not dissipative structures either. The same applies to consumer objects, material culture, and the body of technology as such. Here we see that the problem of orderliness has yet to be resolved in its entirety; We also see that the analysis of the conflict between natural and cultural orderliness, in particular and, as attempted by evolutionary ontology, could contribute to the understanding of this new ontological category.

3. Roots of Evolutionary Ontology

The traditional concept of ontology as a theory of being contained the historically conditioned belief that ontologically oriented philosophy must concern itself with either extra-human, natural being or experience-based human, being. The critical ontology of Nicolai Hartmann came closer to our evolutionary-ontological concept by placing human being (psychological and mental layers of being) in reality and by referring to the meaning of process, time, and the layering of being. All traditional ontologies (including the ontology of N. Hartmann) understood the subject of ontology within an inadequate structure. They overlooked the fact that, following the origin of humans on the planet Earth, yet another ontically different form of reality has begun to develop – a sociocultural being created by human activity.

The term "culture" means the process and the result of human social activity (the total of human activities and all that is created by these activities); that is to say the evolution of a cultural system producing not only intellectual culture but also equally essential material culture, technology, institutions, organizations, established rules Hence, this term is employed as the opposite of the term "nature", by which we understand the result and process of natural cosmic and terrestrial evolution. Because of system interpretation, which will be more easily understood from what follows; we give the term "culture" priority over the related terms "civilization," "society," "techno-sphere".

Manifold human culture existed for a long time only in the form of intermittent islets of variously advanced human ethnicity with a minimally developed intellectual and material culture. These simple cultures were dependent first on the natural ecosystems and, in the last few millennia, on the land cultivation and domestic craft that became highly developed systems after the Industrial Revolution, in both organizational and technical terms. Throughout the 20th century, there appeared not only a post-industrial consumer culture but also the culture of strong economic, technological, and information integration. There started to develop a globalized planetary culture whose ontical conflict with nature has reached such an extent that in philosophy we must consider it an environmentally endangered culture. Globalization saw the end of the "better period" of human history, when the habitability of the Earth, provided by the biosphere, was not dependent on acts performed by humans within the current planetary culture. We agree with H. Skolimowski that the environment is a key problem in philosophy; that, "...the current knowledge is being shattered into pieces, that it is necessary to newly define the terms of nature and ecology because they have become the main philosophical problems" (Skolimowski 1981, p. 26).

A. Subject Matter of Evolutionary Ontology

Considering the new historical situation, contemporary ontology should also redefine its subject matter in order to structure and conceptualize it in a different way. Although it may continue to use the classical term of being, it cannot relate only natural or human being to its meaning. Philosophy – should it acknowledge the authority of the natural sciences – must also abandon the early Modern concept of nature as a pure objectiveness, created by God, that lacks activity, creativity, or memory. Also, naive ideas about nature as a reality that humans can structure via their hermeneutic schedule and that is assigned the meaning and value by humans, have become untenable when confronted with the knowledge acquired by the biological and system sciences. Equally untenable is the "romantic" idea of nature as an infinitely benevolent mother who willingly accepts all human activity, carries it on, and does not return it back with anything bad.

Although philosophical interpretations of nature have changed even in the history of Modern philosophy, for nearly the whole of the Modern era, it has seemed that nature will absorb all human activity; because it accepts it as its cultivation, for which it was predestined by the Creator. It has seemed that, as a pure, extended, objective reality, it has no self-contained being and "development" strategy of its own. Only today are we finding out that exactly the opposite is the case. Terrestrial nature is a self-contained system originated by natural evolution; a system integrated by natural information and capable of adaptation and a specific response to internal and external stimuli. It is apparently the rarest cosmic system that also gave birth to humans and which is capable of independent evolution until the natural destruction of the Sun.

But even a philosophically more adequate concept of nature cannot mean in itself an acceptable change in the concept of the subject matter of ontology. The origination of culture, regardless of the extent to which current ontology has failed to clearly define it, has established not only another part of its subject matter. This, the greatest ontical event in the history of the Earth, changed the subject matter of ontology not only from the viewpoint of its structure but also from the viewpoint of its value.

What do we mean? First, ontology can no longer concern itself solely with the traditional question of what is being but also must consider the much more complicated problem of what types of being are formed by both the natural and the cultural evolutionary processes. Ontology that includes humans and culture in its subject matter will have to deal with the problem of what kind of being can we humans, as live beings in harmony with the original natural being, adapt to to be able to live in that world in harmony with our conservative biological nature (genetic information). Second, there arises the question: under what kind of natural conditions is human culture possible in the long

term? Put in an another way, the axiologization of ontology coheres with our evident species-selfish expansion in the biosphere. Exactly for this reason we repeatedly emphasize that cultural being is not just ontically different from natural being. It parasitizes on nature. Its rapid growth is heading against the creativity of natural evolution: the spatial expansion of culture is destroying its most precious structures and causing a dangerous decline in natural being. This provocative formulation may evoke distrust and doubt. By the decline of the precious natural being we do not mean the decline of matter and energy; but we mean the disappearance of irreplaceable natural orderliness to which we ourselves belong; the disappearance of evolutionary-created orderliness, memory, and information.

The crucial problem of the damage to and decline of natural being, which is hard to express in terms of a common ethnic language, nevertheless helps to bring closer the evolutionary ontological understanding of the cultural evolution. It is precisely cultural evolution that traditional philosophy has failed to discuss.

Both natural and cultural evolution are, in the fullest meaning of the term, ontically constitutive processes; although each of them has different means, direction, and pace. Both occur not only on the same planet Earth but are also, metaphorically speaking, baked from the same flour; out of the dust of the ancient stars. This is what formed our planet a long time ago. The problem is that all this imaginary flour, consisting of the chemical elements of the periodic table, was baked into the highly coordinated inanimate and live structures of the Earth before culture was formed. At the point where the formation of culture took place, the laws of the conservation of mass and energy were effective. Unfortunately, though, there was and is no law of the conservation of orderliness effective, because it obviously does not exist. Since the abiotic cultural structures cannot originate otherwise than via new cultural construction (reconstruction) of the forms and materials of the original natural structures, cultural evolution must produce a different ontical orderliness; it must create a different ontic order inside the original natural order. Cultural evolution reduces or destroys the original systems of the environment, destroying both the animate and inanimate forms, and utilizes their matter for constructing its cultural structures.

When looking at the planet from an ordinary passenger plane, this can be seen at first glance. Cultural evolution has already modified almost the whole surface of the globe; most of the territory has become fields and pastures, expanding human settlements, industrial zones, concrete and tarmac surfaces, and a thick network of motorways and highways. On the finite terrestrial surface, culture has taken the very place, which previously belonged only to live systems. Because no theoretical discipline can reflect the causes or the effects of this dramatic change as a whole, we suppose that, in the era of global culture, the

culturally altered planet Earth must become the subject matter of philosophical ontology. With respect to the next expected expansion of culture, precious natural being will probably decline even further. Ontology will lose its original, individually cultivating, and comforting meaning. It will be forced to deal with complicated, culturally existential, and general worldview problems.

There is no point to speculate whether contemporary ontology, without the current global environmental commission, would stagnate; or whether it would evolve as a predominantly analytic philosophy, as an epistemological criticism of science, or as an anthropological theory of experiencing reality by humans. It is important that, with the argument of evolutionary ontology (even though it is only expressed simply and formally for this purpose); the politics and the whole public, as the agencies that might decide of the change of overall cultural strategy, could be confronted. This contrasts with the fact that just the support of experience and value-free science has been sufficient for the selection of cultural strategy recently. For example, the anthropocentric ontology was not a necessary part of the training of creative technicians.

Some of these problems will be outlined in the following three preliminary reflections concerning nature, culture and humans.

1. *Nature*. We will be brief with the evolutionary ontological reflection of nature. On this problem see our entry Nature (In: Birx 2006, pp. 1700-1702). For several decades, it has been evident to the professional community that the universe and the Earth is the result of natural evolution; that they are both historically constituted structures. We also know that the life on the Earth was formed quite early after the consolidation of its surface, approximately at the same time as rocks; and that its recent organizational complexity has grown gradually. Terrestrial life developed at a pace that perhaps was not steady but that evidently could have been no faster. The current live systems, which are the direct offspring of the first life forms, represent its natural memory in two ways. The time and circumstances of evolution have materialized in their constitution, in the phenotypes, and have been recorded as information in their memory, in their genotypes.

Concerns over issues philosophy has never had to deal with – such as the fate of the Earth, the home to all human beings, cultures, and other live entities – challenges ontology today to adopt a new type of reflection; it challenges it to an "ontological turn" from the study of a stationary natural being to the theoretical reflection of the ontical conflict between natural and cultural evolution. It is precisely philosophy, the discipline responsible for the historically adequate image of reality as a whole, which should be in a position to reveal – and to communicate in such a way that makes accessible to the public the causes of, and the solution to – the current global crisis.

Further, it is obvious that terrestrial life is a single grand organism of which we are a part and whose state of health is in crisis today owing to the mistakes

of humans as a species. By destroying most of the original ecosystem, we have seriously damaged not only the physical structure of life but also its memory, its information structure. We have destroyed part of the genetic information of the contemporary biosphere; we have damaged the precious memory of live nature (its imaginary "intellectual culture"), which was formed and functioned long before we managed to create our primitive technical memory devices.

It is possible to understand indirectly the derivability, limited objectiveness, and the frailty of sociocultural information (including the highest theoretical level of scientific memory, built-in technologically) by virtue of the notion of the possible extinction of humans as a species. In such a case, the spontaneous natural processes would almost entirely wash away all the sociocultural information materialized or recorded in different forms of social memory. Together with its bearer, they would gradually decompose into the natural elements of the Earth' s crust (the construction material of life). Hence, the only information that can be formed, preserved, and farther evolved throughout the entire existence of the Earth (perhaps another 5 billion years) is merely *natural, biotic information*. Nature would not be in a position to make use of any of the inventions perfected by humans, of any of the currently significant and revolutionary information or technologies, after the possible extinction of the human species.

2. *Culture*. Let us turn to the issue of the adequate ontological reflection of culture. On this problem see our entry Culture (In: Birx 2006, pp. 636-640). Evolutionary ontology emphasizes that culture may not be understood as a structure congenial to the natural order of the universe. The spontaneous ontic activity of the universe does not establish, support, or tolerate culture. Culture, whose ontological status has not been generally accepted so far, is a quite peculiar ontical structure. It is definitely not merely information, an intellectual culture, but it is a "physical" system where intellectual culture is a "mere" information subsystem – both built into and dispersed within the "genome", a structural constitutive memory. The content of this memory is not composed of phylogenetically formed genetic information that integrates the biosphere on a fine genotype level (at implicate molecular level). This content consists of purposefully colored, human, epigenetic, neuronal information that originates in human cultural ontogenesis and that is encoded by the human ethnical language. This is the information that conceptually integrates culture at the general phenotype level (at the explicate level). We can see this, for example, in the historical development of abiotic technology; whose evolution began in macroscopic form (tools), and which has only recently attempted to make use of molecular and atomic processes.

The nature-related and nature-dependent order of culture – as we have mentioned above – is not formed naturally, in the spontaneous activity of atoms, molecules and more complex natural structures (including the activity

of live systems). Instead, it is formed entirely through the activity of the human species. It is exactly due to this that such species-selfish activity is capable of alienating environmental niches from other live systems, destroying them, and dangerously violating the natural order. Yet this order preceded human beings and any cultural order in time. Culture cannot structure the naturally organized surface of the Earth without decreasing the extent of the original ecosystems, causing destruction, and increasing entropy.

The covert entropization of nature by culture was pointed out in the 1950s by C. Levi-Strauss: "So civilization in its entire aggregate can be described as a miraculously complex mechanism, in which we would be tempted to see a chance for the survival of our universe if its function was not exactly to form that, which the physicists call entropy, that is immobility. Each word that people exchange, each printed line creates communication between two speakers and thus it evens out the level, where previously there was a different degree of information, and thus a greater measure of organization. Rather than anthropology, it should be called "entropology," as an indication of a scientific discipline whose task is to study this process of disintegration in its utmost manifestations" (Lévi-Strauss 1955, p. 496).

The cultural system is not able to utilize constitutively the highly objective genetic information of human beings, which is constitutive only in a species-biological way and which reliably integrates their organisms into all the abiotic and biotic environments on the Earth. On the contrary, from its very origination, it must build from its sociocultural information, which becomes estranged from nature. Even though it is created by the modification of human perceptual-neuronal information, which complements the organs used in human instinct and is in accord with humanity' s genetically encoded adaptive strategy, it becomes the bearer of the knowing concern of the cultural system. In comparison to the fine and highly objective phylogenetic knowledge, human, ontogenetically acquired, neuronal knowledge is not only rougher and merely approximate but also species-selfish. It is also for that reason that culture is constituted as a great, exterior, non-organic body of humans; as an artificial system with an anti-natural orientation and regime.

The definition of an "anti-natural orientation of culture," which many philosophers find unacceptable even in the era of technical civilization, is well in tune with the first hunter-gatherer cultures. "…when human colonists arrived, not only in America but also in New Zealand, Madagascar, and Australia, and whether the climate was changing or not, a large section of the megafauna – large mammals, birds, and reptiles – disappeared soon afterward" (Wilson 1992, p. 249).

With respect to the biosphere, the new cultural orderliness is not only structurally different, but also differently oriented. It is also notably uniform, with a tendency to materialize promptly not only the loose sociocultural

information but also the peculiarities of its environmental niche. Culture, thus, grows out of the "human line" of the biotic evolution; it "builds" by using the material of the natural structures of the Earth, but it materializes different information about the outside world. It generates a different orderliness and has relatively independent implicate and explicate orders. In particular, the high input of additional energy from fossil fuels and strong economic integration decreases its ability to adapt to the animate and inanimate environments of the Earth; they inhibit its ability to spontaneously optimize from negative feedback from the environment. Post-industrial culture also disrupts the natural dynamic imbalance of life by growing far quicker than the biosphere, by being unable to reach the climax. Biological diversity is dwindling at its quickest rate since the natural catastrophe at the end of the Mesozoic era, which wiped out the dinosaurs and started the Cenozoic epoch – the age of mammals. Due to human error, a crisis is emerging that might also become the end of this epoch.

The extinction of humanity is as equally unavoidable as the extinction of any other animal species from a long-term perspective. It would be no catastrophe for the Earth. Each species appears to be a realization of the evolutionary commission of the appropriate level of the evolution of the biosphere, and it is being continuously tested by its next evolution. It ends naturally mostly because its morphological, physiological, and behavioral structures – reproduced by conservative genetic memory – no longer meet the new biospheric conditions; because they morally "grow old." The sixth stage of the wholesale dying out of a biological species in the present history of the Earth, caused by culture, thus releases niches for new evolutionary experiments in the biosphere. Perhaps forms of life will originate that will reach the threshold of reflection and will be able to learn from our mistakes.

3. *Humans*. A new ontological interpretation of humans is required. Even though humans were not initially the subject of evolutionary ontology, our unique capability to create and develop culture will be the implicit topic of all further reflections here. Grounds for the prime concern about the endangered culture are naturally understandable. Humans are not the immediate causes of this crisis. Since the task of ontology is to concern itself with existence as a whole, it cannot just deal with anthropological problems and pretend that nothing is happening to terrestrial being as a whole in a situation of grave damage to the biosphere. Like a physician at a patient's bedside, ontology must also defend something and pursue something at such moments. Evolutionary ontology aims to be a general theory of an ontically creative reality; a reflection of the conflict between culture and nature. It attempts not only a theorization but also a search for etiology, diagnosis, and a therapy for the Earth's culture-abused ecosystem. We have already pointed out that the only way for it to be theoretically competent is to stand, within the conflict between the cultural and natural being, on the side of natural being; on the side of the host system

of culture; on the side of the Earth and life. So it is no paradox when ontology wanting to promote human interests must increasingly – as if contrary to its entire tradition, stand in defense of nature. Nonetheless, if philosophy is interested in regaining its credibility, it ought to perform this in a competent and non-speculative way. Clearly, just a resolute diversion from the futile relationship between being and existence can disperse the mistrust of social sciences toward the philosophical way of thinking. Only by inclination toward the Earth and global existential problems of humankind, can philosophy seek the understanding and support of both the public and the politicians.

Thus, evolutionary ontology is a consequent indirect criticism of philosophical anthropocentrism as well. It shows that the conflict between nature and culture, the escalation of which would have obviously never occurred without the philosophical support of this orientation of the intellectual culture, is a reliable proof of the inadequacy of all forms of anthropocentrism. The currently prevailing anthropocentric vision of the world is incorrect not only in details or in its incomplete arguments, but also in its deepest nature as a whole. That is true even when it becomes resigned to the establishment of an explicit philosophical concept of reality. In fact, *anthropocentrism*, contrary to the understanding of most philosophers, *does not need an explicit concept of reality*. It imposes itself through the force of its biological foundation in the conservative human genome. We can clearly see the result of this tendency around us: its axiological variation supports the predatory attitude toward the Earth; indifference toward the demands of terrestrial life; mass consumerism and the tacit approval of the public alongside further economical growth and the anti-natural orientation of culture.

We will argue that it is only the evolutionary-ontological reflection of the relationship between nature and culture that makes the adequate interpretation of human beings possible. The relationship between humanity and the world can no longer be defined only psychologically and morally without understanding the unity between humanity as an animal and the entire abiotic and biotic environment of the Earth. But neither does this functional integration of humans into nature represent the entire truth about human nature. Humans are currently characterized most of all by culture, an artificial exterior body created by our activity, the body we are responsible for. Let us reflect on whether this is not precisely the strong argument showing the end of traditional ontology. Traditional ontology's categories, interpretation schemes, and reflective style have had their roots in the naïve assumption of the stability and indestructibility of the Earth by culture; in human pride for reason, morale, and responsibility – in the lordly attitude of humanity towards nature.

Hence, the evolutionary-ontological reflection shows that even today humanity naturally and systematically belongs to the biosphere, and that the environmental crisis cannot be a conflict between human beings and nature:

between nature and human constitution. Human biological nature, from which even the offensive adaptive strategy of culture has emerged, was formed by nature itself a long time ago. This naturalness, "…which evolved during hundreds of millennia," and which "still profoundly affects the evolution of culture," we cannot and may not change (Wilson 1998, p. 518). So the only thing we may attempt is to change the anti-natural ontical character of culture; to change its intrinsic constitutive information (ideas, attitudes and values), which once have set culture against nature.

It is exactly for this reason that evolutionary ontology also attempts a reflection on how natural evolution has shaped, equipped, and confined humans. It respects the uniqueness of a human, but against the background of the broader ontical system of life. As stated above, it regards not only humanity as important but also considers the Earth, in particular nature and life, to be the highest values. The idea of life as the highest value is consistently developed by the Polish philosopher Henryk Skolimowski; he is confident that, to solve the environmental crisis, we most of all need a new reading of the universe, a new cosmology, a new understanding of evolution. "All value-systems are ultimately justified by life" (Skolimowski 1992, p. 221).

Traditional anthropocentric ontologies reverse the order of these values: they view nature as ontically passive, value-neutral, philosophically boring, and uninteresting. They consider it a world of humans for humans. Humans instinctively appropriate such a world, subdue it, and endow it with their meanings and purposes. In such a world, humans establish, emancipate, and self-fulfill themselves with no limitations. In accord with the offensive adaptive strategy of culture, which is the evolvement of biological human nature, we humanize the world and transform it for our immediate benefits without feeling respect or humility for the fact that we are merely a negligible little branch on the tree of life unable to live independently. The branch cannot be indifferent to its trunk nor to the Earth and all other universal structures.

It appears that only when philosophy correctly appreciates the naturally biological and cultural dimension of humans, when it develops an evolutionary-ontological attitude to nature and culture, will it be able to comprehensibly explain to the public what has not been said clearly so far: Although humanity is not the crown of creation; culture is not a higher reality and it is not organizationally more complex in relation to live nature. Nevertheless, humans are sufficiently unique. Namely, we are the sole ontically, yet, in an unnatural way, creative animals on the Earth. *We have imposed culture on nature, divided natural being into nature and culture, and established humanity as the second worldly creator, as a minor god.* But the finding that we produce reality that is ontically lower, purposely organized, and, thus, locally stronger and destructive toward the biosphere, need not be perceived in a purely negative way. On the contrary, it gives ontologically informed philosophy the right to warn the

public in a timely fashion: unless we do something, unless we intervene in the spontaneous process of our species-selfish cultural expansion, we must expect the forthcoming extinction of both humanity and culture.

From an evolutionary-ontological point of view it is also possible to communicate comprehensibly what many citizens intuitively feel in one way or another and which is in good accord with scientific knowledge. First, we live in a cold, vast universe that is entirely indifferent toward the Earth. The fact that we can create our ambivalent culture is due only to the flawless biological reproduction of our somatic and mental structures; in fact because of the integrity, diversity and functional unity of the biosphere. Second, it is almost certain that the human organism as a unit (integrated by the biosphere) strongly lags behind the cultural changes in the external environment. The rapid evolution of the human brain (neo-cortex) during anthropogenesis evidently created favorable conditions for its plasticity during ontogenesis, but this does not apply to other somatic, physiological, and emotional structures; those other structures of the human organism, that are older from an evolutionary point of view, lack such plasticity.

The evolutionary-ontological reflection of humans, thus, also brings us to the role of ontology in the system of culture. Contemporary ontology should not only concern itself with what is an abstractly understood existence as such, what the relationship between traditional categories of existence and being is, or how the natural, non-human world is epistemologically constituted and axiologically experienced by humans.

The question of how we cognize reality and the question of what reality is like are two different philosophical questions. It is exactly for this reason that they may not be equally represented in each ontological analysis. Even though we know that reality, as such, can only be accessible to us, humans, through the prism of interpretation, and that there are renowned authors for whom epistemology is at the same time ontology (G. Bateson, H. Maturana); we give the defense and criticism of this idea, while sympathetic to us, considerably little attention. Generally, an ontological notion of the world obscures any reflections on this topic before they can even be formed. We only accept, with critical reservations too strong, an emphasis on the fact that humans structure reality by a hermeneutic schedule; an emphasis, which is quite popular today. Humans epistemologically structure reality and prefer some of these structures more than others. But all natural ontical structures of reality – even those of which we know nothing yet – were first constituted by evolution and only afterwards discovered by the philosophically and scientifically educated human mind.

For the first time in history, ontology has to examine what sort of ontical entity the Earth is, including its biosphere and humans as an animal species. It must concern itself with the question of to what extent and what ontical

structure should culture have to be able to cultivate humans while not harming life, on whose high level of diversity (biodiversity) it existentially depends. Ontology is for the first time to examine what we, humans, should do to survive here on the Earth – for the period of our biologically allocated time – together with the other species that share our time limit.

B. General Characteristics of Evolutionary Ontology

Evolutionary ontology may also be briefly characterized at a general level. It represents an approach that attempts to understand being in accord with the results of the latest scientific knowledge. In addition to the common phenotype (explicate) forms of things, which are easily perceived by the biologically set senses and nervous system of humans, it observes also their covert genotype (implicate) forms; it takes into account the invisible intrinsic dynamics and structure of the perceptual form of things and of the process of ontically creative evolution. In an attempt to correct the illusions of modern science and traditional ontology, this approach rejects the Eleatic legacy of stable and unchanging existence, including the idea of the congeniality of existence (being) and human sociocultural knowledge (thinking). On the contrary, it ties in with the philosophical tradition of becoming, initiated by Heraclitus, which, due to the low degree of evolvement of theoretical knowledge, could never be duly philosophically thought through and clarified.

It appears that contemporary physics has already surpassed its Galilean and Newtonian eras. It is again attempting to win back its once lost status of the queen of the natural sciences. Equipped with new findings in cosmology, astrophysics, quantum mechanics, imbalance in thermodynamics, it is able to interpret the world not only in terms of particles and elements (localized unquestionably in space and time) but also in terms of the processes and conditions of open non-linear systems (in which organization, imbalance, energetic nutrition, fractals and minor lapses called fluctuations, play their roles). Owing to this approach, physics can study not only its traditional issues in the field of abiotic nature today, but also issues of life, organization, and the behavior of cultural systems.

Even though the traditional stationary ontology of natural being was forced to take into account dynamics and the changeability of some areas of reality, it ultimately preferred that which the cognitive component of human mentality was biologically pre-programmed for: stability, invariance, and a single level method of the arrangement of reality. In accord with the ancient assumption that the world has a stable principle and that a changeable being covers this stable and unchanging existence, traditional ontology attempted at abstraction from variances and changes. In conflict with the way in which science evolved, which gradually uncovered the unsubstantial structure of the micro-world and

the mega-world, traditional ontology (including to some extent the ontology of N. Hartmann) only emphasized what remains and apparently does not change and what neither increases nor disappears as a stable carrier of attributes. We generally designate this approach as a substance-attitude. It is so obvious that it has even been embedded in the character of our natural language itself, in which a crucial role is played by nouns and adjectives – bearers of qualities and qualities themselves. Its theoretical background can be represented not only by faith in the ultimate, unchangeable, and indivisible foundations of all characteristics but also by the absence of belief in the determining role of structure, organization, or the internal memory of a live system, process.

Because the concept of stationary ontology contrasts greatly with the latest findings and theories of science, evolutionary ontology not only rejects and criticizes such an approach, but also overturns the relationship between changeability and stability. The relatively stable surfaces of macroscopic objects, in accord with the visible form of reality, are unconsciously constituted by the normal human brain. Behind these surfaces, evolutionary ontology uncovers covert mechanisms for maintaining their macroscopic structures: fractional and expeditious processes of the interior microscopic activity and grand system processes of their reproduction and evolution within the ontically creative universe.

"Modern physics has shown that the rhythm of creation and destruction is not only manifest in the turn of the seasons and in the birth and death of all live creatures, but is also the very essence of inorganic matter" (Capra 1975, p. 271). With reference to Mach's principle of indeterminateness, which inspired A. Einstein to outline his general theory of relativity; Capra notes that the unity of the cosmos is not only manifested in the micro-cosmos but also at the level of the macro-cosmos. Thus conceived, evolutionary ontology faces many philosophically unresolved issues such as: what generates the ontic creativity of the universe? How does the process of this activity differentiate and refine itself down to the phase in which, under specific terrestrial conditions (that is under almost ambient temperatures and pressures), the most orderly of cosmic structures can be formed spontaneously and die out, such as live systems?

Alas, it is to be observed that the evolutionary standpoint has never been thoroughly applied in ontology. On the one hand, the historically conditioned prejudice that structure (being) is more fundamental than events (processes) and that ontology must examine only stable and unchangeable existence has certainly been in action. On the other hand, the recognition of becoming or natural ontic creativity in a small part of reality, for example in the area of the terrestrial life, was already acceptable in traditional ontological thinking. Evolution, approached from a narrow biological point of view, only as a barely testable hypothesis of the evolution of organisms, did not endanger the ruling stationary paradigm; the concept of a stable existence was supported by not only

philosophical tradition and commonsense but also by the authority of Newtonian physics. Briefly, the scarcely transparent viewpoint of biotic evolution, reduced for the public to the often misunderstood concepts of genetic variability and natural selection, was not in a position to become the general model of the interpretation of reality at all. Not even social evolution, already acknowledged and analyzed by many philosophers, could have been interpreted adequately within the scope of the anthropocentric stationary ontology as a novel ontical layer of reality integrated into a broader natural process. Philosophers simply have yet to arrive at an understanding of culture as being, which is existentially dependent on humanity (and consequently on nature) yet independent and, consequently, subservient to its reproduction and integrity – to its different ontic order. A classic example of an inadequate understanding of nature is Hegel' s concept of history. According to Hegel, the Spirit is active and creative; while nature is only a perpetual cycle, in which nothing ontically new is formed (Hegel 1983, p. 28).

Moreover, in modern philosophy an interpretation caesura between nature and culture was formed, which did not result from an understanding of culture – as opposed to nature – as an artificial structure. The caesura occurred because humans were excluded from nature and wrongly understood as its opposite, as a being belonging to a higher value world of culture. It is proper to note the courage of N. Hartmann in integrating human beings into being: "In the old ontology the opposite tendency was present, to see the whole world as relative to man… There the opposite appears: The world is not ordered toward man, but he is ordered toward the world" (Hartmann 1953, p. 35).

An axiologically higher world of culture – in Kant' s terminology the world of noumenon, freedom, and moral action – could not have been interpreted within the same ontological theory. It was *a priori* promoted to a superior world of human thinking, morality and meaning in advance. The author of the pronounced philosophical formulation of the axiological opposition between nature and culture is I. Kant. At a later stage Kant did not absolutely understand the enlightened contradiction between nature and culture (compare Kant 1957, pp. 348-355, 551-557). Also other authors (for example, system biologists) attack this opposition in particular: "The symbolic world of culture is basically un-nature, far transcending and often negating biological nature, drives usefulness, and adaptation" (Bertalanffy 1967, p. 27).

Evolutionary ontology, as we have already indicated, attempts to create a new image of the world and of humans – a new non-anthropocentric cosmology; but it is not intended to be a physical or a biological cosmology either. It is intended to be a consistently philosophical culturological cosmology that takes into account reality in its real structure as a conflict between two ontically creative evolutionary processes: the spontaneous activity of nature and the sociocultural activity of human beings.

To fully appreciate the evolutionary creativity of nature and the parallel ontic creativity of culture it is not necessary to abandon the traditional substantial characteristics of humans as self-reflexive and moral beings; beings capable of thinking, communication, and transcendence. Evolutionary ontology attempts (against the background of human biological origin and the capability to create culture) a better clarification and specification of these pseudo-real characteristics of human beings. It shows, for example, that morality and rationality, whose biological basis our ancestors adopted from primates, are not primarily genetically replicated characteristics of an individual, but they are primarily products of cultural systems – a part of their constitutive information (non-existent in nature as such). Even though they characterize each human as an individual on the one hand, on the other hand they glue together the relevant culture. They were formed as an emergent product of its development and functioning. Hence, their social role must also have been dual since the beginning. No matter how they co-create humans intellectually by means of relevant local culture (its scattered genome), they form an ontical type of cultural system, its phenotype. This cultural information, unknown to nature as such, makes culture possible; and it simultaneously divides reality into two different ontical systems (orders).

The gist of evolutionary ontology that is best expressed by its complete theoretical concept, including its main theories, may be conveyed in advance in five brief characteristics.

C. Roots and Main Categories of Evolutionary Ontology

1. *Evolutionary ontology* develops cosmology in accord with the ontological process paradigm; it *considers the process to be ontically more fundamental than the structure*. It differentiates two ways in which all explicate forms of terrestrial reality were constructed: the original and earlier *process of natural evolution* and the relatively new *process of cultural evolution*. In addition to the spontaneously created abiotic and biotic layers of terrestrial orderliness, it deals structurally and functionally with a different ontical layer of culture. Traditional ontology considered natural being to be the only being which preferred stability, passivity, and reversibility. In contrast, evolutionary ontology stresses processes, activity, and non-reversibility in its concept of natural being. This is the reason why it cannot directly resume the stationary ontology, which considers the world naturally objective and determined once and for all.

2. *Evolutionary ontology attempts at defining humans poignantly, systematically, and without unnecessary value aspects*. Despite uncovering human cultural ontic creativity, it attempts to be non-anthropocentric. It assumes the validity of the evolutionary hypothesis that humans are descended from Miocene apes and that what is called human nature was formed a long time

ago before the rise of culture. The human being, as a non-naturally, ontically creative species and the unique creator of culture, belongs to nature and is evolutionary-adapted, not alien to it. Just like any other species, humans are also formed only during a specific phase of the evolutionary process of the biosphere and after some lapse of time, irrespective of having managed to create culture, they will disappear from the evolutionary scene.

3. *Evolutionary ontology builds a new ontological status of nature.* It rehabilitates, ontologically and axiologically, the unique terrestrial nature. Terrestrial nature has been depreciated to being a mere objective reality, an uncoordinated and value-neutral matter, by the modern subject-object approach. Nature is presented as a self-organizing system with natural, intrinsic information, as an onto-creative evolutionary process; it has created all the natural orderliness and has spontaneously created all the necessary natural requirements of culture: a highly diversified biosphere and its perfectly adjusted biological ancestors of present-day human beings.

4. *Evolutionary ontology attempts a creation of an ontological status of culture*. It unifies intellectual and material culture into a single functional system with its own intrinsic information – *intellectual culture*. The traditional view did not consider culture to be a relatively separate time-space structure (being), but simply an addition and improvement (humanization) to nature. In contrast, evolutionary ontology uncovers the peculiar ontical substance of culture: its structural and functional incompatibility with nature. Because of the efficient utilization of purpose-oriented constitutive information and additional energetic nutrition, culture is an anti-natural subsystem of the biosphere. It is a subsystem that locally appears to improve nature; but, in fact, since it has only recently been fully manifested, it irreversibly damages and inhibits nature through an expeditious expansion of the opposing cultural orderliness,.

5. Identification of the dependence of culture on nature brings *evolutionary ontology to accept adequate philosophical responsibility for the fate of humanity.* In an attempt to prevent the environmental disaster, it no longer merely attempts a correct explanation of the structure of the world; it attempts to create a new, generally comprehensible, ontological minimum that would help initiate a change in cultural strategy and support new axiology, ethics, and politics. Evolutionary ontology rejects the anthropocentric justification of values, meaning, and purpose. Values, meaning, and purpose are not given to nature by humans but by a natural process of life, which has also created humans as a functional element; it has value, meaning, and purpose in itself. Life and natural structures must be interpreted in such a way as to have value, meaning, and purpose for humans as well.

* * *

Even though only the concept of evolutionary ontology points indirectly to a way of understanding the sense of terms and categories, we will meet the requirements of philosophical tradition and point out to some main categories explicitly. The main categories of this ontology include the following: *activity, evolution, order, orderliness, memory, system, and information*.

By *activity*, we understand an attribute of the entire reality (being as such). By the term reality, we mostly understand ontic activity. We consequently differentiate between original spontaneous ontic natural activity, which constituted nature including humans, and human ontic activity, which is purposeful, derived, and temporary and has constituted culture. We acknowledge the fact that the ontically opposite human activity (or culture) includes a biologically determined aspect of human species-selfishness.

By the *category of evolution*, we mean the following: 1. The cosmic ontically creative process of spontaneous activity of the Big Bang, which has constituted both the inanimate and animate nature; 2. The partial, terrestrial process analogous to spontaneous, sociocultural, human activity that has constituted culture. Since we respect the physical laws of mass and energy preservation, we emphasize that the creative processes of evolution – both natural and cultural – may produce only shapes, forms, structures, orderliness, and memory, that is information. The ontical opposition between natural and cultural evolution is related to the fact that both these evolutions produce their own types of information (their own types of "genotypes") and their structures ("phenotypes"). Recent planetary systems of biosphere and culture are, thus, integrated by different internal information. Sociocultural evolution takes place at the expense of natural evolution; it builds up the temporary cultural system, but it reduces the natural orderliness of the Earth (or increases its entropy).

The *category of order* we mean in two ways, which can be recognized based on the context. First, this category (in accord with David Bohm) is applied to reciprocally complementary orders (orderliness within natural or cultural layers of being), *implicate and explicate*; second, it is applied to opposite ontic orders: both natural order and cultural order. By ontical variation of order, which we consider superior to the complementary variation of order, we mean not only the interior constitutive processes and covert rules of natural and cultural construology (natural and cultural implicate orders) but also the result of this process, including its phenotype forms (natural and cultural explicate orders). The category of order also includes, in our view, the process of evolution. We associate the acknowledgment of two different types of terrestrial evolution with the differentiation of the two orders. This category points to the covert unity of the diversely shaped reality; to what causes its ontical reference and its humanly understandable origin, value, and meaning.

The *category of orderliness* is related to the category of order, information and memory. It means mostly the evident diversity of reality – what its covert

skeleton unity (rules, order) made it possible to create, where it crystallized, and what dominates its uniform skeleton. Under *category of orderliness* we mean both the exterior architecture of the abiotic, biotic, and cultural structures and in part also the processes retaining the identity of such structures in a particular range of external and internal conditions.

The *category of memory*, which is related to the category of order, orderliness, and information, we understand in both wider and narrower senses. In a wider sense, we understand memory as the entire evolutionary-created, ontical orderliness. In a narrower sense, which we prefer, we understand memory as the intrinsic memory, namely the volume of the information stored in the information media of an open, non-linear system – both natural and cultural.

By the *category of system* we mean a functionally integrated, ontical whole within which we may distinguish not only elements, internal structure, and internal functions, but also the behavior of the whole toward the surroundings, that is the external functions. We can distinguish systems open to information yet closed to mass and energy (cybernetic ones) and systems open to the input of nutrients (that is mass and energy) from the external environment. We consistently distinguish natural systems from artificial systems (inanimate and animate, sociocultural); and we distinguish inanimate non-linear systems without internal information (chemical solutions) from complicated non-linear systems integrated by their internal information (for example live systems, artificial sociocultural systems).

By the *category of information*, which is the central category of evolutionary ontology, we understand the orderliness of reality or the volume of an open, non-linear system memory or the content and meaning of messages. We consider information, like the orderliness of being and its memory in a wider sense, to be the main product (purpose) of evolution. We consistently differentiate between natural information, created by natural evolution, and sociocultural information, created by human cognitive activity throughout cultural evolution. The reason for this differentiation is the different volume and ontic role of natural and sociocultural information. Natural information – structural (genetic) and semantic (epigenetic, neuronal) – provides origination and reproduction of a live system, the biosphere. Sociocultural information, structural and semantic (intellectual culture), promotes the development and evolution of the cultural system that is ontically the opposite of nature. This information is, thus, so different (species-limited) in volume from natural information that natural evolution, in the case of the possible extinction of humanity as a species, could not have been able to adopt to in a cultural way either in written or otherwise materialized forms.

PART II
ONTOLOGY OF NATURE

Three
TERRESTRIAL NATURE

1. Natural Evolution

Recognizing the existence of any feature or process, to whose apperception humans were not *a priori* phylogenetically pre-adjusted, requires the intentional selection of a suitable level of discrimination – a level of abstraction. Such a selection must include two additional considerations in the case of evolution: the selection of a relevant time scale and the designation of a bearer of evolutionary change. Quite slow evolutionary changes can be described only within a long time span. Between types of evolution, we can distinguish only according to the bearer of the innovative activity: natural or cultural evolution. Studying cultural evolution as a specific field of activity featuring the comparatively fast pace of evolutionary changes is useful, because, amongst other things, it sheds new light upon evolution itself. Due to the philosophical, ontological consideration of cultural evolution, we can better understand the role of information within the evolutionary process, disclose the pattern of spontaneous creativity, and understand evolution in greater depth.

A. The Philosophical Understanding of Evolution

The evolutionary-ontological approach makes it possible to interpret evolution in the widest possible sense: not only as the evolution of organisms and social features but also as the evolution of the whole universe, including the two above-mentioned types of terrestrial evolution. We have noted above that the conflict between cultural and natural evolution, that is to say the expansion of sociocultural orderliness at the expense of natural orderliness, is the most serious reason for the current existential menace toward culture.

The fundamental difficulty in defining natural evolution consists in the fact that empirically determinable evolutionary changes take place over much longer periods of time than the daily, yearly, and life cycles of human beings. While our ancestors were biologically well equipped for the passage of time during the day, for perceiving figures, mechanical motion, or the potential function of things before the emergence of culture, slow or excessively rapid processes and changes cannot be reliably registered by the human psyche. Humans are components and products of natural evolution and the real creators and actors of cultural evolution; but, in the ideological reconstruction of nature and the encounter between these evolutions, they depend on the incomplete knowledge of the natural sciences and their aptitude for an adequate philosophical vision of the world.

This is probably why evolution remains a suspicious, mysterious concept difficult even for intellectuals to understand. This was also noticed by the protagonist of the evolutionary approach, Teilhard de Chardin:

> For many, evolution still means only transformism, and transformism itself is an old Darwinian hypothesis as localized and obsolete as the Laplacean concept of the solar system or the Wegnerean theory of continental drift. They truly are blind who do not see the scope of a movement whose orbit, infinitely transcending that of the natural sciences, has successively overtaken and invaded the surrounding fields of chemistry, physics, sociology, and even mathematics and history of religions. Drawn along together by a single fundamental current, one after the other all the domains of human knowledge have set off toward the study of some kind of *development*. Does this mean evolution is a theory, a system, or a hypothesis? Not at all; yet something far more. Evolution is a general condition, which all theories, all hypotheses, all systems must submit to and satisfy from now on to be conceivable and true (Teilhard 1965, p. 241).

Stephen Jay Gould, the well-known evolutionary biologist and advertiser of science, is also convinced of the extraordinary importance of evolutionary theory for an adequate interpretation of life:

> Evolutionary theory has many adherents. I believe this is due to three reasons: First, even though it is under constant development, it is still sufficiently firm to provide satisfaction and arouse trust but still it is so ingeniously unfinished that it can draw attention with the promises of puzzling and undiscovered treasures. Second, it is located right in the middle of the scope ranging from scientific fields studying timeless general phenomena to the fields focused directly and exclusively on the particularities of the development... And third – it is concerned with the life of us all... (Gould 1992, pp. 11-12).

Also, the leading figure of the "Brussels school," Ilya Prigogine, is an ardent defender of evolution:

> Wherever we look, we find gradual evolution, diversification, and instability. Curiously, this is true at all levels, in the field of elementary particles, in biology and in astrophysics dealing with the expanding universe and the formation of black holes (Prigogine and Stengers 1984, p. 2).

Elsewhere this author writes:

> …where classical science used to emphasize permanence, we now find change and evolution; we no longer see in the skies the trajectories that filled Kant's heart with the same admiration as the moral law residing in him. We now see strange objects: quasars, pulsars, galaxies exploding and being torn apart, stars that, we are told, collapse into "black holes" irreversibly devouring everything they manage to ensnare (ibid., pp. 214-5).

In the current environmental crisis, relevant knowledge about evolution is not a purely academic matter. We are trying to show that the evolutionary viewpoint is a general key to understanding not just reality but also the crisis; and we are trying to show that the essence of evolution should be explained to the public, namely by philosophy. The need for a democratic political solution of this crisis demands, from both specialists and ordinary citizens, an understanding of the necessary cosmological and biological minimum – an understanding of the elements of evolutionary ontology. The fate of environmentally endangered culture will be decided, amongst other things, by the extent to which humans are educated about the general world-view; it will be decided by their capability to recognize the seriousness of the global environmental conflict and to act in accord with the new image of the world according to different values. Hence, we agree with Hans Jonas (1985, p. 8) that the new situation makes us go beyond "ethics, into the doctrine of being, that is, metaphysics, in which all ethics must ultimately be grounded..."

Not only professional philosophers but also the professional public should share the view about the high evolutionary value of life– an attitude surprisingly supported even by the strongly epistemological critic of biological evolutionary theories, K. R. Popper. Popper's argument appears to be generally acceptable:

> It has often been suggested that values enter the world only with consciousness. This is not my view. I think that values enter the world with life; and if there is life without consciousness (as I think there may well be, even in animals and men, for there appears to be such a thing as dreamless sleep) then, I suggest, there will also be objective values, even without consciousness.
>
> There are, thus, two sorts of values: values created by life, by unconscious problems, and values created by the human mind, on the basis of previous solutions, in the attempt to solve problems which may be better or less well understood (Popper 1992, p. 194).

The single-level, Copernicus-Newtonian interpretation of the world is a highly reduced knowledge ignoring forms, orderliness, evolutionary time, life, and values; it which dominated for over three centuries and imposes on

the public, through school education, the anti-natural Euclidean arrangement of space; and it is in deep conflict with reality. We share Skolimowski's view that "eco-philosophy signals the beginning of a new epistemology: pluralistic, life-rooted, cosmos-oriented in contradistinction to the present one which is matter-rooted and mechanism-oriented" (Skolimowski 1992, p. 55). This small planet, Earth, which may not be the center of the universe, galaxy, or solar system, but it is the bearer of life and the temporary home of human culture. There, we do not manage just the movement, matter, and energy that are subject to the well-known laws of preservation. We manage here, as noted above, the precious orderliness established through evolution; the most advanced forms of life that we ourselves belong to but for which no law of preservation has been discovered so far. This view is also indirectly confirmed by Tom Stonier. When developing the idea that the internal structure of the universe consists of information, he writes that in the universe, "...there appears to be no upper limit to the amount of information possible" (Stonier 1990, p. 114).

Yet even in philosophy the problem of evolution has not become well adopted. The concept of evolution probably emerged for the first time in the work of Nicholas of Cusa De docta ignorantia. This term has been used in natural science for at minimum two centuries. Fossil findings first proved the changes in the somatic forms of the ancestors of recent organisms, and, later, even the hidden mechanism of the transformation of their internal structural information was unveiled in part (Lamarck, Darwin, Mendel, Morgan, Crick). According to H. Skolimowski (1992, p. 235), who strives (not unlike P. Teilhard) to interpret spirituality as, "an aspect of the unfolding evolution," evolution is not, "…a stupid and chancy process of stumbling upon one beneficial variation after another. Evolution is so exquisite in its mode of operation that it could be called divine. I, myself, have no difficulty in accepting the idea that God is evolution, and evolution is God…" Many environmental philosophers who refer to evolution and ontology do not seem to have relevant personal experience with the evolutionary-ontological approach; they do not dare to specify the problems of evolution.

Natural Evolution of the Universe and the Earth

Even though we know that it is difficult to express current views on evolution in few statements, and that there are still authors who deny evolution, we would like to point out that there is currently a wide spectrum of knowledge and theories of differing levels of universality available to the philosophical concept of natural evolution. According to them, we can expect (for example, in agreement with Pierre Teilhard and Henryk Skolimowski) that when the universe began, its organization was most simple and that it has increased gradually only through evolution.

> It began with the zero information state of the Big Bang: First the fundamental forces, then matter differentiated; the process of evolution had begun. The exponential growth of information was inevitable… The concept that as the universe evolves, its information volume increases, is in opposition to the idea that the increase in entropy will, inevitably lead to the "heat death" of the universe (Stonier 1990, pp. 71-72).

Natural evolution is a spontaneous constitutive process within the current tendency of the universe toward expansion and cooling, that is to say probably toward the "amortization" of the original concentrated activity of the Big Bang. It appears that as an independent, anti-entropic activity, it was stimulated by a possibly random disturbance in the symmetry of the universe.

> …we can see that a universe such as ours, possessing about two billion photons for every proton, needs to have arisen from a hot dense state in which there were on average a billion and one protons for every billion antiprotons. …The final imbalance between protons and antiprotons – the 'billion and one to a billion' bias – can arise from this decay rate asymmetry (Barrow 2005, p. 134).

The highly specific forms of this activity seem to have been gradually crystallizing not only in the structures of galaxies and stars but also, after the origin of the Earth, in the conspicuous elements of terrestrial nature.

Natural evolution probably began with the sudden expansion of rudimentary cosmic matter some 10 – 15 billion years ago. The first stage in the development of the universe was popularly described by Steven Weinberg (1977). Ever since (or since the Big Bang), the universe has not only expanded, diluted, and cooled down but also spontaneously structured itself. All the current structures of the mega-world, micro-world, and our intimately known terrestrial environment on the Earth – the macro-world – have gradually been established in this process. The energy concentrated in the original singularity appears to dilute and, secondarily, condense in different space structures due to the application of local gravitational forces.

If it is true that the current structure of the universe was ultimately formed by the secondary condensation of matter and energy dispersed from the original hot singularity; then, from some point of view, the thermal death of the universe, which was once feared by physicists and a section of the public, has in fact already come about. Relict radiation formed by photons, which succeeded in escaping "at the moment of the translucidity of the universe" (300 thousand years after the Big Bang), tells us that the average temperature of the universe is only three degrees higher than absolute zero, that is 3°K.

The so-called irradiation period of the universe lasted for about 300 thousand years, and we do not have any direct testimony about it yet. Afterwards, there must have come, according to the laws of physics, a period of star origin which has lasted until today. In this, the so-called matter period (star period), photons became less significant; because, with the drop of temperature to 10 thousand degrees, their energy became equal to the energy of particles. This is also when the first atoms with electron envelopes started to appear. Due to the disappearance of free electrons from the universe, the universe became translucent and enabled the origination of the first generation of stars composed of hydrogen and helium (No other chemical elements were present in the universe at that time.). With the exception of hydrogen and helium, all the chemical elements of the periodic system represented on the Earth's surface today were formed as a consequence of nuclear reactions inside these first stars or during their extinction.

It was a period that lasted about 10 billion years, and it was absolutely necessary for the natural creation of the abiotic building blocks of the Earth and the life on it. Chemical, pre-biotic evolution created the first organic compounds (aldehydes, hydrogen cyanide, amino acids, protenoids, nucleic acids) in the terrestrial atmosphere without oxygen; and it could already have taken place, along with the further development of life, on our mother planet.

To summarize, the gigantic process of the evolution of the universe created elementary particles, atoms, molecules, cosmic objects, the Earth, its minerals, the relief of its landscape, its water, its soil, and the biosphere including the biological ancestors of modern human beings. It appears that even the world of elementary particles is a complicated one. "Thus the number of particles increased from three to six by 1935, then to eighteen by 1955, and today we know over two hundred "elementary" particles... the adjective ′elementary′ is no longer quite attractive in such a situation" (Capra 1975, p. 86). J. D. Barrow draws attention to something we do not know from the macro-world: that all particles – from quarks and leptons to gluons – are absolutely identical. "We do not know why particles are identical in this way. …Hence, the intelligibility of the world relies upon the fact that there are relatively few types of elementary particle. They are numbered in tens instead of in thousands or millions" (Barrow 2005, pp. 197-198).

Natural evolutionary creativity can, thus, be understood as the general capability of a spontaneously active reality to create orderliness and accumulate information (memory). T. Stonier reminds us of a similar idea in connection with the Big Bang. "However, while energy was being lost, matter as we know it, was being created. A part of that process involved an increase in organization: For example, from quarks to nucleons to atoms. Thus energy was being converted not only into matter, but into structural information as well" (Stonier 1990, p. 151). This capability, bound not only to special cosmic conditions but also to a

set of special terrestrial conditions (for example the intensity of the gravitational power of the Earth, the presence and circulation of water in its atmosphere and pedosphere, the being of dissipative structures), is realized only when these necessary evolutionary conditions exist in a particular area. For example, hydrogen (like all quarks and electrons) no longer comes into existence in the recent, distinctly cold universe. On the other hand, ...the process of establishing chemical elements in stars and supernovas occurs continuously in the universe. This is also true of the permanent, relief-forming processes on the Earth, which are so clearly visible in dry and geologically young regions.

The biotic and cultural orderliness on the Earth – if we set aside their different structures, different times of origination, and their mutual opposition – can gradually grow by means of dissipation and multiple local transformations of matter and energy drawn by live systems and culture from their environment. This special nourishment, which is in the form of the macroscopic products of natural evolution in the case of cultural system, is only used in part for the maintenance of the open, non-linear systems in the state of high orderliness. Some parts of this nourishment may be consumed during the establishment of a new evolution and the accompanying reproduction. An irreversible development toward the greater complexity of a live and cultural systems arises only in a situation where the increase in orderliness, mediated by information, can be built into the structure or, in the case of culture, at least be written into the memory, that is to say the sub-system of intellectual culture.

Since evolution – in contrast to entropy – is an ontically constitutive process, it can collaborate with general decomposition, move against it, "live as a parasite" on it, and is capable of entropizing the environment secondarily, as can be seen relatively clearly in cultural systems. Even in its spontaneity, it is a fully independent process. In opposition to the tendency of reality toward decomposition, it selects, seeks, experiments, creates, and disturbs; it builds increasingly subtle and differentiated emergent structures and the rules of their formation and functioning; it spins the web of the ontical plurality of reality—the structured order of the universe. Nevertheless, we must distinguish between at minimum two forms of disturbance (disappearance) of natural and cultural structures: disturbance caused by entropic processes, namely by the natural decomposition of information-prescribed or succession-established structures; and disturbance caused by information change in the "project" (change in the implicate memory) in the process of system evolution, that is to say by a change in the constitutive natural or cultural information.

B. The Working of Natural Evolution

Since evolution, metaphorically speaking, proceeds "against the current", against the tendency toward general decomposition, it needs adequate energy

support and requires energetic "nourishment". If we look only at the energetic nourishment of the biotic evolution, it appears that it is the limited availability of photosynthesis to bind solar energy to biomass that is the reason for the resourceful ability of the terrestrial system of life (biosphere) to face entropy in all organizational ways imaginable; to slow down the degradation of the biotically bound solar energy into waste heat no longer used. Since evolution blindly follows the optimum path, this spontaneous, creative capability has finally materialized in the immensely complicated orderliness of the terrestrial biotic community. Climatologists discover that the vast majority of the solar energy falling on the Earth cannot be used for photosynthesis (for biomass creation), but it is forced to flow around the reduced system of life and become the cause of extreme climatic changes.

Biotic evolution, which creates blindly, but so slowly and "judiciously," that its structures almost do not grow morally old, consumes the greater part of its energetic nourishment in maintaining, operating, and reproducing the biosphere created earlier (explicate forms of the biosphere memory). Only a negligible residue of this nourishment appears to crystallize in the changes of orderliness of the biosphere (in the implicate forms of memory), namely in the increase of the organizational complexity, in the new function and emergent structures. Once we have noted the problem of the moral aging of a biological species, then it is necessary to take into account that the time horizon of this feature is millions of years.

The situation is different in the case of cultural evolution, which simply learns perfect "natural engineering." This evolution has partially been liberated from both direct dependence on the natural energy in the ecosystem (for example, technical civilizations discovered how to employ concentrated sources of energy – primarily fossil fuels) and from dependence on a few chemical elements of the periodic system utilized by terrestrial life in building its structures. A considerable part of energy (activity) is also consumed in the operation and reproduction of the earlier-formed cultural system. The more extensive this system is, the greater its part that is lost. Considering the rich energy resources of the Earth, such as the wide range of choice of "building materials" and the more flexible sociocultural memory that provides the dynamic information-open genome of the cultural system, the global culture is not under immediate threat of direct energetic or innovative deficiency. There is still enough energy for the creation of new elements and subsystems of the cultural system, for progress and growth; a large part of cultural activity crystallizes today in deliberately and spontaneously constituted structures. The amount, diversity, and complexity of cultural artifacts continually increase more or less in proportion with the growing energy consumption and information interconnection of globalizing culture. Yet, in perspective, this orientation is dangerous; since the surface of the Earth is finite, and recoverable supplies of

raw materials that are hard to replace – for example oil and gas – are estimated to last only for dozens of years.

In a general philosophical statement, we can say that natural evolution consists of all "growing" branches of the divergent evolutionary process of the universe. Its product is not only the number of galaxies and stars – there are about 100 billion galaxies in the universe with about 100 billion stars in each (Barrow 2005, pp. 206-207) – but also the dynamic structure of the universe today, including the abiotic and biotic structure of the Earth.

Evolution generates, destroys, and modifies the elements, complexes, subsystems, and systems so that the diversified aggregate, in its increasingly ordered system, is more and more economical in using its limited evolutionary source: for example, while the biosphere uses the energy of the Sun's radiation, culture uses the energy exerted and released from nature by humans.

Further, we can say that life, as the finest potentiality for the ontic evolutionary creativity of the universe, is realized under quite delicate local circumstances: on the planet Earth and within an extremely narrow range of physical-chemical conditions. These conditions have been created and regulated by the biosphere itself to a considerable extent and have also been neglected in philosophy, because the evolution of the biosphere is not sufficiently known. These conditions include not only the weakening ozone layer, which protects life from ultraviolet radiation coming from the universe, but also the disrupted, all-planetary thermostat of the Earth. Fortunately, we already know that our planet represents a single large organism (Gaia), whose self-regulating abilities exceed the limited resources of culture. The Gaia hypothesis of J. Lovelock appeared in connection with research concerning the issue of life on Mars. It was inspired by the idea that the stability of the temperature and chemical composition of the Earth's atmosphere requires the being of an active control system. According to the author, the biosphere regulates and maintains the climate and the composition of the atmosphere so that it is optimal for existing forms of life. It does not mean that it is a purposeful or planned regulation; because its formation is spontaneous, just like the formation of the inner memory of the live system (Lovelock 1988).

The complicated question concerning the origin of life can be recalled only briefly here. Complex organic molecules could also have been formed in free cosmic space, but the majority of renowned authors agree that life could also have originated on the Earth on the whole scale. If we set aside the symbiotic theory of evolution as proposed by Lynn Margulis (1998), the crucial issue of the origin of life was the functional integration of the subsystem of inner memory into the live system. S. Lem (1995, p. 21) has proposed another hypothesis of a "minimum complexity threshold," claiming that after exceeding this threshold, "... a material system cannot only preserve the current organized state in spite of errors, but also transfer it to the following organisms in an unchanged way".

In conceiving the further development of life, we face two philosophically notable issues:

First: in the biotic evolutionary process we find something quite familiar to the history of human culture. S. J. Gould put it simply: "... the highest form of life was algal mat-thin layers of prokaryotic algae that trap and bind sediment. Then, about 600 million years ago, virtually all the major designs of animal life appeared in the fossil record within a few million years" (Gould 1992, p. 139). This well-know author believed that current evolutionary theory does not have to insist on the sequence of changes, because, "In any local area, a species does not arise gradually by the steady transformation of its ancestors; it appears all at once and "fully formed". …Most species exhibit no directional change during their tenure on earth" (ibid., p. 182).

Not only was this break, followed by a rapid acceleration in the development of life sometimes denoted as a "biological Big Bang," probably connected with the departure of organisms from the ocean to the land and the "discovery" of the new biotic building block principle – the eukaryotic cell; also it was also connected with the fact that, with more complex structures, evolution could proceed simultaneously at several levels of organization. According to S. Lem, creating an eukaryotic cell meant the formation of, "... an elementary foundation brick in the biological building material identical in its main scheme both in trilobites one billion years ago and in the chamomile, octopus, crocodile or human of today" (Lem 1995, p. 23).

It reminds us of the European cultural situation after the Industrial Revolution: coping with instrumentalization and the achievement of a threshold value for rapid technical and general cultural growth in nineteenth-century Europe. An analogous evolutionary mechanism was also implemented in the development of abiotic technology after the advent of mechanization and automation: the rapid growth, differentiation, and overlapping of all historically discovered technical principles and elements.

Second: The insufficiently resolved problem of the two different types of natural orderliness is worthy of theoretical attention. We are leaving aside the abiotic area, where it is more useful to think of constitutive or binding forces (patterns, bonds, connections, physical interactions), instead of the internal information (memory) of a particular structure.

We have noted above that it was T. Stonier who studied the problem of information as a physical reality. "The organization, namely the spatial arrangement of the atoms in such a crystal, acts as a template for other atoms being added on, causing molecules moving at random in a liquid to be bound into a non-random arrangement (thereby bringing order out of chaos)... " (Stonier 1990, p. 14).

In the sphere of life, there is a demonstrable difference between the strictly information-prescribed (instructed) *orderliness of a particular organism* (namely its fixed genotype and phenotype orderliness) and information non-

prescribed *ecosystem orderliness* (not instructed). The second probably exists only in a phenotype form. In addition, a multicellular system has to grow from one cell (zygote); and its multilevel organization, including the process of ontogenesis, must be inscribed in the structure of its heritable memory as an instruction (that is "construologically"). The flexible ecosystem orderliness, similar to sociocultural orderliness in many ways, is created by succession; and, thus, it may probably be integrated only by the mutual food and reproductive dependence of live organisms mediated by their knowledge, namely natural genetic and epigenetic information. An ecosystem has no free or bound concentrated information that would fulfill the function of its memory or an anti-entropic barrier.

There is also an approximate analogy in abiotic terrestrial nature. Minerals and rocks formed in the Earth's interior (or in the Earth's crust) are subject to entropization. They disintegrate, decompose, and, from their newly-acquired abiotic orderliness, fertile soil is formed with the participation of live systems. It is precisely the orderliness of the soil, no matter how its abiotic substrate originated through the enthropization of the bedrock, which can serve as a good example of the formation of free "ecosystem" orderliness without the occurrence of concentrated internal information. In this connection, it is apparent that Prigogine's dissipative structure theory, derived from chemical systems and reactions, is primarily valid in that changes in orderliness are not prescribed by information.

These two different types of orderliness, secured by different types of information and different relationships between information and phenotype structure, also have their analogous sociocultural opposites. Information discrepancy is also found at the level of cultural orderliness between the strictly technologically prescribed orderliness of particular human artifacts (for example, buildings, technical systems, common objects), and a more loose sociocultural orderliness at the level of the tribe, village, town, or whole local culture. The first can partly be encompassed by the individual human mind. The second cannot be encompassed (and, thus, cannot be created) by any human individual.

Although natural or cultural information necessarily participates in the development of both types of orderliness of live or cultural systems, the course and results of the evolutionary process are always more or less unknown, undeterminable, and unpredictable. That is not only because the scattered information of a more freely ordered system (ecosystem, local culture) arises together with this system in the process of its constitution and transformation, but also because the evolution of the strictly information-prescribed structures (for example, biological species) does not take place as a mere implementation of the scenario. It takes place as a complicated, dynamic interaction between information, system, and environment (context) – as an interaction between

genotype and phenotype in a dynamic, material-energetic world. Hence, information not only determines change, but there is also a possibility that internal information may manifest itself under particular conditions. It even depends on the form, behavior, or "success" or "popularity" of the evolutionary structures in the active, natural, or cultural environment. Evolution is, thus, co-determined by many random factors at all levels of the organization of reality. This is well-documented in the development of live systems, but it can also be illustrated in the development of culture. Intellectual culture, which has no analogy in nature (no ecosystem or biosphere as a whole contains such information), can anticipate or regulate the results and trends in cultural evolution in some ways.

The perspective of evolution, concretized and specified by the social sciences, can become the new principle in interpreting the general philosophical vision of the world – philosophical ontology – which has struggled for centuries with the issues of the origin of the world, of its essence, and its composition. Especially due to the progress of the physical and biological sciences (primarily in non-equilibrium thermodynamics and genetics) we begin to understand the general rules and order of "natural construology;" it is the essence of spontaneous creation of complex natural structures from relatively simple elements and components. Thus, we also have better a understanding of intentional and spontaneous cultural construology; this may be differently oriented but grows from natural orderliness and remains connected with it through material structures of the Earth, through the energy of the ecosystem, genetic information.

Everything that seemed to be created, eternal, and immutable for Aristotle and Newton now has to be viewed as emerging and disappearing; as unfinished, transient, and changeable; as a part of large, divergent evolutionary process, which has a beginning and may also be an end.

Thus, to return to the introductory idea of this chapter, it is not only the understanding and study of cultural evolution that shed new light on evolution proper. Studying evolution in any area of its manifestation probably has a catalytic effect on the process of evolutionary thinking.

2. Natural Information

Information (the content or volume of memory, the orderliness of being) is probably the most significant product of evolution integrating both the open non-linear natural systems and the open non-linear cultural systems. Information not only ontically unites but also ontically differentiates reality. In contrast to the visible forms of evolution, which can be distinguished in the explicate order of nature, information is not easily accessible to human

knowledge; because most of it is contained in the implicate order in nature. "Matter and energy comprise the surface structure of the universe. The surface structure of the universe is readily perceivable to our senses. The internal structure is more subtle. It is organized in a manner not so obvious: it consists not only of matter and energy, but of information as well" (Stonier 1990, p. 1).

Natural biotic information, which is as old as life itself, once divided the formations of terrestrial nature into two generally recognized layers: live and non-live structures. The sociocultural information formed three and a half billion years later was similarly constitutive: as a different type of information, it even acted in an ontically more radical way; since, inside the previously ontically unified nature, it helped to constitute culture and situated the younger cultural systems in potential opposition to it. So we can now find on the surface of the Earth, besides the biotic system integrated by natural internal information, another global system – culture, which is integrated by its internal sociocultural information. The ontical unity represents the unity of construction; the unity of the constitutive principles, rules, laws, and interactions – in fact, the unity of information. Since both global systems (biosphere and culture) acquire, accumulate, and use their internal information ontically, it is apparent that understanding the principle and the role of the information may help establish the evolutionary, ontological concept of reality itself. We will attempt to clarify this below.

The blurred term information is close to the terms of knowledge, message, the meaning of message, on the one hand. On the other hand, it shows affinity not only with terms such as memory, program, and structural copy, but also with terms such as order, structure, and orderliness. These three variations of the meaning of information – as content and meaning of a message, as a content of memory, and as an orderliness of being – are hard to distinguish, and they are often confused in everyday communication and in technical language.

The problem of understanding the principle of information is complicated by the facts that natural information and natural reality are products of the same type of evolution, and each piece of information necessarily refers to the structures formed by evolution or – as meta-information – to other information about structures. Since the surface of the Earth was highly ordered even before the existence of life and humans, its natural memory structures represent a potential (accumulated) source of information for all systems with cognitive abilities, namely for live systems and culture.

Information is encoded in two ways in the live systems considered to be natural memory structures. First, it is encoded in the information (memory) structure – the genotype, and it is also encoded in the somatic structure – the phenotype. The second was the only subject matter of systematic, natural-scientific studies of live systems until quite recently.

Providing an exact interpretation of this problem is complicated by the fact that information about the structure (or about another piece of information) must also be encoded in the structure as a part of that particular system; it must be bound in a material-energetic memory medium. Critics who refuse to acknowledge the objective existence of information are right in the sense that the term information is both uncertain and relative; without a specific context (system, bearer, subject), it is hard to identify information reliably. Even authors who overestimate the role of humanity as the bearer and decipherer of information, and who emphasize that information itself does not exist, are, right in some way (Maturana 1985, p. 33; Maturana and Varela 1987, p. 78).

The notion of information has spread only with the development of cybernetics (by such authors as for example Claude Shannon and Norbert Wiener), but mathematical analogies between the volume of information (information volume of negentropy) and entropy meant that it became a complementary notion to the notion of entropy in thermodynamics and in the general systems theory. C. E. Shannon was probably the first to formulate mathematically the anticipated connection between information and entropy in his paper of 1948 (Shannon 1984, pp. 379–423). Due to the notion of information ambiguity, it has quickly won recognition in all theoretical and communicative situations where subject-object and subject-subject thinking is applied. The existential endangerment of culture by a destabilized biosphere nevertheless brings about the need to define the notion of information in such a way that it could also become a philosophical and ontological category.

Even though information originally represented mathematically expressed negative entropy (more to this problem, see Wiener 1954, p. 21) namely a measure of system orderliness (contrary to the measure of its disorderliness), the current increased emphasis on inter-human communication brought about two theoretical changes: 1. It resulted in the hypostasis of the semantic meaning of sociocultural information and in the distortion of the ontic role of information itself; 2. It caused an irrelevant increase in the significance of culture and cultural orderliness – at the cost of degrading the value of nature and natural orderliness. We will attempt to explain these two items in the following chapters and introduce some new evolutionary-ontological arguments.

We should emphasize right at the beginning that by information we will not primarily understand what is transferred between mutually communicating people or what circulates within, and is processed in, the cultural information systems. The classical definition of information adapted to the cybernetics of the time was presented half a century ago by N. Wiener: "Information is a name for the content of what is exchanged with the outer world as we adjust to it, and make our adjustment felt upon it" (ibid., p. 17). We will ignore this narrow anthropological understanding of information because we consider information to be the main product of evolution; to be the most important

result (or "meaning") of the previous spontaneous activity of reality; and to be the "internal meaning of the universe" and human culture. We consider it a part of the reality forming process. Information is not only a message transmitted, received, or processed by a system but also a compressed abstract structure of the system (its memory in a narrower meaning) or as orderliness contained within a structure (memory in the wider meaning). In this sense, information exists objectively, and the category of information is even more important for the ontological understanding of the world than the Modern, anthropological (ignoring the natural orderliness of reality) categories of movement, space, and time. "The structure of the universe consists of at least three components: matter, energy, and information; information is as intrinsic a part of the universe as are matter and energy" (Stonier 1990, p. 107).

A. Structural and Semantic Aspects of Natural Information

Already at the level of the inorganic world, the products created by evolution influence one another not only through material and energy but also through their structures and information. The first real information, namely the ontically constitutive, predominantly structural information (a duplicate of orderliness) and the "complementary," predominantly semantic information (semantic, behavioral), is spontaneously created and used by natural biotic evolution. Predominantly structural information is understood here to be the dominant aspect of natural genetic information, and predominantly semantic information is understood to be the dominant aspect of natural epigenetic (neuronal) information. Structural information can be schematically understood as language recording of a real structure, which is structurally isomorphous to such an extent that it makes it possible for the relevant system to perform its instructed reproduction. In the case of semantic (meaningful) information, which is usually fragmentary and ambiguous, there arises (mostly in the cultural realm) the problem of disclosing the different levels of its meaning. Three levels of semantic information are noted by D. R. Hofstädter (1985, p. 182).

We do not consider these dominant aspects of the two kinds of information described to be separate types of information. Still, we must admit that natural information existed (and fulfilled its ontically creative function) in the genetic and epigenetic forms about three billion years prior to humans.

If we return to the introductory idea about the integrating and differentiating role of information, we can now say that natural biotic information separated the layer of animate nature from inanimate nature on the one hand; and, on the other hand, it connected both of these layers and integrated them into a single organism (the natural order) of terrestrial nature.

The first monocellular organisms survived and reproduced in the terrestrial abiotic environment three billion years ago due to the fact that they

developed and used knowledge – their genetic (predominantly structural) and epigenetic(predominantly semantic) information. Yet this epigenetic neuronal knowledge, which is more or less conscious at the level of animals, does not form the structure of reality; it is not materialized in it; and it is not ontically constitutive (or if so, then only exceptionally). It is knowledge that is repeatedly forgotten. Only human sociocultural knowledge has asserted itself as ontically constitutive due to special circumstances. Without the terms information and memory, we cannot understand adaptation or the process of the spontaneous origination and development of the highest terrestrial organizational complexity – the autopoietic system of planetary life. Through an understanding of the information problem, it is concurrently possible to describe the biologically and culturally interesting phylogenesis and ontogenesis of humans; it provides an adequate anthropological and evolutionary-ontological understanding of culture.

In the process-based, evolutionary ontological approach, both genetic and epigenetic (neuronal) information are, thus, the most important products (and parts) of evolution; they are simply everywhere that sufficiently complicated systems (structures) and their material-energetic exchanges originated. Evolution – natural and cultural – creates not only the materialized orderliness of reality (explicate memory, order), but also non-materialized, ontically potential (implicate memory, order) orderliness. This duality apparently has a much deeper meaning than approximate philosophical intuition may grasp. One of its aspects is also the testing of the compatibility of information-prescribed "construction changes" by the complex physical action of the external world. S. J. Gould was quite forthright in his critique of The Selfish Gene (Dawkins 1976). He showed that this well-known book contains a fatal flaw. "No matter how much power Dawkins wishes to assign to genes, there is one thing that he cannot give them – direct visibility to natural selection. Selection simply cannot see genes and pick from among them directly. It must use bodies as an intermediary" (Gould 1992, p. 92).

The concept of information is not so broadly understood either in philosophy or in the social sciences. A narrower meaning of the concept of information has prevailed; probably since it is more easily understood merely as knowledge, message, a meaning of message. It is understood as a predominantly semantic sociocultural information and only exceptionally as the implicate orderliness of the live system (its internal memory), namely the predominantly structural natural genetic information. Reasons for this narrower definition of information are understandable. Too wide an understanding of information, for example as a synonym for ontical orderliness itself (as a phenotype structure), would make the interpretation of the constitutive role of spontaneous or intentional changes within the live (or technical) system more difficult.

The precise distinction between structural and semantic aspects becomes complicated due to the genetic information that can be simply understood as solely structural information (More precisely, structural information can be considered to be a fractal of the genomic genetic information that is ontically compatible with reality.). This distinction is not easy even in the case of neuronal information, which can be simply understood to be solely semantic information. Such a distinction is also difficult in the cultural field. Among other things, dominance has changed here. Scientific theoretical knowledge, which is materialized in a material culture, including technology and can be considered to be a prototype of partial structural information, is subordinated here to the dominant system role of common experience, that is to say to reality as a whole, which is more adequate to semantic information. Semantic sociocultural information (common opinions, moods, and emotions) is quite rigid and conservative under standard conditions, but it can become significantly constitutive one through increased human activity in the critical stages of social development. The greater integrative power of non-theoretical elements of the intellectual culture was noted also by the author of processual ontology, A. N. Whitehead: "My main thesis is that a social system is kept together by the blind force of instinctive actions, and of instinctive emotions clustered around habits and prejudices. It is not true that any advance in the scale of culture inevitably tends to the preservation of society" (Whitehead 1958, p. 69).

Even though understanding information in the widest possible way (as a synonym for a phenotype structure of society) does not contradict the spirit of evolutionary ontology, we respect biological convention and understand natural information in accord with it as follows: 1. As a content of genetic memory of a live system, namely as a support system consisting of a set of rules, instructions, algorithms; 2. As predominantly semantic epigenetic information, namely neuronal information built into, or newly stored in, the central nervous system (CNS) of animals.

A more precise definition of epigenetic information, or of the very adjective "epigenetic," is problematic even at the cellular level. In the essence, epigenetic refers to the controlled transfer of differentiated cells to the predecessor without altering the DNA encoding sequence. It is probably this ability to preserve the differentiated state of nerve cells that is the basis of knowing and epigenetic memory in the central nervous system (CNS) of animals. Setting aside the unclear role of protein regulating molecules, it is obvious that an "... epigenetically determined process can be inherited with the same precision as a process determined by genetic alteration" (Darnell, Lodish and Baltimore 1990, p. 994).

There is also the interesting question of how the bearer of information, namely a specific memory structure of a system, is different from the information itself. It appears that the bearer must be structured to enable the system to

store information in it and later be able to pick it up, interpret it and apply it if necessary; more simply put, it must be able to use it pragmatically, ontically. From a formally process-based viewpoint, information is a construologic pattern, a limitation upon system variety (the problem of variety limitation was introduced by Wiener' s contemporary, W. R. Ashby (1963, pp. 121-139)); it is its structure compressed by an algorithm or the internal "spiritual" barrier of a system, preventing its decomposition but also providing its change and evolution. From a formally content-based viewpoint, this is an equivalent structural copy of the system. For example, in the case of live beings, it includes their morphology, physiology, behavior patterns, and the ontogenesis program in a way that provides the origination, life, and demise of individuals, populations, and species and is known only to nature in its complete scope. The arguments presented above imply that the term human (subject) cannot be the relevant "opposition" term to the general concept of information as indicated by the current, common, anthropocentric overestimation of the semantic aspect of sociocultural information. Such opposition terms must be structure, system, and context at most levels.

By adopting an evolutionary-ontological approach, we do not underestimate the significance of the semantic aspect of genetic or sociocultural information; but, for understandable reasons, we favor the role of the structural aspect. Two different biotic structures carry genetic and epigenetic information at the cellular level: in eukaryotic organisms, it is a schematically cellular nucleus and a plasmatic membrane. In multicellular animals, the neuronal semantic information acquired in the process of knowing – if we set aside the problem of the innate means of behavior – is stored mostly in their CNS.

We attempt to describe not only the ontically constitutive function of the internal information of the live or cultural systems but also the memory-secured opposition between natural and artificial ontical structures. Since all structures on the planet Earth are products of either natural or cultural evolution, we must acknowledge that there are just two large, ontical-creative processes that spontaneously produce and use their internal information. This is the reason why we have adopted, besides the above-stated distinction between the semantic and structural aspect of information, one more or much more important classification: the division of information (memory) into natural (nature-based) and sociocultural (artificial) information.

B. Genetic and Epigenetic (Neuronal) Information

The genetic information (structural) of a live system objectively includes some evolutionary exclusivity. This information comes into existence over a long process of phylogenesis, and after the necessary selection it becomes the content of the *a priori* structural memory of a live system (a genome); so it not only has a

"privileged" position inside the system and helps to reproduce its evolutionary-created structure but also plays a dominant role in the system's relationship with its surrounding environment. The genetic information of a live system interactively determines which material-energetic flows in the environment are relevant for the preservation of the system (It ensures commensurability between the system and the environment), and in this way it creates an organism that is also "semantically" preset to its environment – to receiving the scope and structure of the potential significances adequate to itself. The metaphor of "semantic configuration" may effectively be used in a narrower sense of the word. For example, the sociocultural memory of an individual, an ethnic group, or a whole local culture must be properly configured semantically; because it also serves the survival and self-assertion of its proponent. Also, Wilson's "epigenetic rules," such as the, "...epigenetic rules, the hereditary regularities of mental development that bias cultural evolution in one direction as opposed to another", may be understood approximately in this way (Stonier 1990, p. 14).

The structural aspect of genetic information, as noted above, makes it possible to understand correctly not only the processes of adaptation and evolution of live systems but also the processes of evolution and adaptation of culture. Understanding the semantic aspect of neuronal information is, on the other hand, useful in the analysis of the behavior of live systems (for ethology) and for understanding the culturally-constitutive, communicative activities of humans.

The natural information of both inanimate and animate systems (memory in the narrower meaning of the word) functions as their anti-entropic barrier. Setting aside the inconclusive interpretation of this question in the abiotic world and focusing on the problem of the natural information of live systems (contained in their genetic and epigenetic memories), we can see that this information helps maintain (and develop) their evolutionarily achieved system orderliness. Considering its origin, function, and location inside the system, it is information of two kinds: genetic and epigenetic. Natural genetic information that originated in phylogenesis during (the hard-to-monitor) species evolution, is stored in the nuclei of the tissue cells of multicellular organisms. As the memory of the elementary cell (zygote), it precedes live individuals; it is *a priori* to them. It is transferred vertically, even though it combines horizontally during sexual reproduction within a species. Natural epigenetic information (neuronal), which is established in ontogenesis (during the life of an individual), is spread horizontally and transferred into future generations only indirectly: by means of a particular ecosystem, specific population, or human culture. This other type of information is bound in different molecular complexes of cells and in the structures of nervous cell bonds.

Since we are not interested in subtle biological problems but in the genesis, substance, and ontic role of sociocultural information, we understand epigenetic information as one of its types – the *a posteriori*, predominantly semantic

information acquired from experience and through knowing throughout the life of the individual. This information, which can also be called behavioral, is stored in the central nervous system (CNS) of multicellular organisms, and, thus, also in the conscious memory of humans. Its different measure of adequacy to the external world, its different function, means of replication, and the fact that it is stored in two different places in an organism – in the genome and in the CNS – correspond to the two kinds and means of origination of natural information described above.

a) Natural genetic information, which is always *a priori* structural information regarding specific live individuals, and whose "measure of objectivity" (compatibility, adequacy to the structure of reality) must be quite high, exists exclusively as one has been biotically built in (Not easily accessible to human perceptual knowing; it is not free or audio-visually available) in two different ways: first, as one that is integrated in the comparatively simple molecular (memory) structure of the DNA double helix (see Watson 1968), that is in the genotype structure; and second, as one integrated in the complex, multi-layered structure of an organism, namely in its somatic and neuronal structure, in the phenotype structure. In accordance with the above, we understand genetic information as the first method of building in, which looks like a text twisted into a double helix and composed of four letters of the nucleic acid language (adenine, guanine, cytosine and thymine). We understand only a part of this special text, which is a component of the natural implicate order of nature, but many of its sequences have already been deciphered. Medical science researchers have already started to map the human genome (as a part of the American project HUGO – Human Genome Project), hoping that within one or two decades they will know the sequence of letters in the whole of our DNA (3.6 billion signs).

The second way in which genetic information, which is a part of the explicate order, is formulated (materialized, expressed) can commonly and theoretically be known; and this knowledge can be phrased verbally; it can be simplified, written down, and secondarily sorted out in a way that facilitates our best possible understanding of the live system (and also through this system its expected internal information). Yet we are unable to fully reconstruct either the first or the second means of "expressing" the natural genetic information in our differently conceived sociocultural information, which is a part of the implicate order of culture.

As we have noted above, the natural genetic information of live systems is the spontaneous creation of natural evolution. Considering the continual and long tradition of life, it represents its compressed record, a precious log of the history of natural biotic construology. It is an accumulated "intellectual richness" that provides the development of terrestrial life; and, even though it belongs to the biosphere, it is culture that is currently striving to seize it. Luckily, these attempts have met with little success. Genetic information, which

is a specific correlate of biotic evolution – that is to say dissipated, complexly differentiated, and in live systems a frequently repeating text that is not easy to translate into the text of ethnic language – has a different language code. It is a part of the implicate order of nature; it was established by an unknown process of the random generation of new information variants and their testing in the complex natural environment; and, thus, we, humans, cannot create and cannot understand it; we can only *destroy it*.

Phylogenetic adaptation is not the only way a live system can acquire and accumulate information about the external world. Besides this adaptation, there is also ontogenetic adaptation, namely information acquired by means of experience and knowing. But due to the fact that only phylogenetically acquired information can be written into the genome, which is replicated during the reproduction of a live system, biological species become accumulators (databanks) of the natural biotic information. Since all live creatures are our distant relatives, their genomes are information recordings of our common geologic past (see Lorenz 1981, p. 57). The destruction of species and the species composition of the natural ecosystems that also destroys a part of the natural biotic information acquired through experience and knowing, namely the neuronal information of live systems, is an irreversible loss of information; it is the barbarian destruction of an irreplaceable anti-entropic barrier of life. It is a dangerous loss of the evolution-created information potential of the Earth. Due to the fact that species do not change much throughout their existence, new information accumulates and disappears in the biosphere mostly through the slow process of the natural origination and demise of these species (see Raup 1993).

Humans, who are to blame for the current rapid decrease in the natural orderliness of the Earth, are fortunately both a natural and a cultural being; their future is critically dependent on both of these ontical systems (orders). Let us hope that the measure of the natural orderliness of the Earth, which is proportionate to the accumulated information richness of the biosphere, will eventually be acknowledged as an irreplaceable condition necessary for human being and as an attribute or an evolutionary correlate of healthy cultural development, in part, because of the contribution made by philosophy.

We will use a sociocultural analogy now: every phylogenetic line seems to be described in a special "file of a continually rewritten and corrected text," yet among the files – if we set aside the horizontal transfer, sufficiently demonstrated only in the case of bacteria – information cannot be exchanged naturally because of the inter-species barrier. This is the evidence that the genetic memory of an individual of a specific species (genotype) forms almost a closed whole from an information viewpoint. This closed whole is structurally "isomorphous" with its system context (phenotype) and can serve only this phenotype as an information barrier against destruction and as a means of its

possible reproduction. This may be the reason why live systems are constructed in so many different ways.

Since the language of genetic information is "procedural," its statements may be tested only pragmatically: a true statement means survival, and a false one means mutilation or destruction. Only the specific live system (the gamete of an individual of the opposite sex of the same species) is able to react correctly to the genetic information during sexual reproduction; it is able to "distinguish, accept and respect" its text. Excessively damaged information of the opposite sex of the same species, or information of a different species, cannot be used by the live system and is usually rejected as a whole. Even if the process of creating a new individual has begun despite this rule, it rarely lasts until adulthood or is accompanied by many serious dysfunctions (faults). Contemporary genetic engineering attempts to circumvent this problem. E. O. Wilson draws attention to this when he quotes the quite courageous opinion of Thomas Eisner, who claims that a biological species is a peculiar storage of genes that can be individually transferred: "A species is not merely a hard-bound volume of the library of nature. It is also a loose-leaf book, whose individual pages, the genes, might be available for selective transfer and modification of other species" (Wilson 1992, p. 302).

Considering the level of organization of reality that is immediately reflected by this information, the natural genetic information has the pattern of "the first reading of reality," which affects the covert implicate order of nature. It may encode the capacities for the structure and behavior of the whole macroscopic organism, but only by means of the characteristics and organization of a limited class of molecules. It produces the so-called genotype, which determines a potential phenotype; and it carries the instructions about structure, function, and behavior of a temporarily existing live organism. We have already noted that the genetic information of a population (a gene pool) has great historical significance: it represents the accumulation of biological experience from designing organisms that preceded a particular species in evolution. Under natural conditions it cannot be arbitrarily combined with different species' genetic information, and it is even impossible to further compress it using an algorithm. The climate of an ecosystem, for example a rainforest, is probably the greatest possible spatial compression of natural genetic information (just like a large city is an analogous spatial compression of sociocultural information).

By analogy, "tropical rain forests, though occupying only 6 percent of the Earth's land surface, are believed to contain more than half the species of organisms on earth" (Wilson 1992, p. 197). It is also apparent that this information may exist and act only within a narrow range of physical-chemical conditions providing the reproduction of live systems.

b) Natural neuronal information (predominantly semantic, *a posteriori*, behavioral), which cannot be encoded in nucleic acids and whose encoding

– different for individual species – has not yet been sufficiently researched, is a special evolutionary correlate of genetic information. Even though it provides the knowing and life-preserving activities of genetically programmed live systems, it is not as decisively significant for most of them as it was due to the development of the intellectual culture in the phylogenetic line of humans. As we have noted earlier, K. Lorenz reminds us that "...learning processes must be involved in every kind of behavior is entirely erroneous; but conversely, there does not exist a single case of teleonomic learning which does not proceed along the lines prescribed by a program containing phylogenetically acquired and genetically coded information..." (Lorenz 1981, p. 261).

Social live animals may partially accumulate neuronal information and transfer it within a continuous animal tradition; but, since they have yet to discover a way of encoding it and storing it in artificial memory structures (We cannot consider even the seeming nuclei of their "material culture," such as nests, burrows, termite hills, to be such structures.), it is fixed mostly in the structures of the CNS and disappears along with the particular individual or population. R. Dawkins indirectly confirms this idea in the context of building beaver dams: "Whatever its benefits, a beaver lake is a conspicuous and characteristic feature of the landscape. It is a phenotype, no less than a beaver' s teeth and tail, and it has evolved under the influence of Darwinian selection" (Dawkins 1989, p. 248). K. R. Popper' s view on this matter is adverse; it simply verbalizes a widespread philosophical preconception: "There are animal products (such as nests) which we may regard as forerunners of human World 3" (Popper 1992, p. 187).

"Content-like," (that is to say considering what it is about within the structure of reality), natural neuronal (epigenetic) information is mostly information about the external macroscopic environment of an organism; it is information about a different (materialized) structural information; it is its "explicate, phenotype" information. As the "second reading of reality," it is much more selective and aggregate, and, thus, less adequate for the soft structure of the environment, than the immediately ontical, constitutive genetic information. It comes from the cognition of the chemical and physical properties of the animate and inanimate environments through the senses of a live system, and it is not transformed into signals common to all organisms. For a particular live system it is adequate, because it transfers to the CNS stimuli and messages about the structure of the external environment that are relevant for the adaptation and satisfaction of life and the reproduction needs of an individual or of a species.

C. Human Neuronal Information

The selectivity of neuronal information, that is "of the second reading of reality", was directly and indirectly pre-set by the *a priori* genetic information that the

epigenetic information has been in close cooperation with from the cell level. At the level of Homo sapiens, who managed to encode this perceptual neuronal information through ethnic language (that is to say to subject reality, the special "third reading") and was able to create culture, this indirect setting is probably also secured by the so-called epigenetic rules. E. O. Wilson suggested that these rules can mediate the co-evolution of genes and culture. Cooperation between genetic and epigenetic information can be proven even at the level of individuals or populations. The epigenetic information of the CNS participates in the accumulation of the phylogenetic experience in the population gene pool; because natural selection, which runs at the level of phenotype forms, helps mediate the reproductive success for the most capable, and usually the best adapted, individuals. Also, in the case of the purposeful activity of the human breeder, artificially triggered change may (after a longer period of time) influence the gene pool of a domesticated species population, even though it appears that it can never create a new species. Even after several dozen millennia of intentional dog breeding that has produced the breeds we have today, rather than other ones, no information barrier has appeared against its interbreeding with the wolf.

A posteriori neuronal information (memory), which existed as early as the animal realm as partial or "additional" information to the *a priori* genetic information, has become the biological base for semantic and structural, sociocultural information. Including its openness to a wide range of relevant stimuli, there arises in culture, by means of the development of human social behavior and through the process of our knowing and cognition of the world, completely new, constitutive information absolutely unknown to nature. This is special-purpose-built-information that is not produced by evolution itself, but by cultural evolution. It is due to the genetically programmed structure of the CNS. This information's system-based, integrative power appears to be greater and more universal in comparison to natural biotic information. We will argue later that this very qualitatively different type of information provided not only for the amazing cultural rise of human but also the dangerous ontically "divided" world – into nature and culture.

Putting it schematically, this division of terrestrial reality into two opposing ontic layers was informationally conditioned by the fact that the new sociocultural information (intellectual culture, Popper's second and third worlds), which did not exist in the previous natural construology, was able to integrate not only the finished results of the biotic evolutionary process differently but also the strictly informationally prescribed products of the evolutionary process of culture (for instance technology).

The acquisition, storage, and functions of sociocultural information are to some extent similar to the processes that existed in the biosphere before humans. Nevertheless, it is possible only within culture to apply the inter-generation, discontinuous, and, regarding the structure of the environment,

species-specific information in a new way; not only in a behavioral way, that is to say in a biologically adaptive and communicative way, but also in an interpretational way; in a theoretical, and possibly also structural-constitutive, way. This is what we mean by ontical way.

The following argument was presented by Richard Dawkins: "John Krebs and I have argued in two articles that most animal signals are best seen as neither informative nor deceptive, but rather as manipulative. A signal is a means by which one animal makes use of another animal's muscle power. A nightingale's song is not information, not even deceitful information. It is persuasive, hypnotic, spellbinding oratory" (Dawkins 1989, p. 282).

This will naturally cause many problems, one is that a part of sociocultural knowledge that is focused on the search for truth will leave the careful, "down-to-earth trajectory," of natural biotic knowledge. Natural biotic knowledge is focused only on survival and compatibility between the live system and environment. Instead, the sociocultural knowledge will become the basis of non-natural cultural construology. The cultural system, producing and materializing an ever larger subsystem of sociocultural information, concurrently generates an illusion that it is moving farther away from its natural biotic base. Informationally closed genomes of live systems seem to be backward and unpromising in comparison with rapidly developing intellectual culture (including its social and technical applications).

Other problems will occur due to the fact that the human brain will become the common biotic carrier of two forms of information – semantic and structural. These two forms of information have not been stored in the same carrier, namely in the same biotic memory throughout the entire preceding history of the biosphere.

3. Ontology of Nature

The problem of nature, although important and frequent in both ancient and medieval philosophical reasoning, has vanished from modern philosophical thought, which is concentrated on the relationship between object and subject. It appears that this ontologically ambiguous concept, whose very term of reference is that of birth and origination, is finished in philosophy. The idea that nature (where humans supposedly do not belong) is a lower sphere of being, a mere group of things and organisms (after all just mere extension, materialization, and mass) came to dominate. This is probably because philosophy shifted its focus toward anthropology. We have seen that even the realist thought of Hartmann, probably under pressure from the German speculative tradition, eventually "diluted nature" into two (spatial) layers of being (Hartmann 1953, p. 45). Humans then, as we have noted with reference to the critical ontology of

Nicolai Hartmann, belong to the psychological and mental layers of being; and, by virtue of their intellect, they are superior to all reality that is not human.

The modern emphasis on the certainty of knowledge, established by Immanuel Kant during his critique of metaphysics, paradoxically brought about not only a decrease in the authority of metaphysics but also an increase in the prestige of physics – the fastest developing Modern natural science. But the main categories and laws of physics (for example, mass, energy, movement, space, time, laws of inertia, force, acceleration, preservation) that could have become a part of elementary and secondary school curricula, due to their comprehensibility and easy verifiability, inconspicuously shifted the theoretical and value-based emphasis. The above-noted emphasis on the law of mass and energy preservation conceals the much more significant fact of the irreversibility of time and the "non-preservation of structures." A section of the public believes that nature consists simply of bodies and organisms; that it is an inanimate and animate mass, which is just distributed in space. Since the laws of Newton are in force, nature is a perpetuum mobile, and the terms such as past, subjectivity, and creativity do not apply to it. It is true that a somewhat more comprehensive concept of nature survives in some philosophical approaches (especially in the so-called "philosophy of life"), in sciences specializing in live nature, in fiction, and also in common thinking; but the technical sciences, and anthropocentric philosophy, take less and less interest in it.

The current global environmental crisis induces the need to include nature in the subject of ontology; to acknowledge that, together with culture, which is in systemic opposition toward it, its concept must establish a base for all further philosophical reflections. According to knowledge produced by the natural sciences, it is apparent that nature represents a grand, ontically creative activity – a process of natural evolution that created not only humans, but also all other natural prerequisites of culture. Hence, nature includes activity, time, and orderliness (information) as its most important ontical characteristics (attributes). This is the main reason why it should be understood in a new way as evolutionarily constituted, highly organized and ramified, rich in shapes, valuable, and beautiful. Philosophy, thus, accepts the challenge to define nature as a developing system that has its own evolutionary logic, its own ingenious, anti-entropic creativity. It accepts the challenge to define it as the basis of all values, as the *only possible home for humans and their culture*. Since it is not possible to directly follow the older Ancient, Middle Age, and mechanistic concept of nature, we once more experience the necessity of transforming an indistinct, every day concept into an adequate philosophical and scientific category.

Yet if philosophy wants to start the process of the ontological rehabilitation of nature, it must attempt to find out which understanding of nature recently prevails. It appears that the currently used concept of nature is not only vague

but also incorrect as to its sense. The above-suggested, mechanistic reduction of nature to an objective structure possessing only one level of organization (of objects and their relations) has distorted the sense of the concept of nature and endowed it with several misleading meanings.

The problems with the concept of nature become apparent if we consult some recent philosophical textbooks and encyclopedias. Many of them, and "Introductions to philosophy", do not contain a separate entry on nature, and are confined to terms such as "naturalism" or "Naturphilosophie" (see for example Flew 1979; Urmson and Rée 1993; Craig 1998). Philosophical dictionaries usually list several related meanings different in their scope. And, for example, one of such dictionaries warns us that we "should be careful about the way we use the words 'nature' and 'natural' and equally careful about the way we use their 'opposites': words like 'unnatural', 'artificial', 'conventional'" (Sparkes 1991, p. 17).

The misconceived philosophical understanding of the concept of nature is also the reason why anthropological contemplations still overlook the fact that humanity is an evolutionary product and a part of the Earth's ecosystem. The fact that nature itself is the highest, non-derived, and irreplaceable value is ignored. If nature is analyzed explicitly, it is understood as a lower form of mass movement; as a mere geographic environment, terrain, or material for building culture. The concept of nature has generally been diluted and swallowed up by the ontologically more important concept of mass.

This is not to say that the concept of nature as an ontic creativity, development, and value – deprived of external objective reality for humans – was not justified at one time. We do not deny that the peculiar, physics-based reduction of reality to ideal variables – bodies, particles, gases, liquids – stimulated scientific and technological progress, which is one of the areas of the global progress of culture. We only point out here that the conceptual system of modern Newtonian-Galilean science and to some extent even the conceptual system of Modern philosophy was constructed with the purpose of dominating and exploiting nature and not with the purpose of paying it respect and reverence. Recently, there is a strong need not only for a new conceptual means but also a more suitable theoretical framework for an adequate evolutionary understanding of nature; *a need for a better ontological concept of nature.*

A. Cosmic and Terrestrial Nature

The universe comprises billions of galaxies, including the Earth and its biosphere, humans, and their culture. A concept of nature ignoring the fact that the universe is a great ontical structure created by natural evolution, is not in accord with the knowledge of contemporary science; it is not in accord with reality. It is high time to acknowledge that naturally ordered being, which has

achieved a high level of the development of life up to the threshold of culture on our planet, is an extensive process of the creative, spontaneous self-organization of the universe. Since the cultural creativity generated by humanity has been expanding dangerously alongside this spontaneous, ontic creativity after the rise of culture on the Earth, ontologically it is hard to characterize nature adequately without taking into account the ontical opposition between culture and nature.

We need not only a planetary but also a "cosmic" view of the Earth and of the human role in the biosphere at this stage of global culture. An adequate ontological reflection of nature simply cannot do without evaluation of the general state of health of the Earth's environmental system. The physics-based, mechanistic concept of nature as an instrumental reality (as discussed above) can no longer contribute either to the discovery of causes of the environmental conflict, or to the means of its resolution.

We suggest distinguishing the two levels of meaning in the currently ill-defined concept of nature: 1. Nature in the broadest sense, including the universe, and 2. Terrestrial nature. Such a distinction allows us to pose once more the question associated with Antiquity and the Middle Ages: What is the status of the Earth in the universe? The answer, which can only be schematically outlined here, offers two apparently contradictory solutions: a traditional, physically-based mechanical solution and the current, evolutionary-ontological solution.

The first, the physically-based and mechanical solution to the problem of the status of the Earth in the universe, is now generally well-known and is relatively easy to understand. Usually it is considered to be the ultimate point of scientific knowledge, which became famous during the era of Modern natural science for having surpassed Ancient and Medieval geocentrism. Its overall concept, defined more precisely by current cosmology, can be summed up approximately as follows: The Earth is a planet of the Sun, namely of a second generation star; it is not a fixed center of either the solar system, the galaxy, or the universe; it is not a spatially significant body within the universe at all (there is no such point). Even the Sun is just a tiny and insignificant part of the universe that, as a whole, that is on a large scale, is homogeneous and isotropic; it is the same in all directions and consists not only of hydrogen and helium but also of a small amount of other elements that can also be found on the Earth; the surrounding universe is not animated; it, as far as we know, lacks any sign of life.

The second, evolutionary, ontological solution of the issue, which is environmentally and axiologically relevant, appears to contest the above physically-based and mechanical description of the Earth and its position in the universe. It apparently brings life to the old geocentrism, because it gives back to the Earth and its nature characteristics that were improperly eliminated

from it by Modern science – its exceptionality, value, creativity, memory, and subjectivity. Even though the Earth cannot be either the reason for the being of the universe or the target of its divergent evolution, we must appreciate its uniqueness. Its uniqueness does not involve its position in space or the place it occupies in the universe; it involves something that both philosophy and science have overlooked – the achieved level of natural and cultural development, namely the precious, ontical orderliness.

Terrestrial nature not only has a "history in space", as G. W. F. Hegel, the great evolutionary theoretician, once put it:

> It has been shown above in reference to the existence of Mind, that its Being is its activity. Nature, on the contrary, is, as it is; its changes are thus only repetitions, and its movements take the form of a circle merely (Hegel 1983, p. 28)

but it also has a virtually irreversible history in time. As a component part of the universe (the history of which is no longer a matter of doubt, either), it is conspicuous by virtue of the fact that one of the characteristics of its unimportant position was the precariously thin zone containing conditions making it possible for life to emerge and develop, without complete interruption, over a sufficiently long period of time.

Cosmology, the thermodynamics of non-linear systems, synergetics, and other synthetic natural sciences show that the development of the universe is the result of a clash between two contradictory processes: on the one hand, it was generated by a gigantic Heraclitean flow of "material" (activity of the universe) following an imaginary thermodynamic gradient (toward maximum entropy and thermal death); on the other hand, it was formed by the opposite process of spontaneous self-organization. The initial conditions and time are, then, the most important determinants of the current shape of the universe. The structure of the universe, as we know it, emerged gradually via the strange "crystallization" of activity of the Big Bang – a "hot" and concentrated stage, originally not separated into matter and radiation. It is supposed that it has developed over a period of about thirteen billion years, which have elapsed since the singularity point.

B. The Uniqueness of the Planet Earth

The development of the Earth and of live nature on the Earth – the biosphere – is connected with the development of the universe. In the first place, the development of the planetary eco-system is directly and inseparably connected with the existence of a highly stable energy source of life represented by a thermonuclear reactor – the Sun. Consequently, the biosphere is a natural

continuation of an abiotic evolution. It is most closely connected with the particular conditions existing on the Earth and with the time necessary for the development of life from its pristine forms until its contemporary level – until the emergence of humans and their culture.

The biosphere of our planet is a great, dissipative structure (an open, non-linear system) nourished by the energy of the Sun. It entropizes and structurally enriches the terrestrial abiotic environment in such a way that the Earth as a whole provides an ingeniously ordered organism with internal, constitutive information. This very planet-encompassing, live system is gradually being referred to by Lovelock' s term as Gaia. "Because of this difference in emphasis, a concern for the planet rather than for ourselves, I came to realize that there might be the need for a new profession... (that of planetary medicine) ...one of the aims of this book is to establish "geophysiology" as a basis for planetary medicine" (Lovelock 1990, p. XVII).

Terrestrial life is indeed a long-term experiment in the evolution of the universe performed in a lab called the Earth. It is self-contradictory that in less than half of this experiment our young technical civilization has so seriously interfered with its course: it is with indifference watching the destroying of its most complex products. It is especially absurd when we consider that the evolution of the biosphere runs on the order of billions of years, while the average life expectancy of biological species, including humans, hardly exceeds a few million years. We still do not know at what stage of our species' "life path" the current global culture is.

Here a vivid claim of the Czech biologist Jaroslav Flegr (2006, p. 19) is in place: "When in Darwinian world all species radiantly develop and constantly transform as a response to constantly emerging new challenges of environment, in the world of frozen plasticity species remain quite invariant and in most cases just plaintively abide until changes in their environment accumulate to such an extent that they will have no other option but to become extinct".

We think that the splendid, admirably arranged, and exquisitely dynamically balanced system of terrestrial life should not be damaged further at least for two reasons: First, culture, as the creation and means of expansion of one particular biological species, has not created the natural structures; it has not understood their functions in the evolutionary process of the biosphere and has not been able either to replace or to repair and improve them. Second, culture depends on the biosphere for its existence, and even today, because of humans, it only remains its temporary and differently constructed subsystem.

Only the biosphere as a whole, only Gaia, is evidently the smallest, relatively autonomous system capable of long-term, upward development in a long period. All its subsystems, individuals, populations, biocenoses, and cultures are finite and dependent upon the prosperity of the biotic whole.

Solar radiation has been, for some period of time, the primary source for the existence, reproduction, and development of terrestrial live systems. Their organization and functional complexity has been growing successively due to the sufficiently long exposure of the Earth to the light of the Sun. It has been growing at a speed that could probably have been no greater, because it is related, on the one hand, to the limited magnitude of the supply of radiation energy and the high reliability of the transfer of genetic information. It is known that evolution makes use not only of the rare, spontaneous restructuring of the genome but also of continually appearing mutations and the unreliability of information transfer. On the other hand it is related to the organization structure achieved by live systems. As in the case of technological development, even the speed of the biotic evolutionary process only increases in the phase of sufficient organizational complexity. From this point of view, the rapid growth of the diversity of the biosphere, which took place 600 million years ago, appears to have resembled the expansion of the abiotic technology initiated after the Industrial Revolution.

Hence, recent live organisms are an important record – "a protocol book", according to Bergson – of the development of the whole biosphere. As open systems possessing internal information, they are both indirect and direct records of the spontaneous, constitutive function of evolutionary conditions and time. Time and conditions have not only materialized but also left an information record in their specific structures. Even human tissue cells contain a part of the dissipated memory of the biosphere. *The evolutionary value of live organisms is directly proportional to the uniqueness of developmental conditions and time elapsed.* This inexpressible value is closely connected to the fact that these organisms emerged spontaneously under conditions which no longer exist. Moreover, we will never recreate these organisms if we destroy them. With some exaggeration and inaccuracy as to the time indicated, but otherwise realistically, C. F. Weizsäcker expressed the core of the problem as follows: "Live creatures can come into existence if the necessary conditions are fulfilled – and these conditions are: the surface of the Earth and two billion years" (Weizsäcker 1964, p. 90).

Let us consider whether this single argument is not a sufficient reason for our having humility with respect to the spontaneous, evolutionary creativity of the Earth; for admiration of our still inhabited planet as the only bearer of life and culture in the universe known so far. Let us consider whether this is not an argument for claiming human responsibility not only for all cultures now threatened but also for the restoration of conditions necessary for the natural, upward development of the terrestrial biotic community.

We have already implied that we are able to simplify the complex structures and systems of nature; to use and manipulate them, but not to understand them properly or to improve them structurally and functionally.

The philosophical roots of this problem will be better understood if we bear in mind the fact that exclusively explicate structures are affected by the neuronal knowing of live systems. Sociocultural information, which was established by the above-described third reading, should guarantee the ontical compatibility between culture and the biosphere; it is the ontically constitutive information of cultural system, and it generally interprets the explicate natural order. Moreover, we must not overlook the fact that this order is interpreted by a single biological species through the prism of its own interests. Even though humans are exceptional animals due to their CNS, natural evolution could not have equipped them with a perceptually-neuronal apparatus that would exceed extremely the framework of their biological needs. It is probably just a convenient coincidence that at the end of the Tertiary period our biological ancestors were somatically and psychologically formed as highly social, yet within their parameters "universal," animals. As "omnivorous primates" with highly developed social behavior – "specialists in non-specialization," as put by Julian S. Huxley – we were selected to utilize a wide range of macroscopic natural orderliness. The biologically determined universality of our needs and abilities provided the development of an aggressive adaptive strategy as a means of adapting nature itself to our own interests, but it has also lured us into an evolutionary trap. We have ignited the cultural evolution, namely a species-purposeful reconstruction of the natural environment, with little adequate information – limited according to the possibilities of the self-preservation neuronal apparatus of biological ancestors of our species.

We understand that anthropologically oriented philosophy may feel this wording to be less than courteous towards humans. When we consider that all scientific and philosophical knowledge – setting aside its sociocultural mediation – has been primarily realized through the nervous structures mostly inherited from primates, this wording is not, in fact, either provocative or incorrect.

The global environmental crisis is planetary evidence that culture, which has caused the crisis, is not a spontaneously grown natural structure; it is not a structure evolutionarily and organizationally in harmony with original nature. Quite the contrary, it is an artificial structure, differently and more strongly integrated and destructive toward nature. Culture, as we have discussed above, was not established through the natural continuation of terrestrial, biotic evolution as a whole; it does not grow on all branches of the evolutionary tree of life. N. Hartmann would probably say that it does not come into being through the transformation (Überformung) of a lower layer; namely of organic being. To put it metaphorically, it hypertrophically thrives only on one phylogenetic line of life – on the recently established and time-limited evolutionary line of Homo Sapiens.

C. Information Value of Terrestrial Nature

It appears that contemporary information society should finally listen to the arguments for a respectful relationship toward the Earth, which are also of an informational format. As noted above, the current state of the health of the biosphere, the system to which we humans belong, is alarming due to rapid cultural expansion. The decline and fragmentation of the natural ecosystems proceeds hand in hand with the process of the extinction of unique biological species. Only these species are the bearers of the scattered genetic information of the current level of biospheric development. Hence, the suppression of nature by culture seriously damages not only the phenotype structure of highly ordered organism of the biosphere but also its genotype, memory, and information structures. Simply through the high level of personal consumption, people unwittingly damage the most important result of cosmic evolution: natural being and natural information. This being and information were established long before we managed to establish cultural being and our primitive technical memory. Since genetic information forms an invisible implicate order of life, since it functions as an anti-entropic barrier; the danger threatening us as a biological species is the gravest one in the whole of human history. Unfortunately, even current philosophy is not able to define it clearly and mediate it to the general public.

Thereby, we also ignore the fact that the weakened biosphere has been forced to change the strategy: if it cannot defend itself by force, it defends itself by weakness. To increase its resistance to the destructive effects of culture, it is able to quickly change over into a new equilibrium: to dispose of its most complicated, least needed, and most fragile forms. Unfortunately, humans belong to these fragile forms of life, and culture, of course, depends on humans.

We are coming to the core of the problem. Maintaining a high level of natural orderliness, including the variability of current forms of live systems, is not only of reproductive significance; but it is also functional from the viewpoint of the biosphere and existential from its elemental viewpoint – humans. It has an equally great constitutive, cultural importance. We do not create or reproduce, but "read;" that is, we distinguish the content of our knowledge, sociocultural information, from the products of natural evolution. Konrad Lorenz, whose experience in the sphere of natural science we can trust, has written the following on this subject: "Scientific truth is not something that the human brain has created but seized from the extra-subjective reality surrounding it" (Lorenz 1963, p. 311).

To put it simply, cultural information is acquired in the first place by studying the structure of nature; by familiarizing ourselves with the products of natural evolution. We know that the whole, irreversible evolution of the planet appears to have crystallized in live systems. An enormous quantity of natural

information is specified and even directly inscribed by the language of nuclear acids within these live systems. We have not correctly read and understood this precious information that spontaneously reproduces and preserves itself in contrast to our neuronal information, and, therefore, it belongs to the biosphere. We should also be aware that the genetic information of live systems, which disappears due to the destruction of species and natural ecosystems by culture, also acts as a special "intellectual culture of the biosphere."

Even if we disregard, for the time being, the fact that, without the preservation of its natural diversity the biosphere is unable continue in supporting its most developed forms including humans; we should admit the significance of this diversity: the fact that we must not destroy the scattered genetic information of the biosphere, because its ever more precise reinterpretation enriches and specifies our inadequate cultural information concerning the structure of terrestrial life and the conditions of sustainable culture. "In the world as a whole, extinction rates are already hundreds or thousands of times higher than before the coming of human" (Wilson 1992, p. 346).

All serious damage inflicted upon the memory structure of the biosphere might not only have immediate consequences for its existence, namely the collapse of the current level of its dynamic balance and transition to a new state of balance. For the section of humanity that may survive, this would probably mean serious disturbance of both the physiological and psychological condition of humans as a species. We partially agree with the biologist F. Wuketits:

> Our situation is so alarming because there is no hope of us finding the way out, available to previous civilizations, despite the catastrophes they caused. ... today, environmental systems are destroyed globally. We can no longer prevent a global catastrophe (Wuketits 2001, p. 236).

We should not neglect the other side of this unique historical situation. The information correlate of each open, non-linear system – natural or cultural – which is needed by that particular system for its preservation and evolution, necessarily comes into existence only along with this very system throughout its reproduction and evolution. Hence, it is apparent that even currently available theoretical knowledge could not have been established sooner in local cultures that are neither environmentally threatened nor connected in terms of information transfer. It is also to be presumed that without a broad and finely differentiated material culture, including the current anti-natural technosphere, we would probably not have been able to create a sufficiently differentiated intellectual culture. In the absence of such a culture, there would not be a sufficiently differentiated spectrum of incentives for intellectual activities and for the emergence of environmental philosophy, ethics, and politics.

Hopefully, our thoughts should lead to the logical conclusion that the disclosure of the uniqueness of terrestrial nature results in a sense of the urgent need for a new philosophical view of the world, a new human attitude, both theoretical and practical. The concept of nature presented by evolutionary ontology raises the straightforward question of how high-level philosophical generalization can be used for the sake of the preservation of all higher forms of life, for the sake of the preservation of humans and their culture. The proud anthropocentric philosophy, which took stock first in the noble attributes of humans and later in their individual freedom and inseparable rights, will be forced to admit that it has not been aware of the fact that what is the inseparable thing is just life; life's destiny is interconnected with human freedom and human rights. These, as becomes apparent, are limited by the "Constitution of the Earth" itself: by the imperative of the preservation of the biological diversity of life. Hence, we refer to Wilson's remarkable idea of asking whether contemporary governments should not be bound by an "ecological version of the Hippocratic oath, to take no action that knowingly endangers biodiversity" (Wilson 1992, p. 342).

Then, the highest value that is now being disclosed is not what we have created and what has been admired by generations of our ancestors (the artistic and theoretical achievements of the intellect, human skills and artifacts, technological constructions and buildings, and the like); but the highest value is that which we have not created and which we have already almost condemned. It is the highest value, both in our daily life and in theory; it is the absolute value. Contrary to tradition, we are recognizing that such a value can be neither humans nor culture, but the Earth – the unique terrestrial nature, life, the biosphere.

PART III
ONTOLOGY OF CULTURE

Four

ANTI-NATURAL CULTURE

The evolutionary ontological concept of culture (see also our entry Culture. In: Birx 2006, pp. 636-640), which includes cultural being in the subject matter of ontology for the first time, can follow the philosophical tradition only to a minimal extent. Modern philosophical concepts of history (Vico, Condorcet, Hegel, Marx, Comte) may acknowledge social evolution, but mostly in intellectual, sociopolitical, and economic terms; these do not reflect human history (and culture) as a part of a wider natural development and do not consider culture to be a "system within a system." That is, culture is not considered to be an artificial system which has developed within an older and broader natural system – a planetary biosphere.

Marx probably best approached an understanding of the systematic dependence of culture upon nature during his analysis of the peculiarities of agricultural technology. "Even a whole society, a nation, or even all simultaneously existing societies taken together, are not the owners of the globe. They are only its possessors, its usufructuaries, and, like boni patres familias, they must hand it down to succeeding generations in an improved condition" (Marx 1894/1959, p. 530).

Despite different starting points and different emphases, modern authors understand human history (and culture) as the growth of human power over nature; as social progress connected with the growth of human labor productivity, technology, education, and individual human freedom. They understand it as a process that is ever more dependent on humans and on the preceding cultural development, and ever less on nature itself.

This dependency is certainly valid in a particular aspects; yet this is a dependency from around the "first layer," which cannot, under any circumstances, disturb the deep existential connection between culture and nature. Even cultural systems organized in a complicated way depend on the faultless reproduction of natural prerequisites for their being and evolution, mostly on the normal biological reproduction of humanity. Human health appears to be the most reliable feedback of the adequate development of each advanced civilization in this respect. This has been insufficiently considered. Here we fully agree with H. Jonas: "As long as the danger is unknown, we do not know what to preserve and why…We know the thing at stake only when we know that it is at stake" (Jonas 1985, p. 27).

The traditional approach to humanity and history is quite substantively-attributive and ascribes to individuals features that are the products and characteristics of the system; it underestimates both the spontaneous constitutive

activity of the impersonal system of culture and the covert ontical conditioning of culture by its natural host environment: *the subjectivity of terrestrial nature.* The emphasis is usually put on human purposefulness and the unique abilities of humans, such as theoretical thinking, language communication, ethics, values, cooperation. Hence, this approach does not study the uniqueness, creativity and value of nature for culture; it is not interested in the ontical pattern of natural orderliness and not even in the principle of the endangerment of culture by the destabilized biosphere (see Moscovici 1982). Since it overestimates human individual activity; it cannot relevantly grasp the processes exerted by the anti-natural cultural system, whose expansion almost independently from human will damages and entropizes evolutionary-constituted nature. By promoting humans over nature, it lowers the existential significance of nature for human reproduction and health; it overlooks the personally-constitutive role of nature in the process of human ontogenesis.

1. Culture as a System with Internal Information

Fritjof Capra, the well-known physicist, wrote in one of his books:

> Scientists and non-scientists frequently retain the popular belief that if you want to know the ultimate explanation, you have to ask a physicist, which is clearly a Cartesian fallacy. Today, the paradigm shift in science, at its deepest level, implies a shift from physics to the life sciences (Capra 1996, p.13).

From the standpoint of evolutionary ontology, we dare to be more radical. In a situation where human culture has conquered and occupied the Earth, and irreplaceable natural being is disappearing at a horrific speed, *the paradigm of science must move from the sciences about nature toward the sciences about culture.*

The location and role of human culture within nature is not theoretically discussed even at the stage of its globalization. It appears to hide the fact that culture is a system established by human activity, which includes intellectual, organizational, and material elements; human activity rapidly and dangerously intrudes into the body of terrestrial nature and expands at its cost. Culture must also wield *an object form (phenotype) and, thus, its own environmental niche*, which it can acquire only by "stealing", limiting and controlling places originally occupied by different inhabitants – *by natural ecosystems*. This finding has also been overlooked. Non-critical advocates of globalization trends are probably quite unconcerned that culture is understood in an objectless and inexplicit way as follows: 1. As human cultivation, namely as an acquired characteristic of

human behavior; 2. As an intellectual culture; 3. As a better view of civilization; 4. As a continuation or refinement of nature. But all of these concepts are confusing when we are confronted with the current environmental situation.

Culture should not be considered an extended *phenotype* of humans such as dams in the case of beavers; but it is neither a mere *genotype* of its system, namely a mere intellectual culture. It is *a "phenotype" of its intellectual culture, that is to say a physical system with its internal information.* In relation to humans as a species, it is their "external inorganic body" or special artificial environmental system that suppresses original natural systems. Thus, along with the growth of this "body", that is the cultural being, *precious natural being disappears.* The environment that originally shaped humans, and that the conservative human organism still remains consistent with, is also disappearing.

Humans, as the species that ignited the cultural evolution and that has never needed to know what nature, culture, and the place of culture within nature mean, may now without a philosophical theory of the ontical conflict between culture and nature become an *element in the process of its demise*; the development of partial rationality is, along with economic liberalism, probably the main cause of the current expansion of culture, and it places human destiny into the hands of blind economic spontaneity. Economic spontaneity might have optimized the growth of the cultural system only on an indestructible Earth.

The slow process of the complex evolutionary understanding of the world as a whole apparently lags behind the fast pace of the progress of civilization. The globalizing culture that increasingly lacks any negative feedback from its cultures and their niches, therefore, loses even its negative worldview feedback from the Earth as its only possible host environment.

A confused understanding of culture is one of the causes of social resignation and skepticism. *If we want to face the environmental crisis at the level of politics or at the level of the public, we must know the systemic principle of culture.* Even the general public should know that culture is a *system* created by human-activity *with its internal information represented by intellectual culture.* It should know that terrestrial existence is evolutionarily constituted and that *cultural being arises only from natural being.*

For the purpose of an adequate interpretation of culture, we must abandon the substantive approach to humans and humanity. Together with the acknowledgement of the existential dependence of culture on nature, we must accept the irrefutable *fact of human liability regarding culture.* On the one hand, it is necessary to appreciate the real value of the natural ontically creative evolution of the Earth, especially the evolution of the highly independent global system of the biosphere, and on the other hand, it is also necessary to reveal the roots of the anti-natural creativity of the cultural system. Such a revelation is connected with both the questions of why the ontically constitutive activity

of humanity has not been able to join the older constitutive activity of nature and why it has created the special line of ontically contradictory creativity of culture.

A. Expansion at the Cost of Destruction

The only two global "subjects" currently in conflict on the surface of the Earth are *culture and nature.* This is true even though the conscious and purposeful face of humans quite easily asserts itself in specific human activities, and only humans are the bearer of sociocultural knowledge, moral and legal responsibility. Since animate nature as a system, which is incomparably older than culture, occupied the surface of the Earth with its single-cell organisms (bacteria) over three billion years ago, and since it is an indivisible planet-encompassing system with its information; animate nature as a system implies the following two notable conclusions.

First, the emergent structures of culture must necessarily have originated in a different way than the life on the Earth. Fritjof Capra frequently quotes the work of the foremost microbiologists when he notes that, "Far from leaving the micro-organism behind (on an evolutionary "ladder")… According to Margulis, the concept of a planetary autopoietic network is justified because all life is embedded in a self-organizing web of bacteria, involving elaborate networks of sensory and control systems which we are only beginning to recognize. Myriads of bacteria, living in the soil, the rocks, and the oceans, and inside all plants, animals, and humans, continually regulate life on Earth" (Capra 1996, pp. 210-211).

Second, the cultural structures (organizations, institutions, objects, technologies, theories) originated not only from the less ordered states of abiotic terrestrial nature but also mostly at the expense of natural biotic orderliness, which preceded the existence of culture. Cultures originated through the realization of human, non-biological intention; they originated through a preference or a demise of some organisms of terrestrial life by limiting biological diversity and using the informationally-nonprescribed ecosystem orderliness.

Cultural orderliness is an orderliness with a different organization than that of nature, yet it is necessarily simpler and more open to new knowledge. This cultural orderliness was able to locally subordinate some abiotic powers and natural ecosystems. The cultural system had one crucial strategic advantage in comparison to them. Despite the fact that it was also an analogous type of information non-prescribed orderliness, it contained, in contrast to the natural ecosystems and from the very beginning, *free constitutive information* orienting human individuals; it contained their social consciousness – *intellectual culture.* The spatial, integrative reach of intellectual culture was originally limited by the environmental niche of a particular culture, but today, in a globalized

information society, the intellectual culture of the economically and technically most advanced countries tends to include the whole globe.

From the traditional viewpoint of short-term human benefit, it seemed that culture improved terrestrial nature; it seemed that it was able to complement and cultivate its structures and powers. It seemed – and many authors still believe this – that cultural evolution has been either a co-evolution or a direct continuation of the evolution of life on the Earth. But we know already that the natural biotic evolution is a divergent one; that it does not culminate in a single line with humans, even though the great evolutionary theoretician P. Teilhard de Chardin believed that to be the case. "Once and once only throughout its planetary existence has the earth been able to envelop itself with life. Similarly once and once only has life succeeded in crossing the threshold of reflection. For thought as for life there has been just one season. And we must not forget that since the birth of thought man has been the leading shoot of the tree of life" (Teilhard 1965, p. 303).

Nowadays it is proved that natural biotic evolution accrues and culminates in all branches of the so-called "evolutionary tree of life." If it does not culminate in humans, then it is to that effect less able to culminate in their artificial, species-specific, evolutionary creation – their external inorganic body, culture. As a purely human-generated creative process, cultural evolution has aimed from the very beginning not only against entropy but also against the system that surrounds it; it prevents entropy and lowers its total balance under terrestrial conditions. Cultural evolution *against the older, evolutionary-constituted structures of animate and inanimate nature.*

The significance of the finding presented above cannot be diminished even by the fact that culture has generally been understood positively so far – as intellectual culture; as something that has been cultivated by both humans and nature. Both standard and further civic education do not clarify the relationship between nature and culture. The physical laws of preservation (for example the law of the equivalence between mass and energy) emphasized in schools unintentionally evoke the possibility of controlling nature through technology; and, despite the fact that the abstract thinking of students is nurtured, these laws are, rather, an obstacle to understanding the ontical conflict between culture and nature. The structures of terrestrial nature are evidenced not only by the results of natural evolution or natural disasters but also by the decrease in the natural orderliness of the Earth caused by culture. As such, these are subject, putting it figuratively, to the "*laws of non-preservation*" structures.

An evolutionary-ontological approach to the Earth that deals with the origination of its natural and cultural orderliness must also interpret the significance of terrestrial time and space in a new way. It reminds us that all natural structures are not only time-ordered (by memory, implicitly) but also space-ordered (by phenotype, explicitly); it reminds us that artificial,

purposefully created structures, despite being subject to the same physical laws, impair and suppress them due to their analogous spatial demands and their rapid expansion.

Fields, highways, and cities are as material, time-localized, and spatial as the elements of inanimate and animate nature (such as mountains, rivers and ecosystems). The spatial expansion of these material culture elements occurs only by a process in which culture limits or destroys the original natural orderliness materialized and written (for example by organisms), including genetic memory, information. With reference to S. J. Gould, F. Wuketits reminds us that, "...the demise of a single, even the tiniest species, means not only the disappearance of a piece of protoplasm but also the end of a unique evolutionary path ... forever" (Wuketits 2001, p. 190).

Due to the ontical difference between natural and cultural structures, we are forced to deny the following frequently expressed view: that human culture is a superstructure and an improvement on nature; that it is the advancement of the creative work of natural evolution. Instead, we believe that it is the purposeful and temporary transformation of nature; the supplementation and replacement of original natural being harmonious with humans. The first cities were particularly suitable places for mutually cooperating people to meet. Even though a slow-developing culture was advantageous for humans, the fast-expanding technical civilization is becoming dangerous; the expansion of the biologically adverse, artificial environment, and differently structured sociocultural space are occurring too radically.

Even though the majority of political-science interpretations of the world quite obscure the relationship between nature and culture and produce a feeling that culture faces quite different problems, many biologists and environmentalists draw attention to the fact that it dangerously destroys the most important thing upon which the biological being of humans depends. We are witnesses to extremely rapid changes in the conditions of human physical and psychological health. We also believe that the conflict between global culture and nature may become a question of life and death for nature-dependent humans.

We have stated before that the cultural order originates not from chaos but from order; that it originates from the natural orderliness that had already been achieved by evolution. The cultural system, which develops through the knowing of humans and takes advantage of this knowledge in a way that is insensitive to nature, is able to develop at a speed greatly exceeding that of nature.

Even though it appears that culture follows the evolutionary process of nature, and even though some authors consider it to be a "continuation of the genetic evolution by different means" (Popper and Eccles 1977, p. 48); culture distinctively re-orders and re-orients the natural factors and powers it

employs. It forces them to operate within a super-individual, artificial system ("the exosomatic organism of human") that has absorbed and materialized the sociocultural information equal to the selfish intentions of the human species. The unilateral concept of the co-evolution of gene and culture, according to which genes and culture are flexibly and indirectly connected by "epigenetic rules," is typical of a sociobiological approach to culture (see Wilson 1998, pp. 246-247). The growth and expansion of culture is accompanied by the destruction of, and a decrease in, the biological diversity of life on the naturally ordered surface of the Earth. Nevertheless, instead, the different constitutive activity and the different ontic order of culture are determining; *the growing processes of both the spontaneous and the purposeful activities of humans are the constitutive elements of culture.* The blind process of biotic knowing and residual activity of the Big Bang in establishing and differentiating the biosphere are not the crucial factors shaping culture.

The structure of the artificial organism of human society integrated by sociocultural information, whose structure includes not only material culture, including technology, social institutions, and organizations, but also other social activities and regulations (values, management, division of labor, cooperation, communication activities). This artificial system constitutes *an open self-organizing system of a particular local culture.* This physical system, by means of its specialized subsystems, develops and materializes knowing (by which it produces not only the sources necessary for human life but also its structures); and it spontaneously reproduces and develops itself. This physical system exceeds the knowing, regulation, and productive capacities of the individual at all levels.

B. Intellectual Culture Divides Reality

Not only human individuals or natural evolution but also the super-individual activity of the cultural system – *the evolutionary process of culture – may establish emergent ontical structures.* The previous history of culture can best be understood based on the changing phenotype forms of cultural system. This history began with the inconspicuous transformation of the natural environment and the live systems created by human activity. Quite recently (in Modernity) this transformation expanded by technical design supported by science (by structural sociocultural information), which is currently accompanied by the extensive artificial transformation of the surface of the Earth. No matter how fast the most recent information technologies develop, and global information networks appear, it appears that it will be difficult to change the traditional way of forming cultural structures. On the other hand, this traditional way of artificial design has excluded so far (though not probably forever) the difficult and dangerous intervention into the almost inaccessible information contained

in the genome of live systems. Unfortunately, philosophical literature has paid little attention to this crucial problem so far.

The context presented above implies that the constitutive information of cultural structures cannot be represented by natural information; but, rather, by the content distinct, differently acquired, encoded, and utilized (distributed) cultural information – *intellectual culture.* This very intellectual culture integrates and helps reproduce human society; it "*is able" to turn the natural potential of humans, including a part of external natural forces, against the remaining nature.* Even a quite simple culture (with a minimal material-technical base) is, due to its focus and the integrative power of its intellectual component, *anti-natural and ontically divides reality:* the special behavior, knowing, and communication of humans make the cultural community a non-standard, potentially opposing subsystem to the biosphere.

The dramatic turning point in the relationship between nature and culture has not been brought about *either by human "failure" or by cultural "failure".* Quite the contrary, it was caused by the *successful growth of the current anti-natural type of culture* – the planetary interconnection of originally local human cultures. The globalized culture absorbs the different dispersed local cultures that used to respect the peculiarities of their environmental niches due to their own circumstances; the globalized culture suppresses nature in a massive, astute and concealed way. The crisis, whose roots the public cannot see, originates as a result of too rapid a growth of the artificially ordered structures that expand in places once occupied by the original climax ecosystems. The greatest existential crisis of culture is related to the disappearance of irreplaceable natural being. The devastation of the Earth's natural orderliness is not limited and accidental, but the global and dominant result of cultural spatial expansion, it follows that it is necessary to consider philosophically not only what culture brings to humans in current, narrowly intellectual meaning but also what it brings in terms of a somatic and psychological outlook; simply by too radically changing the Earth, natural ecosystems, and the way humans live within culture.

The still common emphasis on the intellectual side of culture – a generally acknowledged reduction of culture to intellectual culture – may be based on the incorrect notion of ontical adequacy between the whole cultural system and the biological organism of humans. Yet civilization's stress, for example, can change many functions of the human body that have adapted little to civilization.

The biosphere, as the only Earth-based system capable of independent, long-term existence and evolution, is currently in a state of critical, dynamical imbalance. "In the world as a whole, extinction rates are already hundreds or thousands of times higher than before the coming of a human" (Wilson 1992, p. 346). Since the open, non-linear system of the Earth is not subject to mechanical causality, even a small impetus could bring it into a new, much more imbalanced, state. We are almost certain that this planetary system,

which is capable of self-regulation, will "sacrifice" any life form to maintain its integrity under new conditions, just because these life forms are not currently "needed".

Humans are also a normal animal species, a large primate, whose biological prosperity depends on the structure, the scope, and the "state of health" of the natural ecosystems; but their evolutionary line (the hominid family and the first humans) was exceptional for unknown reasons. Besides their adaptation to the environment by means of changes in their internal biological structure, which is slow and limited, humans were endowed with somatic and psychic predispositions for rapid and apparently unlimited purposeful adaptation of their surroundings. As bipedal hominids with front limbs freed from locomotion, humans were equipped by natural biological evolution *to start off the cultural evolution*. This originally inconspicuous process, limited to several advantageous areas with small populations, caught terrestrial *nature "unprepared"* due to its scope and pattern. It is not based on a better food strategy focused on the survival of a larger population – although, this may have been true for the predominantly agricultural local cultures. It is based on the unsustainable strategy of consuming and transforming all of nature for one biological species – for humans: *the high personal and abiotic consumption, unlimited by both the human organism and psyche, of all of us.*

Culture as an abiotic system, as noted above, has been possible only due to its internal information – intellectual culture. The systematic pattern of culture and the specific mechanisms of its evolutionary process not only provoke but also develop the intentional purpose of the intellectual components of culture, including the purposeful activities of individuals (for example their activities in specialized scientific and education institutions). They also limit, absorb, and even disrupt them. The extent of human activities may generate all levels and lines of cultural evolution; but humans, as purposeful beings in their individual manifestation, become subservient to the whole of culture. Since humans are forced to socialize, namely to respect the material and intellectual heritage of their ancestors, they eventually behave similarly to "the cells of a complicated organism with collective intelligence and adaptation abilities..." (Capra 1983, p. 307). The results of the current and long-term activities of humans then reflect not only what they strive for but also what they do not intend and do not want – that which emerges from the operational logic of a historically created system as a whole (this idea is especially developed by G. W. F. Hegel in his philosophical conception of history).

Even non-material cultural products – language, money, ethics, science – can never function purely as tools for the realization of current human interests. They have emerged spontaneously as specific subsystems and accepted rules of the cultural system, which established them for the purpose of its preservation, reproduction, and evolution. No individual and collective subject

fully understands them and can easily subjugate them. We can say, by using the terminology of biology, that all current cultures and their subsystems have grown up during cultural evolution. Or, as F. A. Hayek noted, culture is also subject to the fact that "highly complex spontaneous orders" arise "through a process of evolution" (Hayek 1990, p. 24). A majority of purposefully-created constructions, institutions, and subsystems "result from spontaneous order – and are similarly susceptible to variation and selection" (ibid., p. 103). They would not fit into the total order which would be merely intentionally organized.

The arguments presented above allow us to declare that not only natural ecosystems and the biosphere but also *local cultures and the globalized culture currently feature all characteristics of a large dissipative structure*. Let us recall again Prigogine's term, "dissipation," denoting energy dispersion within a system, its energetic and material nourishment, which may in part be used for the growth of its orderliness (Prigogine and Stengers 1984, pp. 177-209).

Culture is a complex and large artificial system. It may even include other live elements and subsystems besides humans, but it also features its non-biological integrity and self-structuring within the host system of the biosphere. Culture features a capability to know the external environment, to use it, and to grow at its expense; a capability *to materialize its knowledge and internal information*.

Human individuals, who will eventually be the only biological engine of cultural evolution, are in part liberated technologically and socially throughout this cultural evolution. Their general dependency on the great, extra-individual system of culture increases at the same time. What grows, transforms, differentiates, and restructures is, only in part, the ontogenetically acquired content of individual human consciousness, human knowledge, skills and abilities; it is mostly different elements and subsystems of social organizations, and intellectual and material cultures. Since even external natural powers are unable to directly change the strictly information-based live systems, we cannot expect that culture, organized in an ontically different way, would be easily able to do so. Even for this culture, the genomes of the biological species remain information-closed structures, and culture is just an external power to them.

Cultural evolution primarily transforms and structures a system; the system creates its new elements, parts, and subsystems, such as institutions, organizations, material and technical instruments, knowledge, rules, values Humans, as the live elements of terrestrial nature who cause this evolutionary movement, cannot change along with the cultural system. Nevertheless, within the options determined by their quite conservative genetic memory, they adapt to the transformations of the cultural system analogically to the transformation of nature. Only in this sense do they intellectually transform themselves depending on their roles in the system of culture, but only to the

extent allowed and permitted by their *a priori* ontogenetic program of learning. This mostly concerns the utilization of the *potential multi-functionality of the human brain*; especially of its capability to control the delicate muscle motor activity, integrate semantic knowing, and process memory-fixed conceptual knowledge.

It is almost certain that the potential multi-functionality of the human body was created by the very evolutionary changes that resulted in the appearance of long fingers when humans lived in trees, and, eventually, in the liberation of hands for the handling of objects. The remaining cultural predispositions of humans are greatly derived from this decisive somatic change. This idea is defended mostly by the evolutionary biologist S. J. Gould as follows: "Upright posture is the surprise, the difficult event, the rapid and fundamental reconstruction of our anatomy. The subsequent enlargement of our brain is, in anatomical terms, a secondary epiphenomenon, an easy transformation embedded in a general pattern of human evolution" (Gould 1992, p. 132). Regarding human brain we could probably metaphorically state that nature created its perfect "hardware;" while culture, where every human being socializes throughout their ontogenesis, creates and changes its "software".

2. Two Ways of Constituting Culture

We have stated above that all terrestrial being is evolutionarily constituted. The natural and cultural evolutions may be interconnected by many analogies and isomorphisms, but differences prevail. Culture, just like the biosphere, is also a global dissipative structure; but the cultural system, which originates via different activity and produces and utilizes a different type of information, is considerably open. Since it is unable to achieve climax yet; the cultural system is open not only for matter and energy, but it also remains permanently *open to free, sociocultural information*. We will attempt to explain this.

Human activity, which shapes the cultural system, may produce cultural structures in two ways: *directly and indirectly. The indirect way* dominated in the shaping of culture before the Industrial Revolution and, in our view, corresponds to the "cautious" growth of culture as an artificial system inside the natural system. The indirect way acts remotely as a reminder of the establishment of the natural ecosystems within the abiotic terrestrial nature through colonization and succession (chronological succession). This is the means whereby the system-appearance of culture originates in advance as information that is non-prescribed. It was in this way that organized bands of hunters and gatherers, ethnic languages, mythical consciousness, Neolithic villages, medieval cities, the market, and the institutions of a liberal society all emerged. This information non-prescribed, and comparatively slow, way of the

growth of cultural orderliness is characterized by the gradual integration of "prefabricated parts" of natural evolution into the cultural system and by their thorough testing by the host environment – nature.

The direct way, on the other hand, produces abiotic cultural structures according to rational anticipation, namely information instructed – prescribed ones (for example tools, useful objects, structures). Even though this way is distantly reminiscent of biotic construology methods (the spontaneous realization of genetic information by a live system), it is quite different. It is different not just in the fact that information-prescribed elements of the cultural system (things, structures, technics) designed and redesigned by humans remain open to new information in contrast to organisms, but also in that only a minor part of social intellectual culture is materialized in these structures – such as productivity-oriented knowledge. An option, which decisively asserts itself only in the liberal market economies, has also appeared; namely, that incomplete knowledge and economic interests (profit) determine the shape of culture and, thus, distort human ontogenesis and the ways humans live.

The above-suggested model of the formation of culture implies that the materialized cultural structures are "born," either through transformation (the re-shaping) of natural objects or through artificial technical "synthesis" from comparatively simpler products (materials) of natural evolution. It follows that the building material, and in part also the functional activity, of technology stem from the structure and activity of the Earth; from its previously built-in matter and energy. The evolution of abiotic technology appears to artificially "animate" or additionally reincarnate another part of the terrestrial, abiotic nature within culture; since terrestrial, abiotic nature has not been incorporated into live systems, it was subject only to entropization under terrestrial conditions. This information-prescribed design is the way the productive subsystems of the global technosphere emerge (manufacturing complexes, transportation systems, and information networks) along with the small common things of every-day use and consumer goods.

Despite their existential dependency on humans, the artificial cultural structures spontaneously interconnect into large functional aggregates. They behave quite independently; and, due to human cooperation and continual sociocultural activity, they more or less independently reproduce as relatively independent functional elements of culture.

In short, *the first method* (indirect) of ontic activity in culture had dominated in hunter-gatherer and agricultural cultures, that is to say until the *Industrial Revolution*. *The second method* of direct ontic creativity in culture, characterized by the intentional application of science as free, partial, structural information (which has become the main agent in endangerment of culture by the destabilized biosphere), has fully developed only in so-called *technological cultures*.

A. Indirect Method of Culture Formation

We will further specify the first indirect method of the ontically creative cultural activity. It is apparent that all the so-called natural peoples were, from today' s perspective, profoundly non-technologically oriented toward the preservation of the integrity of cultural community; the reproduction of traditional knowledge, values, and rules of social behavior. Since their material component was nature slightly adapted to their needs, the simple, local cultures afflicted little, or only local, damage to natural ecosystems. They developed through slow empirical discovery the utilization and transfer of efficient algorithms of practical human activities (via the transformation of the natural ecosystems, live organisms, the countryside, soil, and other natural structures and processes). The intellectual component of these cultures, which we will discuss in detail in connection with the content and role of cultural information, developed slowly; yet they developed much faster than the natural transformation rate of the genetic information of live systems. But since the local cultures respected the empirically discovered dynamic equilibrium between the cultural and the biotic societies, they protected their local environmental niches and maintained natural conditions for their long-term existence.

"Even so-called "primitive peoples" studied by ethnologists, profess deep reverence for plant and animal life. This reverence is expressed in what we call superstitions. But in reality these "superstitions" provide for a quite efficient way of preserving a natural balance between human and his environment... " (Lévi-Strauss 1991, pp. 105-106). This is probably also valid for sedentary ethnic groups. Damage caused to nature by nomads who migrate with their herds is often irreversible.

The rustic material culture was originally predominantly "biotic" (consisting of domesticated animals, cultivated plants, enzymatic processes during food processing); it was mostly reproduced and energetically saturated by the biosphere itself, except for tools, more complicated artifacts, dwellings Most cultural objects have long lifespans, both physical and moral; and, thus, *the local cultures* – if we set aside the food demands of people and animals – *do not excessively burden the biosphere either by their reproduction or by their evolution.* Quite the contrary, since the pace of cultural evolution was slow, some of its elements could have been optimized through multiple, spontaneous contacts with other natural structures almost for free (similar to natural ecosystem elements). This spontaneous optimization trend has not been subject to analysis within the fields of the social sciences or philosophy yet. F. A. Hayek indirectly draws attention to this problem in the example of the establishment of spontaneous order (Hayek 1982).

The construction and utilization of tools and other technological devices may be determined by the existence of relevant structural information; that

is to say an intellectual idea, including the adoption of quite complicated technological knowledge and skills. But the practical utilization of instruments does not need a broader, artificial, functional structure. A tool can be connected directly to humans and their existential power; it does not require its technical carrier. The production, reproduction, and energetic nourishment of such an artificial carrier (a machine), as can be clearly seen in the example of factories from the time of the Industrial Revolution, consisted of a demanding technical performance, and necessarily burdened the environment. The utilization and functions of a tool are usually under the control of an individual; and instruments – except for in the fields of the military, irrigation, important constructions – do not become controversial subjects of ownership, political strategy, and ethical evaluation. They also do not come under the direct control of a the management centers of society.

The purpose-oriented order of culture may have "won" over the natural causal order of nature locally, and may have subordinated even quite complicated natural structures to some extent (for example domesticated animals, artificial agricultural ecosystems, an increase in the human capability to control their existential powers in a cultural way); but at the instrumental level of abiotic technical progress without the possibility of using additional energy resources productively, it was not capable of disturbing the global dynamic balance of the biosphere. *Extensive natural ecosystems* are sufficiently elastic for the instrumental activity of small human populations. Hence, on the other hand, *they cannot prevent human cultural expansion and the destruction of some areas*. "Ancestors in our phylogenesis were not born environmentalists but looters. They could not cause more damage simply because they did not have the possibilities we have and also because there were comparatively few of them" (Wuketits 2001, p. 195).

The Neolithic Revolution, an immensely important process that "created" almost all known species of domesticated animals and cultivated plants, was the first great *evidence of the limited powers and preferences of the indirect, ontic creativity of cultural evolution.* This, probably the deepest technological and social change ever, that could not even theoretically have been the work of a single individual, partly removed humans from the natural order (or, rather, humans themselves stepped out of the natural food chain). On the other hand, the agricultural sphere and Neolithic culture as a whole, remained a part of the biosphere and were able to exploit its integrity, its environmental energy (the accumulated radiation of the Sun), and its natural production abilities.

Traditional agriculture has become a bearable "organic parasite" on original ecosystems for several millennia. Empirically discovered forms of the universal utilization of domesticated animals and cultivated plants played a positive role in the establishment of conditions for the internal self-sufficiency and environmental balance of agriculture. Special agricultural technologies,

even before the Industrial Revolution, provided *the specific biotic mechanization of agricultural labor.*

We mean especially the utilization of animal power for soil cultivation, crop harvesting, transportation, and the propulsion of stationary machines. The difference between a plough pulled by an ox and a plough pulled by a contemporary tractor may be significant from an environmental viewpoint; but, from a purely technological viewpoint (turning and aerating soil), there is, rather, a quantitative difference. Even the almost forgotten horse-operated gin, which could still be seen behind every larger country barn in the middle of the last century, is a good example of the way in which animal power can be harnessed to drive stationary threshers, feed cutters.

B. Direct Method of Culture Formation

The expansion of the direct, ontically creative activity of cultural evolution, comparable to the sudden growth in the disparity and diversity of the biosphere after the Cambric explosion approximately half a billion years ago, was started by the *Industrial Revolution*. European culture relied on artificial technological creativity based upon the intentional application of structural, sociocultural information (natural science); in other words, it relied on the prospectively troublesome development of abiotic technology. Since the technological principle of the Industrial Revolution consisted of the complicated social process of transforming manufactures into factories, natural science itself was unable to bring this revolution about; but it took part in its expansion and elaboration. The rapid, spontaneous development of abiotic technologies began in Europe at the turn of the 18th and 19th centuries. The productively applied, mechanical principle artificially "set in motion," for the first time in human history, that group of human artifacts (tools and macroscopic parts of machines created from comparatively passive inorganic matter) that could not have been functionally integrated and brought into dynamic motion by craftsmanship.

A tool's capability to receive new sociocultural information (form) is limited mostly by its material. Wooden, bone, and stone tools were much less able to adopt and maintain the required form in comparison with later metal tools. Casting, forging, and the sharpening of metal tools were prerequisites for their differentiation and specialization.

Given the greater absorption capacity of mechanical systems to materialize available sociocultural information (science), the inanimate natural powers and structures in particular could be quickly integrated into the process of production. Only from the distance of time can we see that it was mostly fossil fuel energy (coal energy from the preserved biomass of previous geological periods) that turned on the wheels of the Industrial Revolution. For the first time in the history of culture, the mass exploitation of the non-renewable

natural resources of the Earth was begun, and with it probably another wave of a frontal attack on the diversity of life.

We have noted above that the first wave of attack on biological diversity was carried out by hunter-gatherers. Agriculturists constituted the second wave. The difference between the individual waves is also found in the pace influenced by technology. "...a day's work with chain saws can carry the species away" (Wilson 1992, p. 232).

It was the beginning of a process that has been continued and exacerbated by anti-natural culture; at the end of this process we find the currently highly differentiated global abiotic technosphere, damaged and polluted planet, deforested and pointlessly developed countryside, exhausted soil, simplified and destabilized biosphere.

Human culture prior to the Industrial Revolution was based on agriculture and, consequently, on a preponderantly biotic technosphere. It was still able to maintain an approximate balance with original nature, because it was technologically weak and developed at a sufficiently slow pace. This was possible due to the fact that information-isolated local cultures were technologically underdeveloped and rarely energetically integrated, and culture as a whole developed quite slowly without the mutually advantageous cooperation between its comparatively independent parts. Time is the reliable optimization element for all newly emerging objects inside the spontaneously-active terrestrial reality, and both large opposition systems – the biosphere and culture – had had time at their disposal.

The rapid expansion of culture requires compensation for the insufficient optimization function of time in both theoretical and practical ways; since neither the environmental production and consumption nor the sustainable way of human living will spontaneously originate on a planetary scale, the technological progress must be controlled by the relevant subsystem of social control – *an environmental policy* – by means of environmental laws, education, and upbringing.

As stated above, it has been proven that cultural structures are "baked from the same flour" as natural structures were once baked. This imaginary flour (dust from the ancient stars found in the elements of the periodic table) was baked (incorporated) into both inanimate and animate forms of the planet Earth by evolution. Since it is no longer available, the material for artificial cultural structures may be obtained only by "milling the pastry" (destroying) of unique structures of terrestrial nature. This is the significance of our frequently repeated central idea that *the expansion of the differently ordered cultural being necessarily brings about a decline in natural being.*

The level of a tolerable spatial expansion of culture, or, to put it slightly differently, the scope and measure of parasitism of culture on nature, is a serious philosophical and moral issue of our time. Yet, even in philosophy, we avoid the

question of what gives humans (normal live beings who cannot live in an artificial environment forever) the right to occupy the whole Earth with their culture. What empowers our species – putting it in economic parlance – to destroy such a large amount of "natural capital," whose interest payments have kept alive all the local cultures?

> Nonetheless, several recent assessments have estimated that biological services flowing directly into society from the stock of natural capital are worth at minimum $36 trillion annually. That figure is close to the annual gross world product of approximately $39 trillion… If natural capital stocks were given a monetary value, assuming the assets yielded "interest" of $36 trillion annually, the world's natural capital would be valued at somewhere between $400 and $500 trillion… (Hawken, Lovins and Lovins 1999, p. 5).

Evolutionary studies of the expansion of globalized culture, nevertheless, show that its course appears to copy and extend the genetically prescribed process of the aggressive adaptive strategy of humans as a species. No matter how much the current human culture believes in controlling advanced science, ethics, legal theories, and philosophies; in practical technological and political matters it does not respect its general theoretical doctrines and, especially, *human biological nature.*

Humanity has caused the environmental crisis and bears the *collective responsibility* for it; humanity currently has no philosophical theory that could justify what is happening on the planet with respect to the sufficiently lengthy possible future of cultural development – *the unlimited wasteful satisfying of marginal needs of humans currently living in rich countries.* It looks as if we have already accepted the facts that we were selected for our indifference to the broader context and the more distant future, and that we will become extinct soon.

F. Wuketits, the biologist, repeatedly draws attention to the inescapable demise of humans as a result of their actions. "Catastrophe with a capital C, the greatest catastrophe of the planetary scale, which would dwarf both world wars even without nuclear conflict, is being brought about by the systematic destruction of environmental cycles. Humanity pushes the Earth off balance and has no idea of the horrible consequences this behavior might have" (Wuketits 2001, p. 227).

Even philosophy has followed the inconspicuously self-destructive expansion of culture from its very beginning. Many philosophers certainly know that there is no moral value or any serious reason that would give culture the right to farm such large planes of soil, manufacture so many useless things, "industrially" exploit tamed animals, occupy natural ecosystems and kill other

live creatures, simply because they are in the way of human desire for riches, freedom, and consumption.

Even though we would like to avoid futile moralizing, we cannot easily avoid the problem of the current *absence of philosophical and political responsibility.* To be sure, the responsibility for the critical environmental situation, which appears to be evasive, can be generally easily specified. Nevertheless, determining it is related to understanding the relationship between the indirect and direct means of the formation of artificial cultural orderliness as presented above. We have claimed that the direct, information prescribed, means of culture formation asserted itself in Europe only after the Industrial Revolution. This very formation of culture "from above", that is to say by means of the direct productive application of science, is in accord with the spirit of the bourgeois liberal market economy; it is currently significantly outrun and restricted by the process of culture formation "from below", that is to say the indirect method. Thus, it confines the spontaneous forming of culture by means of human cohabitation with culture and nature – their mutual communication, value attitudes, and non-productive practical activities. Since only *partial theoretical knowledge brings profit, success, and power,* it is readily applied in the production, superfluous consumer technologies, and in different forms of social material culture.

Thereby this process dangerously increases the *distance* between the rapid anti-natural development of culture and the slow development of terrestrial life. The same *distance* also increases between the accelerating expansion of the technosphere and the slow general understanding of the world by the insufficiently educated public. The technosphere imposes upon humans their anti-natural behavior, artificial needs, and unsustainable lifestyles. This is not about the fact that the public cannot understand production-oriented science and cannot control nor manage it.

The view that, along with the growth of scientific knowledge, there is no growth in human reason, wisdom, morality, and responsibility is currently held by many authors. "Quite the contrary, along with the growth in scientific production our helplessness, increases and an abyss between the feasible and the defensible widens. Science and technology increase their distance from us; we lose the ability to discern relevant knowledge from irrelevant, the results of scientific studies that are crucial to life from those that put life in danger. It would be naive to believe that the results of scientific research are neutral" (Wuketits 2001, p. 236).

Another crucial point is that the growth of independence of these structures confines the level of freedom and democracy attained. Therefore, without the help of the newly-oriented natural and social sciences, without the help of evolutionary ontology; the public could not adequately understand culture. The public cannot understand the situation brought about by the unchecked

utilization of incomplete anti-natural knowledge, which is existentially threatening humanity and culture for the first time.

We admit that the issue of an adequate understanding of the world, which is a prerequisite for any humanistic correction of the spontaneous sociocultural development by means of common civic activity, cannot be studied either by production-oriented science or by market-oriented economics or politics. To be sure, this is the marginalized problem of the dangerous, ontical influence of science and technology on nature, namely about the historically unprecedented problem of the existence of culture. This problem demands a competent philosophy to be understood. Unless we just want to watch the further self-destructive development of culture, we have no chance but to react adequately to this new situation from the position of philosophy: *to specify the concept of the ontical conflict between culture and nature; to promote educational reform;* to develop an ingenious system to popularize and reflect on science (in printed and electronic media); to search for the means of a better, more radical application of the systematic biological sciences, whilst cultivating both the public and the highest level of politics. We believe that philosophy that recognizes its participation in the irreversible destruction of the Earth via culture will never again behave like an abstract, theoretically-neutral discipline or as a narrowly understood anthropology.

Again, this does not all concern the simple establishment of rational, negative feedback between globalized culture and terrestrial nature, that is to say a verification relationship, which could supplant the lost corrective feedback between the local cultures and their environmental niches. This must also concern the revitalization of the basic, historically primary means of indirect culture formation by human activity. Probably only this *indirect, complex means, subjected to general aspects of human health and happiness, can integrate the direct, partial means* (information prescribed) and the fight against the dictate of the incomplete scientific, technological, and economic rationality. Partial knowledge, producing success and power, bears the inclination to materialization in anti-natural cultural structures and to promotion by seductive ways of imposing the consumer technology on the public and youth.

3. The Anti-Natural Pattern of Culture

First, to prevent misunderstanding, we must say that "anti-naturalness" is not an unknown phenomenon in the biosphere. To some extent, the self-preservation behavior of most animal species is "anti-natural." Each species realizes its phylogenetically created program (genetic information), behaves selfishly, and does not care about the general well-being of the biotic community. The natural activity of the self-preservation-oriented biological species provides

an immensely complex network of food, information, reproduction, and other relationships. This network establishes and continually optimizes the naturally ordered environmental system, the planetary biosphere. Humans (who seem to be no exception to this pattern), due to the special circumstances discussed above, have managed to form a different type of selfishness and anti-naturalness – universal cultural selfishness and *ontical anti-naturalness*. To be sure, cultural evolution produces orderliness unknown to nature: *cultural being* expanding at the expense of nature.

At the rise of culture, because of the biological predisposition of humans toward an aggressive adaptive strategy, cultural orderliness originated mostly through the genetically conditioned self-preservation activity of relatively isolated human populations. Following the appearance of ethnic languages, which were able to encode perceptually-neuronal (sociocultural) information in a non-biological way, the process of forming culture via human activity became more complicated; and we can distinguish the two above-mentioned ways of its formation: *indirect* (information non-prescribed) and *direct* (information instructed). The natural balance and co-evolution between these two ways was maintained in Europe – as described above – approximately until the Industrial Revolution. From this period, the culture formation process, via human activity, has become significantly influenced by the structural element of social intellectual culture – *production-oriented natural science*.

Because the anti-naturally-oriented social system was in accord with the similarly oriented natural science, it did not hinder the application of new structural information – quite the contrary; it issued a social delivery order. The elements of the global mechanical technosphere – with a high demand for raw materials, energy, and geographic space – were established. The development of large abiotic technical systems (factories) with their metabolism that were not adapted to nature and that showed immanent tendencies toward expanded reproduction and evolution, could be seen. In this anthropocentric social atmosphere, the practical success of the applied sciences cemented the illusion that humans were not natural beings but that they exceeded nature due to their reason, understanding, and values. It seemed that nature was an ontical reality of a lower order; that it was a plain materialization without development or its subjectivity; that it was an inanimate or animate matter obeying humans and being improved and humanized via their acts. In both theoretical and practical approaches, the lordly approach of humans toward nature gained the upper hand. Modern philosophy and science, developed and named those facts that were the natural pre-requisites for the human relationship to nature from the very beginning of culture. R. Descartes stated this precisely:

> They suppose that, "... it is possible to attain knowledge which is quite useful in life, and that, instead of the speculative philosophy which is

> taught in the Schools, we may find a practical philosophy by means of which, knowing the force and action of fire, water, air, the stars, heavens and all the other bodies that environ us, as distinctly as we know the different crafts of our artisans, we can in the same way employ them in all those uses to which they are adapted, and thus render ourselves the masters and possessors of nature" (Descartes 2003, p. 41).

Little has changed in this view even today. Also the post-industrial stage of the artificial, technical creativity of culture is intellectually based on the partial rationality of the Modern era. It is based on a distorted human phylogenetic experience of nature that cares little for the integrity, value, and conditions of the natural development of the biosphere. Even though technologies that are less environmentally aggressive and more energy and waste efficient will eventually come into existence, the general human approach toward nature remains unchanged. The tempo at which more environmentally friendly manufacturing processes are established is equaled by the tempo of the environmentally careless abiotic consumption – the new common feature of current human lifestyles. This orientation is in accord with the incorrectly understood liberal right of humans to ownership, freedom, and consumption that is unlimited by nature.

It also appears that the institution of private ownership, which proved to be so beneficial in the pre-environmental period from an economic, civil, and sociopolitical standpoint, is currently hindering a more rational approach to the environmental crisis. The classic defense of private ownership itself conflicts with reality. Its author, the 18th century English philosopher J. Locke, suggested that the Earth originally belonged to no-one but that there had been different ideas as to how it could be divided among individuals. His ideas were based on the facts that human individuals were the owners of themselves and that even the labor of their bodies came under their ownership. Hence, "whatsoever then he removes out of the state that nature hath provided and left it in, he hath mixed his labor with, and joined to it something that is his own, and thereby makes it his property. It being by him removed from the common state nature hath placed it in, it hath by this labor something annexed to it that excludes the common right of other men" (Locke 1973, p. 134).

These arguments, which should be criticized nowadays, show that the liberal right of humans to ownership was constructed anthropocentrically; that it did not provide the right of other live beings to survive or for the protection of the precious inanimate memory structures of the Earth. In combination with ancient hunter-gatherer's archetypes with the fear of dark forests and jungles, the worst possible attitude of humans toward the remnants of the original natural ecosystems is arising today. The former Brazilian Minister of the Environment, whose ideas apparently stem directly from the field, wrote

the following: "When we see something as majestic as a rainforest, we feel that we must do something about it: introduce progress, roads, bridges ... into it" (Lutzenberger 1990, pp. 81-83).

A. The Opposition between Natural and Cultural Orderliness

A potential disagreement between natural and artificial orderliness has existed since the rise of culture. At the time of the hunter-gatherer cultures, this disagreement did not threaten the normal functions and evolution of the biosphere. Cultural community was forced to live on the biotic natural overproduction, which enables only a sparse population. Culture only damaged the natural environmental systems selectively and locally. Despite the fact that some regions of the world were damaged by extensive grazing and poor agricultural technologies in the Late Neolithic period, the natural environmental system was still available for the further extensive expansion of culture. The productivity of natural ecosystems for humans increased almost a thousand times due to the Neolithic Revolution. A paleolithic hunter needed 10 km^2 for his sustenance; a neolithic shepherd, 10 ha; and a medieval farmer, only 2/3 ha of arable land (see Dorst 1965).

The physical globalization of human culture – the connecting of formerly isolated regions in terms of materials, energy, and information – accompanied by the planet-wide migration of people, rapid exchange of technologies, goods, inventions, services, has brought about a situation never encountered by humanity before. Due to the subordination of the planetary cultural system to its internal principle of profit, artificial structures have been established whose *operation no longer serves primarily human survival.*

The issue of profit, which is closely related with resources of social wealth has not been sufficiently resolved with respect to nature. It appears that the only possible source of social wealth must be the seduction of the natural activity of the Earth. The classical doctrine of A. Smith, that human labor is the source of wealth, concealed the participation of nature in its creation. Classical capitalism was concerned with some balance between the exploitation of inanimate, natural resources (materialized in production) and the exploitation of live human labor (natural resources within humans). Given this, current global capital tends to much more intensive exploitation of human labor, materialized in advanced technologies that seduce the Earth unprotected by law.

The internal principle of profit is set up for success in economic competition; for the growth of wealth and political power of a narrow stratum of owners. A strong, purposefully integrated, global technosphere; a global economy; a global division of labor; and global cooperation are all developing inside the global, causally weak, integrated biosphere. This not only shortens distances between people and cultures but also cancels out the beneficial decelerating effect of

the original biosphere. This decelerating effect had eliminated failures and disasters, and all living creatures had previously been adapted to it. The high speed, at which cultural influence spreads, creates for humans and for life in general a previously unknown, planetary "present day". This is the reason why globalization eventually turns against humans. It multiplies the anti-natural forces of culture and forces the destabilized biosphere to change its strategy: *If live nature cannot defend itself by means of dominance and force, it will do so by means of its vulnerability, instability, and fragility.* It no longer has enough power to maintain its most complicated structures, but it is able to maintain its system integrity and to eliminate those live forms that are the most fragile and surplus to requirements. Humans as a species are, unfortunately, just a hindrance to its further evolution.

Since we have not been prepared for these changes in the reactions of nature, either by our natural or by our cultural development; *it is not only our biological constitution that fails in the confrontation with wounded nature*: *our cultural archetypes fail too.* No culture can cooperate with such a weakened and destabilized biosphere. No political subject could possibly handle it in a delicate way in the current, economically competitive environment. Since there is no adequate philosophical concept of the crisis, even the intellectuals do not understand what has happened and what will have to be done to secure human survival on the Earth.

At the end of the book, you will find our invitation to a discussion about a rental relationship between culture and nature, called Lease Contract with the Earth. This text was approved by the general assembly of the Czech Writers Association on 4 December 2004, and it was first published in its newsletter, "Dokořán" No 32/2004. It was also published in Literární noviny (17 January 2005); Britské listy (21 January 2005); Životné prostredie 1/2005; and in other domestic and foreign journals. Since issue number 3/2005, a discussion on this topic has been ongoing in the Philosophical Journal of the Czech Academy of Sciences and also in Filozofia of the Slovak Academy of Sciences. Many biologists have arrived at similar approaches.

> Agreements between nature and society (civilization) would certainly be desirable, even if they were signed by just one of the contractual parties. Nature does not need us and our civilization. Making peace with nature can only mean that we have understood that it is us who is most endangered because nature, burdened for so long, will surely kick back one day (Wuketits 2001, p. 247).

The rapid expansion of the current, artificial, cultural orderliness also tests (empirically) the actual sense of the social intellectual culture. Until we created the globalized, anti-natural culture, we did not know that our intellectual culture

– especially its theoretical components, the natural and social sciences – was not as amazing and sublime as we believed. It shows that the intellectual and material cultures are closely interconnected and represent two sides of the same system, whose pattern can be judged only by means of its "self-interpretation" simply by considerations of its intellectual culture.

Indeed, the vast majority of intellectuals refuse to accept this unpleasant truth and insist on the preconception that human theoretical knowledge is sublime and highly objective. As far as science is concerned, this objectivity is supposedly guaranteed by empirical testing, strict logic, and methodology. But the biological prerequisites of logic and methodology – setting aside the short-sighted experimental testing of known truth – originated within the same process of phylogenesis as our body and our *a priori* perceptual-neuronal apparatus, designed to know our external world.

"The hope that the evolution of human has achieved its apex, that it has achieved a state of perfection is deceptive and considering the way we devastate this planet, also ridiculous. Is the goal of evolution supposed to look like this? To create a live being that is conscious of its behavior, that intentionally perceives nature and other animals only to destroy them in the end? Will the ‚omega point be achieved only when the destructive power of human will be able to completely destroy this planet which is the only one to "support life" for far and wide around? " (ibid., p. 199).

The insidious, ontical inadequacy of the conceptual *third reading* of the information built in by nature stands out only if we understand that our ancestors could not have understood live systems otherwise than as "black boxes," able to satisfy their biological needs through their characteristics, for example the need for food. They understood them as many of us understand cars, mobile phones, and computers. Since the rise of culture, a deception, later reinforced by Modern science, has been preserved: that there is just one representative level of world orderliness; and almost all changes within nature are as visible and reversible as a rearranged table, which can easily be returned to its original place, or as a cut tree, whose seedling we can plant if needed.

The problem is more complex than that. We have noted that it is useful to distinguish *two types of orderliness* within terrestrial life: natural orderliness, which is strictly *information prescribed*; and the *comparatively free, environmental* orderliness. Despite the fact that we perceive only macroscopic structures and their relationships, namely a portion of the resulting environmental orderliness; we are discovering that natural evolution not only secured the information prescription of the animate forms from the perceptual-neuronal knowledge of human but also that it neatly connected both types. At some level of damage to the natural environmental system (the biosphere), the existential conditions for the individual life forms producing the environmental system (the biosphere) are changed so greatly that their strictly information-determined individual

orderliness, attuned to standard relations within this environmental system, does not allow them to adapt. These forms will either become totally extinct or move elsewhere. If too many live forms in a particular environmental system become extinct (or maybe just a single key species), *a sudden system change (a qualitative one) might occur:* the system then ceases to exist or changes into a new state of balance; but the new balance exists without some evolutionarily best developed forms that it cannot protect, because they are usually the most fragile ones. It is this time-extensive feedback – the spontaneous reproduction of human health conditions – that the current biosphere uses to check human culture.

In reality it is much more complicated than this model situation. But we know that our being is also threatened; because the means of our theoretical knowing is biologically behavioral in a significant way, that is to say strongly ontically inadequate and not in accord with the spontaneous constitutive process (evolution and the dynamic system characteristics) of the biosphere. In short, from some level of damage to the biosphere and reduction by culture, even theoretical knowledge of nature will not make it possible for us to survive. We will be unable to compensate the loss of natural orderliness. This implies that life – including human life – belongs in the world itself. Our genetic information (that is our genotype and phenotype) have been adequate for the world so far, but the world interprets human neuronal knowledge as a part of the implicate order of culture only partially, that is to say in a distorted and species limited way.

This does not just concern the fact that the expansion of culture threatens our traditional phylogenetic and ontogenetic adaptations. It is not only human somatic health that is threatened but also our psychological health: the reproduction of the normal structure of the human personality. A changed environment that increasingly corresponds only to a narrow cognitive component of human personality continually stimulates this very component. If this component is not cultivated by widely-conceived rationality, values, emotions, and by the humble relationship of culture toward nature, then it may be dangerous even to humans themselves. "Human' s cognitive skills have undoubtedly improved in a comparatively short time, nevertheless human generally uses these skills to assert himself on the Earth without any regard for other species...his quite short period of active operation has changed the appearance of the planet. The anthropozoic stage is predominantly a stage of destruction and eradication" (Wuketits 2001, p. 200).

Our consciousness does not reproduce sociocultural information, but, instead, it derives this information from the structure of the surrounding environmental orderliness (translates it into an ethnic conceptual language). This fact implies the question of what organizational level of highly differentiated natural being was the defining pattern for the pattern of cultural information

and, consequently, for the technological and objective character of human anti-natural culture. At present, we know with certainty that it could not have been the level at which the natural biotic evolution "constructed" live systems – *the molecular level*. It could only have been the organizational level of sensually perceptible, macroscopic objects. It is here that we must seek the causes of the anti-natural pattern of culture: in the reduction of the highly complex systems of both inanimate and animate nature to concepts representing objects and their relations; in their reduction to our language that is conceptually poor when describing the sphere of medium dimensions – the mesocosmos. Here we can probably see the deepest informational cause of the ontical disharmony between culture and nature. This is related to the reason for the pushing back and damaging of the biosphere by intentional human activity – by culture and the technosphere.

B. Three Shallow Environmental Arguments

Let us consider three shallow environmental arguments that depreciate the dangerous anti-natural pattern of culture. *First,* some biologists typically claim that humans are an environmental disaster for nature (see Wuketits 2001); that humans have been causing damage to, and disrupting nature, from the very beginning. To be just, we must disprove this claim. Due to special circumstances, it was not only humans who were adapted to the aggressive strategy of adaptation. Even nature, as such, was "constructed" – so to speak – to fit such a strategy. To be able to purposefully adapt the natural environment to them, humans obtained not only a specific physique, but also a specific psyche. They obtained will, emotions, and the ability of abstract and creative thinking, through which they have been able to simplify and transform natural ecosystems. Humans are also able to use the qualities of complex live systems similar to the way in which they use the qualities of comparatively simpler technical systems and the implicated inanimate natural processes and forces. Since natural ecosystems are able to continually supplant their damaged or lost elements, a small cultural burden does not disturb their integrity. Unfortunately, humans did not gain the *ability to immediately know about and influence the soul of animate nature* – its invisible implicate order, its genetic information.

The unimpaired biosphere – just like any other complex system – can bear some level of burden without damage. With no adequate reduction or suppression of the original ecosystems, with no purposeful selection as a result of the extinction of both the ancestors and competitors of the current domesticated animals; humanity would probably have not been able to resolve the crisis of the hunter and gatherer economy; it would not have been upgraded from hunting and gathering to agriculture. The same situation occurred a few millennia later. There would probably have been no industry, no complicated

mechanical technology, and no contemporary information technology without production-oriented science; without the mass exploitation of fossil fuels, minerals, and other non-renewable resources. Real danger to the habitability of the Earth appeared only at the stage of globalizing culture.

Second, we cannot support the idea that when natural, homeostatic systems of the biosphere fail, the subjects of ethics and politics must be extended with the problem of intentionally influencing and controlling the Earth's ecosystems. The possibilities of environmental ethics are also doubted by F. M. Wuketits: "Environmental protection based only on ethics has no future, because you cannot see, and as realists you cannot even expect, that humanity, who feels he is the "master of the Earth," would significantly change in the near future" (Wuketits 2001, p. 197).

The idea that nature cannot find its way without us, human beings, has even been mooted. This is a classic anthropocentric illusion revealing a deep lack of insight into the problem. Nature would do quite well without us humans, but it has found it difficult to rid itself of our technological civilization. This technological civilization is continually searching for new resources for its anti-natural expansion by means of global economic integration. By doing so it cuts off the negative feedback that once assured the adequacy of local cultures to their environmental niches; so the decisive, system-wide solution detrimental to the whole culture, which is continually being deepened due to our inability to understand adequately and control the conflict between culture and nature, is simply postponed. Current economic prosperity marks the postponement of our final defeat, rather than our victory. Nature maintains, as always, its systemic superiority over culture. Consequently, not only do we not have to help nature, we cannot help it. It would be enough to decrease the excessive and structurally improper sociocultural burden to make space for nature.

Third, we must oppose the apparently strong argument that pretends that nature itself destroys its products. For example, biological species and natural ecosystems are destroyed in floods, storms, earthquakes, meteorite impacts This argument, too, reveals a lack of understanding of the current environmental situation. Setting aside the rare geological catastrophe, a natural demise as a prerequisite for natural origination is a part of the spontaneous transformation of the evolutionary process to be in harmony with the changing conditions of the abiotic and biotic environments of the Earth. Evolution does not create permanently existing species. When this very loss of biodiversity is caused by the anti-naturally oriented culture, that is to say by a subsystem of the biosphere that exists temporarily and is existentially dependent on nature, the situation becomes dangerous for humans: for example, due to the fact that an excessive reduction of the current biosphere causes disharmony between the genetically reproduced structure of human nature and the radically changed structure of humans' external environment.

Five

SEARCH FOR THE CONCEPT OF BIOPHILOUS CULTURE

If the anti-natural pattern of traditional culture ultimately resulted from the spontaneous process of asserting the genetically prescribed human constitution, that is to say from the aggressive adaptive strategy of humans as a species, then the biophilous culture (tolerant to nature and sustainable) will have to be formed differently (due to the impossibility of changing the human constitution): *by means of information and axiological changes in the cultural system genome.* These changes will not come about spontaneously, and must be preceded not only by an adequate philosophical understanding (concept) of culture, but also by the *identification of the ontic role of sociocultural information within the cultural system.*

Sociocultural information is information that appears along with the formation of culture; along with the creation of a new ontical layer of terrestrial reality. We should again remind the reader that the ontological concept of information in the sociocultural field must include not only the narrowly cognitive component but also the human emotional value and volitional aspects. This information is, on the one hand, a *product* of cultural evolution; and, on the other hand, it is also its *prerequisite*. Despite the fact that it was established and utilized only by the cultural system, at the level of humanity as its bearer, it could have been established only through the modification of evolutionary older, animal neuronal information (predominantly semantic). Even sociocultural information, leaving aside its volume, function, and means of storage, *exists objectively* and has two main forms: *semantic and structural.*

The semantic aspect of sociocultural information has been acknowledged and intensely studied for a considerable time. Its different aspects are studied in specialized disciplines – semiotics, communication theory, information science None of these disciplines, as far as we know, systematically involves the study of the cardinal *problem of the transformation and division of the originally natural neuronal information in the semantic and structural aspects of sociocultural information.*

This is purely a philosophical problem that has been indirectly formulated by different authors. For example, even Popper's concept of "three worlds" represents a significant step in this direction. Popper's emphasis on human speech, which he believes is the true center of World 3, affects the problem of the constitutive role of cultural information: "Human speech gave rise to human culture resulting in the appearance of symphonies, books, paintings, bottles – generally, the products of human activity..." (see Popper and Lorenz

1985, p. 75). Yet Popper is inconsistent in the fact that he assigns some of these products to World 1. The subject of sociocultural information is, for example, treated in Habermas' *theory of communicative behavior* (Habermas 1981) and to Hayek's theory of the origination *of spontaneous social order* (Hayek 1982, pp. 35-52); but both of these approaches monitor the specific conditions of human sociocultural activities. It is probably only evolutionary ontology that studies the process whereby human non-biological activity, within inter-human cooperation and language communication, creates not only an artificial open system of culture but also its internal constitutive information – *the genome of culture* (intellectual culture, the implicate order of culture).

1. Genesis and Structure of Sociocultural Information

It is not easy to depict theoretically the process of "separating" sociocultural information (from its original animal neuronal information) at the level of humanity. At the same time, we can also see its "division" into sociocultural information that is *predominantly semantic and predominantly structural*; however, this does not mean a mechanical division but, rather, the emergence of new functions from the original, potentially multi-functional capacity of the human brain. The brain, the natural memory structure of the human being, and the biotic carrier of both newly originated aspects (forms) of sociocultural information, all remain morphologically constant (structurally identical). After the rise of culture, the human brain was apparently forced to process, use, and store *three different forms of information as follows:* 1. *Original animal neuronal information,* which was evolutionarily in accord with natural genetic information; 2. *Semantic sociocultural information,* whose general pattern and the vagueness of its content correspond to common human communication and pragmatic interpretation of the world, and which only indirectly plays a cultural-constitutive role; 3. Partially technological (later also theoretical) *structural sociocultural information.*

Since even the natural semantic information (animal) must have fulfilled an ontically constitutive environmental role to some extent, it appears that the above-mentioned "separation and division" must provide both of the above-described means of sociocultural orderliness creation: *first* the "historically older," information non-prescribed, *system-organization* orderliness; this integrates the cultural system, mostly by means of the activity of human individuals, and originates mostly through time succession; *second,* the strictly information prescribed technological orderliness, that is to say the "*construologic one;*" which analogically integrates partial cultural structures just as natural information integrates live systems. We have noted above that technological activity (the manufacturing of tools and other artifacts) was a part of cultural

creation from the beginning, but that it only began to assert itself significantly in Modernity, along with the development of industry and the significantly consumer orientation of culture.

These two means of culture formation via human activity are in a loose accord with the two means of constituting sociocultural information: 1. Culture originates as a result of non-biological forms of human sociocultural activity connected with the utilization of ethnic language; 2. Culture originates through the intentional transformation of the language function from the interpersonal communication tool into the means of representation and technological reconstruction of the fragments of the external world.

Even though ethnic language probably did not emerge to describe the external world, but in response to the need to expand the possibilities of group cooperation via more subtle and better structured communication; this very descriptive function gave humans as a biological species with an aggressive adaptive strategy a significant selective advantage. This function significantly exceeds the narrow temporal and spatial frame of the warning and courting sounds of animals. It provides a conceptual interpretation of reality; contemplating the past and future; describing abstract relations, and establishing and criticizing intellectual projects and theories. Thus, ethnical language significantly influenced the human species' specific image of the world; provided the design of an artificial world of material culture and technology; and modified the process of human ontogenesis. Yet even ethnic human language, which first encoded the neuronal (epigenetic) semantic information of the live system in the history of the biosphere, has been unable to decrease significantly the incompleteness and approximation of this information.

Even though language ranks humanity in the order of culture, it is unable to influence important anthropological constants: genetically pre-set senses; the structure of emotions, character, and volitional features of humans. We are setting aside the following facts: Besides the two forms of the general integrating information of the cultural system (construologic and organizational), which make this system specific and separate it from the biosphere, there must always be an individual version of total cultural information in the field of a particular person's psyche; and a person psyche separates that person from nature and includes him or her in a particular culture (this may be partially reflected by the quite unclear philosophical problem of the psychological and the mental in N. Hartmann and K. R. Popper).

Both of these forms of sociocultural information described above exist as system-bound and comparatively free. It appears that, at the rise of culture, the free, sociocultural information (both that of the system-organization and the construologic) had to be carried by the memory structures of human individuals – by the brains of people living at that time. Fossil findings of

preserved parts of hominids and first human skulls also indirectly prove that it originated from neuronal information (semantic) after the transition to erect walking. This was approximately at the time when language communication, labor skills, and abstract thinking started to develop. Humans did not draw this new information that is unknown to nature – as noted above – from the evolutionary biological heritage of their own species; but, in accord with their genetic predisposition, they adopted it via socializing, learning, upbringing, and education throughout their ontogenesis modified by language and culture. Since humans were included in the natural and cultural environment; they were able to utilize information previously "built-into" the systems of nature and culture, that is to say information that was biotically and socioculturally bound. In this aspect, humans are not much different from other animals that also register, and have to respect, the object-bound, sociocultural information. Humans are the only live creatures that are also able to utilize their *free and available sociocultural information* originally *transferred via oral tradition;* this information is now stored in different artificial structures of the sociocultural memory, and it is not understood by other live systems.

It has already been said that some hypothetical feature or "limited" adequacy of the perceptually-neuronal information, with respect to the multi-layered structure of reality, is generally connected to the fact that, in a particular species, this information depends on that which creates the internal image of its relevant environment and what is crucial for its survival. In the case of the human biological ancestor, who had to draw natural environmental energy from multiple levels of the so-called natural food pyramid, and managed to ignite cultural evolution, the *role of the neuronal information has been extraordinary from the very beginning.* We will attempt to specify this.

A. Macroscopic Origin of Sociocultural Information

Natural, by senses, and intellect non-mediated genetic information concerns the implicate order of nature, namely the characteristics, interactions, and arrangements of molecules. This information anticipates the internal structure (of cells, tissues, and body organs) and behavior of the whole live system. This dependency of the content of sociocultural information on the perceptual and rational representation of the world is a reference to the surface and external forms of reality that humans, as great animals, can analogously distinguish in a subtle way, because it has been significant for their survival.

We can declare that *sociocultural information* mostly comes from *one layer* of the natural order of the world, from its macroscopic layer. This information was originally (at the rise of culture) connected mostly with the explicate order of nature. Most concepts in our ethnic language – our common concepts of space, time, movement, bodies, heat, energy, life, including the cultural interpretation

scheme, values, legal regulations, motivation – were derived from knowledge of this order, namely from the organizational level of macroscopic objects.

Sociocultural information comes from the external forms and characteristics of objects empirically studied by humans, including "objectively" understood live systems and human artifacts. This special perception of reality, which did not particularly distinguish between natural and artificial structures, was the basis for human cooperation within culture. It helped to discover the first efficient algorithms for the intentional physical transformation of the environment. Until the emergence of the global environmental crisis, it was unimportant that the sum of sociocultural information (the imagined genome of culture) had not adequately reflected either the explicate or the implicate order of reality. Considering the reproduction of human cultural life, our ancestors were satisfied when it reflected a mere *fragment of the explicate natural order:* the terrestrial abiotic and ecosystem orderliness established in succession. It was as if nature intentionally concealed and secured its implicate order from humans and against malpractice, that is to say the binding forces between the elements of abiotic structures and the strictly information-prescribed structure of live systems.

The biosphere, as a dissipative structure more-or-less closed to information, constituted itself in such a way that its current sun collectors – green plants – could receive the cosmic energy from above, from our life-giving stars, without any inhibitions. In contrast, culture had to start with energetic nourishment drawn from below – from the biotic resources of its biological niche. Newly emerging dissipative structures of culture (hunter-gatherer bands), which were integrated through their specific knowing activity as an information-open, sociocultural system, were materially and energetically dependent on the Earth; on the finite phenotype forms of natural evolutionary process. Since the terrestrial conditions give all new structures (both natural and artificial) approximately the same chance of survival, *cultural evolution* was forced to *face the opposition of two differently oriented processes* from the beginning: At first, cultural evolution mostly faced *the opposition of biotic evolution*, which in part absorbed and even disturbed "human cultural activities" through the activity of the live system. And later, after the broader expansion of its construologic component, culture increasingly had to also face increasingly *the opposition of the objective tendency of reality to decomposition*; to the natural destruction of all ordered structures (to entropy). Explicate forms of reality, the cultural and natural phenotypes, spontaneously dissipate much faster than implicate forms, the genotypes. As physical structures they are subject to irreversible ontical demise; to the omnipresent process of entropization. The spontaneous emergence and demise of the explicate (phenotype) forms of reality always lie behind the ontically creative activity; they are probably the main factors in the concealed "growth," and unfortunately also in the "disappearance," of the implicate memory (order, information) in nature and culture.

The main reason for the presence of free, sociocultural information within the information non-prescribed cultural system, that is to say the information available whose parallel we cannot find in natural ecosystems, is the *structural difference between cultural system and all natural systems.* Culture is the result of the purposeful activity of one biological species, and the presence of the free information within the cultural system is a prerequisite for the preservation of its incompletely independent ontical structures. In other words, it is caused by the need to maintain *artificial structures advantageous to humans in an artificial way*: via everyday human activity (labor within the division of labor, learning, motivation, management, cooperation). Human labor, oriented by free sociocultural information at all levels, not only rebuilds the natural structures but also compensates the process of the dissipative impact of the animate and inanimate natural forces on the cultural system; it renews its disrupted elements and maintains its anti-natural structure and orientation toward the biosphere. Probably only cultural information that is comparatively stable, and has been proved by experience and complemented by current information (acquired through everyday knowing), can unite and reproduce the cultural system by means other than simply via narrow biological interests.

The level of reflection of nature and the scope of human collective cooperation that provide the reproduction of the cultural system must be incomparably higher than the level of knowing and cooperation within any other species community. To put it differently: the comparatively stable living conditions of most biological species are spontaneously reproduced by natural evolution; and therefore, considering their self-preservation, they can survive with *genetically prescribed reproduction and instinctively determined behavior.* They can exist with their animal-developed individualities and with the prevalence of their *a priori* genetic information. This information is, as stated above, highly compatible with the implicate order of nature; with the abiotic and biotic environment of the Earth. It appears that this environment mediates even the inter-generational transfer of animal semantic information; this is, to some extent, similar to the way in which the material and intellectual culture provide the inter-human transfer of semantic and structural sociocultural information. The fact that animal instinct – in contrast to symbols – limits individuality was noted, for example, by Whitehead: "In place of the force of instinct which suppresses individuality, society has gained the efficacy of symbols, at once preservative of the commonwealth and of the individual standpoint" (Whitehead 1958, p. 66).

B. Intellectual Rules of Culture

Since the living conditions of humans must generally be reproduced by culture, neither their species-genetic information nor their partial (personal) sociocultural information (which is just a tiny part of the total sociocultural

information) can provide the reproduction of the cultural system as a whole. If this unnatural system is supposed to survive in the "hostile environment" of the biosphere, it needs from the very beginning something that is its intellectual status; different rules of operation; *a different constitution than the biosphere*.

Yet we should not be mistaken by the facts that there is also a quite strong systemic similarity between nature and culture, and even the elements of material culture – analogically to the elements of the biosphere – necessarily originate as phenotype realizations of their structural information. Partial structural information, prescribes material, form, structure, and functioning to different human artifacts; and it has so far been unable to command its highly active atoms and molecules to reproduce, repair, and develop the particular macroscopic structure they are a part of. This strongly integrating information, which has been able to provide the cultural utilization of different characteristics and processes of both animate and inanimate nature; it has been able, if we can put it like this, to command only the human and the unredeemed technical systems. Due to its different language code, it has not been able to enter the natural implicate order of nature so far.

Current information technology is able to make use of natural characteristics of abiotic microscopic structures (free electrons, atoms, molecules, crystals). And its unambiguous theoretical origin is beyond questioning; it originates almost exclusively by means of the materialization of structural, sociocultural information. Even this current information technology has not actively accepted the wider human purpose (memory finality) of culture. The elements of technology and material culture, which are established, oriented, and system-integrated by the cultural community, do not acquire "individuality," "subjectivity," intentionality, and the capability for self-preservation the same way as live beings do. They cannot be spontaneously active themselves; they are not able to reproduce and generate evolutionary cultural changes. The more culture develops along its material-technical base, or the more distant it becomes from its original biological roots, the less it can rely on the support of the surrounding natural processes.

It is possible to object here that the information-open cultural system, besides its sociocultural information, also contains built-in natural information, for example in humans themselves, in domestic animals, in microorganisms, and plants. But this system did not grow spontaneously from the total of the abiotic and biotic elements of the Earth, from the natural activity of the Big Bang. Thus, even cultivated plants and domestic animals, which may be integrated by all sociocultural information, require a level of everyday human support and care to some extent similar to that required by the abiotic cultural structures – material culture and technologies. These artificial structures, as we know, must be connected to a so-called additional source of energy. Unlike the biosphere, the current technosphere is not connected with the universe

(the Sun) in a positive way but, rather, in a negative way: it is subject to its universal capability to entropize everything that exists.

There is probably *another reason* for the indispensability of total (general) constitutive cultural information, which is narrowly connected with the matters discussed above. All cultural institutions, organizations, and cultural elements are, in terms of function, reproduction, and evolution, dependent on the systemic integrity of the human community as a whole; on the mental cohesion of cooperating individuals. Their function and mutual compatibility of the technologies, cultural institutions, and organizations are potentially secured due to the means of their intentional or spontaneous structure; but their functioning and role in a particular culture depend on the characteristics of the "mental cement". This is related to the integrating power of the locally and timely conditioned ideas and values – with the obligation and permanence of universally accepted (that is system-constitutive) cultural information.

What we call total, general, or encompassing sociocultural information here is quite hard to specify. This is not just cognitive information but also emotions, values, ideology, and myths, and the general binding force of this complex intellectual structure. This is best expressed by the term the "spirit of the times." It is also apparent that the spirit of our times is not biophilous but significantly anti-natural.

General system-organization information, as noted above, need not represent a comprehensive philosophical image of the world. It may consist of universally shared emotions, illusions, myths, and religious or secular attitudes, ideologies, values, and even existentially important, biological or technological knowledge. It is quite a different problem that, in its available form, this information may exist in the cultural system only as dispersed, non-concentrated, and non-inscribed; and, thus, no individual may fully comprehend, understand, or bear it as a whole. F. A. Hayek draws attention to this problem when criticizing harmful rational constructivism as follows: "… civilization rests on the fact that we all benefit from knowledge which we do not possess" (Hayek 1982, p. 15).

2. Ontic Role of Biophilous Sociocultural Information

Live systems do not acquire and gather information to enjoy the recognized truth. Their cognition, although it also includes features of redundancy, is subordinated to life. Numerous means of biotic cognition of the external world (for instance, the blind interaction of mutations and selection, which maintains and changes the genome, and the more or less "intentional" perceptual cognition of animals with central nervous systems, which provide the flexible adaptation to particular living conditions) have an evident self-preservation purpose: Since

it concerns knowledge that is potentially compatible with the environment, it secures the sustainable physical reproduction of live systems, their adequate behavior, and slow, ongoing evolution. Biotic knowledge is, thus, an aspect of the spontaneous activity of life. It participates in the growth of the natural orderliness (and evolutionary memory) of the biosphere; in the creation of the irreplaceable wealth of information of the Earth. In this sense, it is ontically and axiologically constitutive.

Due to the influential European tradition, intellectual culture – free, sociocultural information – is still overestimated. Philosophy from Aristotle to Hegel has considered the purpose of human knowledge to be knowledge itself, the revealing of truth, and the intellectual cultivation of humans; it has been unable to sufficiently appreciate the idea that besides knowledge focused on truth, the cultural system lives and dies along with knowledge whose purpose is much less noble: to assure the physical existence and reproduction of culture. The continually growing overproduction of free sociocultural information gives the impression that culture is merely an information and communicative society of knowledge and art. Hardly any attention is devoted to the fact that culture is an *artificial, open, non-linear system* that continually absorbs and materializes human activities from biotic and abiotic *nourishment* acquired from the environment. Unlike the biosphere, which does not seem to have any free, natural information, culture is an open system, not only in terms of matter and energy but also in terms of information and human conceptual and non-conceptual knowledge. Although sociocultural cognition is vague, macroscopic, and fragmentary in comparison with the "content unambiguous" biotic cognition, it is as ontically constitutive within the cultural system as the historically older knowledge of live systems. If provocative metaphors of two Chilean philosophizing biologists U. Maturana and F. Varela are valid for these systems – namely that "each action is knowledge and each knowledge is action," and that "life is knowledge" (Maturana and Varela 1987, pp. 31 and 191) – then an analogous thesis has to hold for cultural systems: *culture comes into existence through the materialization of its knowledge and sociocultural information*.

Developing these ideas will not be a simple and formally easy task. Before we begin, it will be useful to emphasize once more, but in a different context, the fact stated above: culture is neither mere information (intellectual culture) nor simply "...strictly defined as complex socially learned behavior" (Wilson 1998, p. 323). It is *a dissipative structure, that is a physical system*, which, as a genome, *contains rapidly growing intellectual culture – free, sociocultural information*. The constitutive role of sociocultural information can be understood not only by an analysis of its special content and function but also by a systemic, evolutionary interpretation of the open, non-linear system of culture. This system must build up, reproduce, and transform its body, not analogously to live systems, at the expense of the consumption of matter and energy nourishment from external

environment. Since it is a non-natural, adaptive system of a single, temporarily existing species; it cannot develop naturally at a slow, Darwinian pace of accreting information and acquiring material and energy nourishment from the environment. It also must materialize special information, "nourishment": information read and interpreted from the environment by humans. This very non-genetic knowledge may be developed incomparably faster by culture than the natural genetic knowledge by the biosphere; it may be processed and transferred without horizontal and vertical impediments. One can clearly see this in the evolution of abiotic technology, where new scientific information, and newly-discovered technical principles can readily participate in the perfection of all historically established forms of technical systems.

A. Cooperation between Genotype and Phenotype Structures

We would like to stress once more that an open non-linear system of culture as a whole, which is capable of existence and evolution, may be created only by mutually cooperating *genotype and phenotype structures*. Thus, a phenotype of specific culture, which also includes free sociocultural information (available intellectual culture), becomes both the new physical environment of human life and a measure and indicator of the maturity and credibility of intellectual culture. The expansion of phenotype structures of culture is the current immediate cause of the irreversible damage to the terrestrial environment. Since these structures grow too fast, there arises the questions of how much the anti-natural pattern of culture is determined by information (knowledge, ethics, and values) and whether it is possible to prevent it at this level, or mitigate its undesirable effects.

Before we attempt to answer this question, let us recall the broader natural context of culture, which is connected with the ontic role of sociocultural information and has not been considered by traditional ontology. The surface of the Earth has always been finite, and it was naturally ordered before the appearance of culture. There were no available or uninhabited regions suitable for human culture. When culture occupied an environmental niche, it took this niche away from other live creatures and suppressed, simplified, and damaged the orderliness of the natural environment. This process was caused by the fact that the phenotype (explicate) cultural orderliness, which is no less ontical and no less spatially demanding than natural phenotype orderliness, stood as a barrier to life; that it was unable to expand otherwise than by suppressing the natural structures. Yet this is conclusive only today: where you can see a field, a cultivated meadow, a highway, or a city, you cannot find the ecosystems and their elements that were there before.

Culture can locally subdue nature so easily; because, in comparison to nature, culture's organization and structure is not subtler, that is ontically

higher. But it is ontically lower, structurally coarser, and, thus, necessarily more strongly integrated. Yet we strongly disagree with the view of the post-modern philosopher Gianni Vattimo (1990) that the transformation power of technology is confirmation of the ontological weakness of natural reality. We agree, though, with Stanislav Lem who claims that in comparison to live systems, culture has one strategic advantage: "…freedom in selecting building material (because it can use anything contained in the universe)" (Lem 1995, p. 15).

Two points should be made regarding the structure of sociocultural information. *First:* we have noted that this information is singled out from natural animal information (neuronal, semantic, *a posteriori*), and it is divided into sociocultural *structural and semantic information.* With regard to the evolutionary adaptation of the neurosomatic structure of humans to the factors of the natural environment – which were essential for the survival and development of our ancestors – it was redundant for the human cognitive apparatus to be more sensitive. "Our senses have to be perceptive enough to gather a significant amount of information from the environment. But it is understandable why we have not become too good at this" (Barrow 2005, p. 200). The human cognitive apparatus was constructed for the direct revelation of what has been called the implicit order and what is called scientific truth today. *Our ancestors were far more interested in survival than in truth. Truth and an adequate interpretation of the world are only today the subjects of scientific and ontological questions.*

Until the appearance of the global environmental crisis, whether people had an adequate image of the world – whether they objectively and truthfully perceived the live systems, objects, and relationships, including nature as a whole – was not important in preserving culture. Since the natural conditions of cultural life were reliably reproduced by nature itself, humans only had to focus on partial reproduction and technological matters: on acquiring food, maintaining, and developing culture. In the terminology of structural and semantic information: during the establishment of the cultural system, production-oriented science may have asserted itself after the Industrial Revolution; yet in the indirect process of its system creation, which then withdrew into the background, the predominance of partial sociocultural semantic information (communicative) was maintained.

Second: the abiotic sociocultural information that made culture possible, and which in its sum represents as great a reservoir of the accumulated knowledge as an animal species, has had a *special content* from its very beginning. We have stated before that not only did it not just contain knowledge but also even that knowledge included in it had one common feature. It came into existence in a highly selective way: in our terminology, as the *"third reading"* of the surrounding natural and cultural orderliness undertaken by human ethnic language. We have also noted that it did not concern the internal structure of

things and live systems but – using the characteristic terminology of Modern philosophy and science – the so-called *primary qualities of reality*.

The spirit of mechanical natural history, usually criticized only at the level of epistemology, is probably so compatible with human nature – with the biologically predetermined positive dependencies of humans on the success of their aggressive adaptive strategy – that in the sphere of practical, technical applications of science, it need not face public protests even today. But even any possible protests made by the public may be misleading. Why do people protest against the construction of nuclear power plants, but not against those matters that make their construction necessary? Why does the public not protest against the excessive production and spread of new cars and electric appliances – these "weapons of mass destruction" of nature – whose participation in the destruction of the Earth and the consequent endangering of human health is much more critical?

A long time before the appearance of modern natural science, an apparent practical orientation asserted itself in the European cultural milieu: an interest in perceiving some parts of the world independently from the remaining parts; an orientation toward the cognition of forms, size, motion, and location of things in the limited space of human interests.

Regarding the extraordinary significance of analogous perception of forms in humans, K. Lorenz metaphorically noted:

> It borders on the miraculous the way in which gestalt perception can abstract configurations of distinctive features from chaotic background of accidental stimulus data, and then retain these over the years (Lorenz 1981, p. 45).

The magic power of the conceptual ideals of culture, which were the object of Husserl' s criticism in his *The Crisis of European Science*, not only caused the deformation of the theoretical image of the world; it also abiotically structured the whole social-material culture, including the typically non-natural layout of human residential space. Husserl reminds us that it is necessary, "…to note the presentation of the mathematically sub-structured world of ideas as a single real world, which is predetermined during perception, to be the 'natural world' of our every-day life…" (Husserl 1954, pp. 48-49).

Even though the European theoretical orientation was not the only one (at the same time there was the Eastern holistic perspective), it opened the way to the technological exploitation of nature without any consideration for its whole; its non-linear pattern, creativity, subjectivity, and evolutionary-created equilibrium.

We will now try to explain the complicated, structurally constitutive role of historically and locally variable sociocultural information by comparing

it with the analogical role of natural genetic information. As we have stated above, *natural genetic human memory* is the structural memory of the human species; highly stable and capable of self-repair and precise replication. To be its real "production documentation," to be the program of its ontogenesis, it has to encompass all relevant information about the organizational structure and compatibility (commensurability) between the human body and the environment; it has to be a *molecular-interactive, continual, and highly objective memory*. This is much more complicated in reality because of the above noted problem of epigenetic information, which is able to fix and hand over the differentiated state of cells with the same credibility as the DNA-controlled processes. The relationship between information and context (interpretation) is also crucial. To create an identical cell, we need a whole cell; not just its genes.

This natural memory structure is a part of the implicit order of the slowly developing biosphere. It contains the structural, constitutive information, where the historical, evolutionary experience of the species is inscribed in the universal language of nucleic acids. The gene pool of human being is the objective, constitutive information of a "normal" biological species; this information is quite stable, and it is only in harmony with a slowly changing biosphere. With regard to its delayed and limited reaction to external conditions, it is adequate to the biosphere, which once shaped our biological ancestors – the hominids.

Considering the indirect and complicated form of inscribing new information – where spontaneously generated information changes, enacted at the level of genotypes (mutations) and confirmed by selection at the level of phenotypes, play a crucial part – it is virtually impossible to enter the human genome via targeted interventions; it is impossible to enter a positive construologic instruction about a cultural change in the external environment of humans into it; it is impossible to deliver information encoded in our cultural language. Although it has never been proven that human social adaptation can be fixed into the DNA, surprisingly, there is still a considerable interest in this unproven hypothesis. Research on the so-called genetic assimilations, dealing with the biological convergence of once separated living populations, seeks to confirm it.

The special, structural-information isolation of natural biological structures from the permanently changing external environment may be one of the causes of the slow moral aging of biological species, but its evolutionary meaning is positive as a whole; it helps to reproduce the biological diversity of life formed by evolution; it protects biological species from extinction, namely from irrevocable adaptation to temporarily changed life conditions. To be able to react promptly to the variable external environment, all complicated organisms are equipped with another, more adequate mode: *the genetically preset nervous system*.

The *language barrier* that we encounter in gene manipulation is not a hindrance to the "inscription" of neuronal information about the external

environment in the genome of an individual or the gene pool of a population. There has been an *insurmountable physiological and anatomical barrier* so far: the gap between the genetic memory located in the nucleus of the cell and partly also in some cellular organelles, and the epigenetic memory which, as noted above, is located both within the cell and chiefly within the structure of the brain-cell bonds (neurons). In other words, there is no two-way link between these two different memory structures inside the live systems. At the lowest organizational level of the live systems, it has been expressed quite clearly by the so far valid central dogma of molecular biology that we have already mentioned.

Natural, neuronal human memory is the memory of the gray matter of the brain, from which, a biotic carrier of the sociocultural memory with a complex structure was created during cultural evolution. Natural, neuronal human memory in its biological essence is a *supporting, short-term, and discontinuous memory*. In spite of the continual cultural tradition, its individual content is always formed only throughout the life experience of an individual and disappears along with it. This content has nothing in common with either the complicated layered structure of the human organism or the complicated layered structure of abiotic and biotic environments of the Earth. As has already been mentioned, without adequate scientific and philosophical cultivation, this information mostly concerns the fragments of one level of the macroscopic structure of reality. It participates in the creation of our common image of the world, which is necessarily partial and species-deformed (selfish) and cannot be inscribed into genetic memory.

K. Lorenz was probably thinking about something similar when, in connection with the cumulative cultural tradition that does not select information from the external environment as strictly as phylogenesis, he wrote about culture: "Humans can afford to drag along a more useless burden than any wild animal" (Lorenz 1973, p. 68).

The sociocultural memory was formed from the human natural neuronal memory (epigenetic), and the distinction between the *information-semantic and structural aspect* makes sense of its content. It is not easily understood, either in terms of its content or its functioning. Genetic memory is the memory of our whole species and ensures its somatic and behavioral compatibility with the environment by the high degree of its direct molecular interactivity. In contrast to this ontically reliable memory, *sociocultural memory cannot guarantee any similar compatibility between its physical phenotype (culture) and nature; it is not sufficiently objective*.

We have already noted one of the reasons for this bias in sociocultural information; that is, the derivation of its content from the so-called primary qualities of the phenotype structure of reality. There are also other reasons. For instance, there is the one-way process in which a replication of genetic

information is implemented in a cell, or in its nucleus, based on the direct deterministic copying. The high reliability of this process is ensured by the fact that, together with the particular information, its carrier – the DNA molecule – is also passed on to the new host (the somatic or reproductive cell). To illustrate the strictly deterministic transfer of genetic information from one cell to another cell during asexual reproduction, we could use the mechanism of copying a file from the RAM memory of a computer into its hard drive. This is the difference between the strictly deterministic transfer of the genetic information and the vague, potentially infinite dissemination of messages, values, and knowledge of sociocultural information, which is available to all people and easy to misinterpret.

Psychologists know that a crucial part of inter-human communication consists in its non-verbal component, mimics, gestures, the voice color, charisma of the speaker This is probably related to the fact brought to light by P. Watzlawick. He claimed that during communication it is not just the "digital neuronal transfer" of the communication content in operation but also the transfer of information about the relationships between the communication participants is encoded in the analog mode. "The human being is the only organism known to use both the analog and the digital modes of communication" (Watzlawick, Beavin, Jackson 1968, pp. 62-63).

Sociocultural information exists not only in a dispersed and fragmentary form but also in a form more freely (arbitrarily) interconnected with the world and with its language carrier. Even our broadband polysemantic language, usually colored with emotions and non-verbal components of communication, probably makes it vague and semantically unstable over a wide range.

The brain, as a biotic carrier of sociocultural memory alone (without any supporting theoretical reflection), is usually able to recognize only that part of the meaning that had been anticipated genetically; that is, which is closely connected with the essential life functions of the human organism and with its a priori pre-setting to the aggressive, adaptive strategy.

B. The Content Vagueness of Sociocultural Information

We will try to explain the content vagueness and variability of sociocultural information encoded by the ethnic language. The phylogenetically older chemical encoding of neuronal information about the external world is similar in its explicitness to the above-mentioned replication of genetic information. While a majority of animals have preserved the overwhelming predominance of this information, humans receive, and secondarily encode in language, the neuronal information by means of only two of their senses – vision and hearing. This potentially richer audio-visual basis, which is suitable for the horizontal spreading of sociocultural information through

the process of imitation and contributed to the development of the theoretical components of the intellectual culture, is assigned to the external world in an incomparably looser way. S. Blackmore overestimates the problem of imitation and replication during the dissemination of so-called memes: "Instead of thinking of our ideas as our creations, and as working for us, we have to think of them as autonomous selfish memes, working only to get themselves copied" (Blackmore 1999, pp. 7-8).

Even though biotic carrier of sociocultural information – the human brain – may also be modified by the process of ontogenesis (the impact of the external environment, the maturing and learning that continually shape its elastic structure), this fact does not solve the problem of distinguishing relevant information and determining its value and validity. The problem of the specific audio-visual transfer of sociocultural information will become even clearer when we consider that, "Ninety-nine percent of the animals find their way by chemical trails laid over the surface, puffs of odor released into the air or water, and scents diffused out of little hidden glands and into the air downwind. Animals are masters of this chemical channel, where we are idiots. But we are geniuses of the audiovisual channel, equaled in this modality only by a few odd groups (whales, monkeys, birds). So we wait for the dawn, while they wait for the fall of darkness…" (Wilson 1992, p. 4).

Uncertainty and the problematic obligation of cultural information at the level of an individual are affected still by one more factor. If we set aside the question of its compatibility with the external world and the problem of its encoding, we will find that it enters the human mind as if *per se*; that is to say not only without its carrier; but also without any external intermediary. Among humans, and between them and the world, it is, thus, passed on only by the special resonance of subtle intermediary structures of both the external and the internal environment of the organism primarily by means of resonance, waves, and photons. The specific electromagnetic interaction between the carriers of technical memory in our computers, though deterministic itself, does not reduce the biologically and culturally conditioned vagueness of sociocultural information either.

R. Dawkins, who thinks quite mechanistically, makes no distinction between the different means of gene and meme replication. "Just as genes propagate themselves in the gene pool by leaping from body to body via sperms or eggs, so memes propagate themselves in the meme pool by leaping from brain to brain via... When you plant a fertile meme in my mind you literally parasitize my brain, turning it into a vehicle for the meme's propagation in just the way that a virus may parasitize the genetic mechanism of a host cell" (Dawkins 1989, p. 192).

Even though the process of the language encoding of sociocultural information, which also influences the level of its adequacy to the external world, cannot be analyzed in this text, we will briefly focus on the general problem

of symbolism. At the beginning, without the current conceptual ideals and theoretical interpretation constructions, human perception of the macroscopic order of reality had a significant biological flavor; it coalesced with the projection of the non-reflected feelings, needs, and visions of the things themselves, but it enabled objective discrimination of the properties and structures of the external environment. The naming of things and their replacement with symbols have probably been the most important cultural acts. These acts presented not only the possibility of manipulating them via ideas, for example, by means of verbal magic, but increasingly also the possibility of manipulating them practically.

A. Gehlen draws attention to this problem with his idea that the technical subjugation of external natural forces was preceded by their fictional subjugation by means of supernatural technology, the magic. "The fascination with automatism is a prerational, transpractical impulse, which previously, for millennia, found expression in magic – the technique of things and processes beyond our senses..." (Gehlen 1980, p. 14). "Working with tools is demanding, but magical formulas suffice to stabilize the weather or to guarantee the spring's return" (ibid., p. 18).

It is not quite evident that the process of the objectified manipulation of the world, including the intentional creation of technical structures, was significantly stimulated by the development of the descriptive function of human interpretive language. Without a proper language, it is not possible to communicate or to construct new, fine ontic structures. Language, by means of words and other symbols, translates "the designer's intention" into material reality, namely it mediates even the process of structural information materialization, besides others. We agree with S. Lem that it is impossible to design without language, even when the designer is an impersonal entity when, for example, natural biotic revolution is the designer (compare Lem 1995, p. 236).

Especially the creation of symbols, which transcends the biological advantage quite far, resulted in the separation of the internal and external human world. It meant a transition to an entirely new interpretive language that, in contrast to the "imperative" language of chemical signals, built human self-confidence; liberated humans from their instincts; and strengthened the feeling of non-identity between humans and nature via its illustrative character. The more or less freely created being of conceptual symbols, which had won its sovereignty, cultivated, on the one hand, human dissatisfaction with the natural status of the world; and, on the other hand, it definitely divided that which had never been separated before (within the sphere of human consciousness): the world and its image in the human mind.

The decisive significance of symbolism in the evolution of culture is noted also by L. von Bertalanffy: "The symbolic world of culture is basically un-nature, far transcending and often negating biological nature, drives usefulness, and adaptation" (Bertalanffy 1967, p. 27). *Symbolism, disconnected sociocultural information* and also, in a mediated way, the human mind, *from*

the world of things and chemical signals and offered them a new degree of freedom – understandably within the implicit order of culture. A practical method of trial and error could be replaced by the rational method, namely by trial and error in conceptual symbols; causality could be complemented with finality and purposefulness. Since the future goal had been anticipated by nature through blind genetic information a long time ago, it could now be analogously anticipated by culture as well through human, conscious, neuronal, sociocultural information (naturally only in its ideal symbolic image). From this perspective, it is equally important that symbolism created prerequisites for artificial linguistic recording, namely it *created a new memory structure outside the human brain, not existing in nature*. Not only the objectified, shown, and verbalized intellectual ideas but now also the recorded ideas could become parts of general sociocultural information – the scattered genome of the anti-natural culture.

"The consequences of humanity's symbolic activities are enormous;… Phylogenetic evolution based on hereditary changes is supplanted by history based on the tradition of symbols… Fourth, the symbolic universes created by human gain autonomy or, as it were, a life of their own" (ibid., pp. 29-30). "Symbolism, if you will, is the divine spark distinguishing the poorest specimen of true humanity from the most perfectly adapted animal. It is the differentia specifica of Homo sapiens..." (ibid., p. 36).

Even though the early forms of inter-human communication and the first cultural knowledge were quite primitive theoretical achievements considering the adequacy of the theoretical reflection of reality, it appears that they sufficiently fulfilled both the indirect (communicative) and direct (technological) system-constitutive functions. They developed the innate aggressive adaptive strategy of humans and shaped culture as an anti-natural system within the biosphere. K. Lorenz also notes that strict preservation of what has been well-approved is biologically more important than acquiring anything new. The most ancient selection processes of cultural information have "...fulfilled their tasks analogous to the genome task within the evolution of species" (Lorenz 1973, p. 69). They provide the reproduction of those things that had been approved of by evolution. Hence, not only the hereditary patterns of behavior (instincts), fixed genetically, but also the ancient cultural archetypes, fixed probably in the form of quite vague epigenetic rules, are currently the crucial constitutive factors of culture.

C. G. Jung noted this problem: "(Sure enough,) ...the archetypal images decide... (the fate of humanity). Humanity's unconscious psychology decides, and not what we think and talk in the brain-chamber up in the attic" (Jung 1968, p. 183).

The physiological factor is undoubtedly one of the causes of the anti-natural pattern of culture. This is the fact that some conscious processes located in the

evolutionarily youngest structures of the brain (neocortex) have always been connected with its deeper and older structures called the archicortex, paleocortex, subcortical cores Human conscious processes (including contemporary scientific rationality) are closely connected with the phylogenetically ancient instincts, emotions, and intentionality of those biological species that preceded modern humans and whose CNS had yet to contain structures for the rational reflection of reality. The blind, natural evolution of the biosphere could not have anticipated that one of its development lines, based on neuronal memory, would ignite a sociocultural evolution ontically opposed to the whole of nature.

Considering the need for the self-preservation-oriented, biophilous transformation of currently environmentally endangered culture, there looms one more important finding. Every piece of generally accepted (shared, acknowledged) sociocultural information, both that which is predominantly *semantic* (communication, a worldview) and that which is predominantly *structural* (partially technological), is able to perform an ontically-creative function; it can be constitutive in a sociocultural way.

This is confirmed by the fact that evolutionary cultural creativity began not out of thin air or some initial zero point, but that it modified what natural evolution had apparently finished. Considering the great social-motivating power of human emotions and ideas, every local culture was able to adapt the finished products of the terrestrial evolutionary process; it newly redistributed and shaped the naturally constituted systems and structures. The biotically predetermined aggressive adaptive strategy of humans, which has also become the first dominant strategy of the cultural system, was possible even without a theoretical vision of the world as a whole.

In the traditional stage of anti-natural culture, the adequacy of human activities and artifacts for the Earth, and their structural and functional compatibility with the Earth, need not have been based on a general ontological theory; they need not have been controlled legally or politically. They were secured and anticipated – if we can put it this way – by nature itself: by the *a priori* genetic memory of humans. S. Lem' s metaphorical statement is fascinating: "... through elementary cells an organism issues synthetic *a priori* judgments: the great majority of them turn out to be correct..." (Lem 1995, p. 230).

The destruction, or an empirically discovered adjustment, of a nature-compiled and reproduced ecosystem was much easier for the human being as an animal, who adapts by behavior, than designing a simple, yet fully artificial, system. Hence, human activity was efficient toward nature even when it was based on incomplete, approximate, semantic information; on a vague or even false vision of the world. This finding is in accord with the fact noted by the science historian J. D. Bernal, who claimed that the history of the development of the area of individual fields of technology is in almost reverse order to the analogous spheres of the historical development of science (see Bernal 1954,

p. 20). In short, nature grew spontaneously from the beginning according to its sociocultural information, which was not adequate for nature.

Even at the stage of rapid, abiotic technological progress, when the science-based (that is much more specific and easier to verify) structural information asserted itself besides the inadequate semantic information, the importance of the semantic approximation and vagueness on the part of human knowledge has not decreased. Also, in the current anti-natural culture, the ontically determining information is still represented by those things that can draw wide social support due to their compatibility with the generally accepted "spirit of the times" and those things that cannot be strictly theoretical (culturally critical). This includes such things as simple statements, metaphors, and slogans of practical life that eventually respect "common" civil attitudes, commonly shared views, values, illusions, and feelings.

This is another reason why the evolutionary-ontological concept of biophilous culture cannot remain just at the level of high theory. Along with this level of philosophical reflection, we must seek category-based and didactical forms of popularization for the new ontological understanding of culture; and we must develop a deferential relationship between humans, life, and nature through upbringing.

Due to the technological applications of ecological structural information, cultural abiotic structures and technologies that are more considerate to nature have gradually appeared; but, due to the focus of contemporary society on individual consumption, profit, and property, the public does not feel any intense environmental threat. This combination of inadequate education and the prompt saturation of artificial life results in an environmental indifference in which the future appears to be something lacking everyday urgency; something that can be put off and disregarded.

When promoting a biophilous cultural strategy, the concept cannot originate only by developing the potential of human nature but must have the cooperation of robust theory. The greatest impediment to be encountered is probably the fact that the natural *memory structure of the average human brain* still remains a physiological base for the constitutive sociocultural information; namely a limited, approximate, and biologically discontinuous individual neuronal memory. This *a posteriori* human memory was once, as we know, set *to aggressive adaptation* by *a priori genetic memory.*

The problem of the ontic role of the biophilous sociocultural information will be better understood if we consider what we have noted above. Even the rapid development of theoretical knowledge (incomplete structural information), which the technologically developed countries achieve by means of highly efficient "top-level methods", will not be able to directly affect the average human psyche by itself. This does not just concern the facts that this psyche is determined genetically and the sociocultural reality of humans is affected

only by their CNS; that is to say by their current phenotype. This also concerns the fact that to facilitate any biophilous influence on the human psyche, it is necessary to facilitate *training and education* besides any changes in the anti-natural structure of the cultural system. This presumes, for example, a conceptual biophilous reconstruction of education and a newly understood popularization of science. But educational arguments do not have an urgency comparable with arguments of the prompt technological application of science in current culture. Putting it quite critically, a liberal market society does not require environmentally educated and critically thinking citizens, but consumers. We can see that educational activities cannot find worthy allocation even in the mass media.

Newspapers and television, especially, turn away from the difficulty of popularizing science and philosophy; and, in accord with the perfunctory, consumer orientation of the current culture, they incline to the common thinking, values, and tastes of the mass "consumer" of goods and information. It appears that the anti-natural culture, which allied itself with the analogously oriented natural science in the Industrial Revolution, currently allies itself with the similarly oriented hedonistic component of human nature.

Besides the direct focus on the prospective questions of the naturalization of science, technology, and the whole of material culture, science faces another, even more difficult, task. Science must transform the volume of the phylogenetically selfish nervous memory of humans by means of upbringing and education to make it more adequate to the structure and value of nature; to make it reasonably objective.

Together with H. Jonas, we worry whether we will be able to balance the scope of our current power with foresight and the power of knowledge, and:

> … whether, without restoring the category of the sacred, the category most thoroughly destroyed by the scientific enlightenment, we can have an ethics able to cope with the extreme powers which we possess today and constantly increase and are almost compelled to wield (Jonas 1985, p. 23).

If we base our contemplation on the metaphor comparing the genetic information of live systems to mutually separated book volumes in the imaginary library of life, where almost no information is transferred horizontally, then we could be quite optimistic in the search for the biophilous, ontically constitutive cultural information; the sociocultural information whose natural memory structure is represented by the brains of people living today may be combined and spread in an unlimited way. It is not transferred along with its carrier; and every one of us has the equivalent of twenty million book volumes in our heads, because our brain library is "...ten thousand times larger than the library of genes" (Sagan 1980, p. 278). Yet this problem is much more complex. It is not

based only on the adequate volumes of the free sociocultural information. It is also relevant to consider a way of forcing biophilous information, which only indirectly influences the cultural system, to be accepted by this system so as to be able to play an ontically constitutive role within it.

3. Problems of Adopting the Biophilous Culture Concept

The analysis of the ontic role of sociocultural information implied that a change in the internal constitutive information of the current anti-natural culture (of the cultural genome) is a key factor to its biophilous transformation. The principle is evident: *if we want to change a system with internal information, we have to change its information (its internal memory or genome).* The old (unchanged) constitutive information of the system is able to undo direct phenotype changes.

The internal memory of a system (its constitutive information) is in fact its algorithm-compressed structure, which not only prevents the decomposition of things created by evolution but also helps the transformation of them under some conditions. We have noted above that the *cultural system*, just like natural ecosystems, may include strictly information-prescribed elements (on the one hand, for example cultivated plants and domesticated animals, and, on the other hand, material culture and its technology), but as a whole *it cannot be a strictly information-prescribed system.* In contrast to natural ecosystems, the cultural system contains free constitutive information, which includes human rationality and purposefulness; but it is shaped by evolution (by historical succession). This is made possible by the fact that free sociocultural information (views, knowledge, emotions, values) is not much different from bound information (phenotype-built in, materialized) in the traditional pre-environmental culture. Its participation in the structure, reproduction, and evolution of the cultural system is asserted mostly indirectly by means of exerting influence on the sociocultural activities of humans. We can say that the system of sociocultural orderliness, which does not have its strictly determinist information correlate, exists (analogically to environmental orderliness) only as a phenotype. In other words, no adequate genotype "corresponds" to the phenotype of a cultural system except for strictly information-prescribed elements of culture. Nevertheless, free sociocultural information brings us *hope that it will be possible to transform the current anti-natural culture into a biophilous one.*

A. Prerequisites for biophilous transformation

Since we have called free sociocultural information (intellectual culture) the implicate order of culture, we can say that *the implicate order of culture, which*

is a human product, is easily accessible and readable to humans – in contrast to the implicate order of nature, which is a product of natural evolution. The main *problem of the intentional, biophilous, sociocultural change* does not merely consist in finding the optimum content of new sociocultural information but mostly in making *the phenotype of the anti-natural cultural system accept the dissipated, biophilous information* and avoiding treating it as a hostile, ideological interpretation.

We would like to recall that the internal information of the cultural system and the structure of the system are two closely cooperating structures (in the case of technology even an analogy of the biophilous genotype and phenotype) with a free correlative relationship in which information plays an ontically constitutive role. We know that the cultural system as a whole cannot be a strictly information-prescribed system. Even so, our emphasizing its phenotype (ontical) pattern, namely the fact that it originates by means of the materialization of its information (its system knowledge), attempts to fight the widely-spread intellectual illusion about the intellectual pattern of culture.

Surprisingly, this viewpoint is also supported by the environmentally-knowledgeable biologist F. Wuketits:

> Cultural development can be generally characterized as the evolution of ideas, and Darwin's concept of natural selection can be applied to it... Cultural development can be then understood as a competition of ideas (analogous to Darwin's competition of organisms) (Wuketits 2001, p. 219).

The intellectual illusion deeply underestimates the phenotype of the cultural system; it ignores the mediating role of the systemic context of culture. This context, whose comparatively independent entity appears to accept ideas supporting it spontaneously, resists any attempt at change; At the same time, this context includes, amongst other things, the following: material culture, including technology; social institutions and organizations; habitual ways of knowing and social communication; language; social regulations; human activities; and life stereotypes.

Free, generally constitutive information of the cultural system in the pre-environmental culture (consisting of generally accepted views, theories, ideologies, values, and myths) may have been created together by all components and levels of intellectual culture, but eventually its content was determined by the *communicative-semantic, non-theoretic level.* This level was in accord not only with the structure of common human nature but also with the pattern of technological and social development of a particular culture. It appears that we can see a gradual reversal in the globalizing culture. Within the scope in which the anti-natural culture goes through spontaneous structuring, permeated with technology and

globalizing, it is becoming dominated by *the theoretical level*: philosophy and cultural sciences. We should not be misled by the fact that the globalization of the current anti-natural culture has lacked an adequate theoretical reflection of the world so far; that it has grown by means of the uncontrolled proliferation, expansion, and differentiation of economic and technological information and organizational structures. We should not become disoriented by the ideologically masked transformation of priorities in the cultural developments following the Industrial Revolution; in the civilization of the so-called "third wave", which has supplanted the "smoking chimney civilization." The transfer of emphasis from wealth and violence, the traditional supports of power, to a swift utilization of information, which spreads horizontally, is potentially inexhaustible; and it cannot be depleted by utilization. Finally, we should not be misled by the fact that nation-state politics currently have no adequate control over these processes, because they gave up this control in their obligation not to intervene in the processes of the productive application of science, entrepreneurship, and the movement of globally mobile capital. Since the legitimation of politics depends on the level of support from voters, the cultivation of whose worldview is neglected under the current liberal market condition; even political representations lag behind and necessarily follow, metaphorically, the carriage of the spontaneous process of technological, economical, and information globalization. Compare A. Toffler (1990). For general problems of environmental policies see for example A. Gore (1992).

Better conditions for the potentially dominant role of philosophy and cultural sciences arise spontaneously in the current globally critical situation: *First,* by means of dysfunctions occurring within the host environment of culture, at the level of the biosphere system, and the human organism. The aggressive strategy – adequate for few dissipated local cultures – meets the limits of the permissible burden on the biosphere; the limits of the Earth, and even the limits of the biological plasticity of humans.

In connection with the general condition of the co-evolution of genes and culture, this is indirectly noted by E. O. Wilson: "For tens of thousands of years during the Pleistocene Epoch the evolution of artifacts remained nearly static, and presumably so did the social organization of the hunter-gatherer bands using them. There was time enough, as one millennium passed into another, for the genes and epigenetic rules to evolve in concert with culture" (Wilson 1998, p. 326).

Second, by means of dysfunctions produced by the traditional, incomplete rationality within the current, spontaneous development of culture, it accelerates the growth of the economy and technology without creating a relevant philosophical image of the world for citizens. That may be the reason why we are witnessing the environmental failure of traditional politics. Traditional politics will be unable to stop and reverse the self-destructive strategy of current

anti-natural culture without a new worldview minimum for the general public and an adequate ontological reflection of the crisis for the purpose of political decision-making.

There is an important circumstance immediately influencing the process of the biophilous environmental transformation of culture. In the environmentally unthreatened society (a pre-crisis society), there was never great difference (either qualitative or quantitative) between free (available) sociocultural information and information objectified (bound, incorporated) in the cultural system. It was apparent that even classical natural science had easily been objectified in technology and in the social system, and it quickly turned into – as frequently noted in the 1960s – *a productive factor* after the Industrial Revolution. The openness of the cultural system to new information, in a society threatened by the environmental crisis, does not decrease; but some components of intellectual culture (for example partial technological knowledge) continually enhance the crisis, while other components critically reflect it (both the natural and social sciences). The greater openness to information in some technical fields (for example microelectronics) causes a growth in the difference between the free and the bound sociocultural information. Not only does the retarding role of the built-in information become prominent, but so also does that of the old system context. The social stress and system instability appear.

What causes these system failures? Mostly, individuals, social groups, and frequently even institutions (including the scientific ones), who are the bearers of the more adequate sociocultural information than the one already built in into the cultural system, have no power to apply this new information; they cannot reasonably use it. Only new biophilous politics – putting it in a simplified way – could have this mediating power. Yet such politics need the wide-spread support of a public possessing a mature worldview. Hence, that part of available cultural information, which is able to cause the relevant sociocultural change, must comply with two different requirements at the same time: 1. It must influence the public and environmentally cultivate individuals to a generally acceptable level; 2. It must permeate the power domain – national, local, and global politics.

In other words, since culture is a succession-created system (human activity) with its internal information (a system that is not strictly information prescribed), it cannot simply operate with new sociocultural information in the first-order theoretical form. It cannot operate with just the specialized, incomplete knowledge; the abstract theoretical knowledge of philosophers and feelings, skills, and attitudes of specialists. *A single-level academic vision of the world is not enough.* For the objectively necessary process of the positive environmental transformation of culture to begin, both of the above-described and practically-applicable layers must be established in the newly-formed environmental consciousness.

B. The Problem of The Environmental Turning Point

Even though the "turning point" of the unbalanced, non-linear system of society could possibly be brought about by a small, empirical fluctuation; a real committing impulse toward a change in the system context of culture, which would be ready to adopt the biophilous information available, could only be administered to society by *environmental politics* as a system with strictly information non-prescribed orderliness. But the practical steps of new politics and legislation could be environmentally competent; they could suitably control human activities and the super-individual system context only with the support of philosophical and scientific knowledge.

Even though the anti-natural, sociocultural context was established in a different environmental paradigm over centuries, the aggressive, cultural strategy program permeated the field of human upbringing and education. It is, therefore, able to "resist" any adoption of environmentally positive change. We can also say that this context in its current form (which includes manufacturing, consumption, material culture, and technology, institutions, organizations, and both the social, intellectual, and material life of humans) is quite anti-natural oriented in its principle. It provides a "social purchase order" similar to that established once by the expanding Industrial Revolution society for the application of natural sciences. The resistance to changes of this context resembles an inter-species information barrier, or an immune system: since it did not originate via the objectification of environmental, sociocultural information; it ignores it. Or, rather, it fails to "understand" it; "refuses" to read it; "cannot comprehend" its urgency and humanistic message, its ethos, and its cultural self-preservation volumes

It is becoming apparent that the vast majority of traditional sociocultural problems could have been resolved or moderated within the current system – through acts of political power, plurality, and democracy. Only in critical situations have ideologies and politics had significantly greater influence on the shaping of the cultural system by means of free sociocultural information.

Should the expansion of the cultural system exceed the threshold of bearable abiotic and biotic burden on the Earth – should culture achieve an environmentally highly unbalanced state – even a small impetus (fluctuation), as noted above, could bring about its collapse. The rapid demise of "real socialism", suggested here as a kind of a model for environmental, sociocultural change, is not a good example in terms of the environmental instability of culture. What is at stake here is not the change, control, or redistribution of political power within traditional anti-natural culture. At stake is the change of the parasitical strategy of culture in relation to the host planet.

There is currently no feasible, pro-natural version of the technologically highly developed anti-natural culture that has almost conquered the planet,

and, thus, it has nowhere else to expand anymore. There is no historically verified system of a biophilous culture that both respects and protects nature. Since it is currently impossible to change human nature; in addition to close cooperation between philosophy, science, and politics, the careful naturalization of the upbringing and education of society is probably the only hope for starting the process of the environmental transformation of culture. Unfortunately, this is also what the current politics of economical growth and high personal consumption usually most consistently avoid. The vast majority of its technocratic representatives do not accept the frequent invitations of theoretical ecologists to discuss these issues. They prefer – in part because they are under pressure and in part because of the purpose of their visualization – petty problems and heated discussions on TV screens, whilst discrediting themselves in the eyes of the environmentally sensitive public.

Finally, we would like to emphasize two more points. First, *to facilitate the positive environmental transformation of current anti-natural culture into a pro-natural culture, it is not necessary or even possible to transform us, humans, in advance.* Second, it is not enough if the need for environmental change is realized only by scientists, philosophers, and a section of the environmentally-sensitive public. To be sure, official government policy must present a transparent, comprehensive *vision of sustainable culture.* In spite of the fact that even biophilous culture will be established through succession, environmental policy must start with a visible, publicly understood, supported, and controlled environmental transformation simultaneously in two fields: in the comparatively easy accomplished naturalizing of manufacturing, material culture, technology, and residential areas; and in the more complicated naturalizing of human ontogenesis, upbringing, education, and lifestyles. This reversal of the ratio of natural and cultural elements to the disadvantage of nature is probably the reason for the frequent distortions of "humanness" in some youths and adults today.

On the other hand, we should not underestimate the fact that, in the current information society, even a small section of the environmentally educated public can exert a pressure that could, under some circumstances, force the adoption of partial political and legislative decisions. Without starting the practical process of the environmental transformation of society, the conservative system context will not adopt any new environmental information; and the irreversible change in the general cultural strategy will not occur. Moreover, the environmental problem is global; it concerns the socially and technically structured world where there are quite strong political tensions. Strategic solution exceeds the limited powers of governments and legislative bodies of nation states, and it cannot easily start in countries not yet technologically developed – in the first and second-wave civilizations. Yet even this is no reason to despair. Even though a positive environmental change of culture from below is not easy, and

the spread of new information among citizens does not suffice in itself; the objectively necessary biophilous transformation of culture would be impossible without new, semantic, sociocultural information.

A real planetary solution to the crisis would be based on the absolute priority of the sustainable habitability of the Earth for the first time, namely on a biophilous cultural strategy. Such a strategy must first be prepared by theory. If the old technology can be transformed only with new technology, then the old anti-natural culture and politics could be transformed by the biophilous culture and politics. Hence, the positive environmental transformation of an existentially endangered culture by means of its new constitutive information represents a historically unprecedented attempt in politics to end the uncontrolled stage of the anti-natural and to start the pro-natural stage of cultural evolution, namely a sustainable stage of coevolution between culture and nature. Our hope for the success of this attempt is supported by the fact that the conditions for environmental change automatically ripen as the crisis develops in current anti-natural culture. Yet this crisis must become even more pronounced; the habitability of the Earth must, unfortunately, become even more complicated to force the current short-sighted party politicians to accept the program of necessary changes; this program is currently better understood by common people than by bankers, businessmen, and top political representatives.

Humans as a new biological species appeared on the naturally highly ordered Earth; whose biosphere they did not have to perceptually-neuronally understand, because they were somatically and psychically adapted to it. That is also the reason why traditional culture, which has developed primarily human-species predispositions, has destroyed natural ecosystems, occupied, and plundered the Earth during its expansion. It is hard to imagine a task nobler for philosophical ontology, together with the sciences, ethics, law, and politics, than intellectual preparation for an irreversible future change; the efforts to the rescue and value-rehabilitation of the evolutionarily achieved natural orderliness of the planet, which is a *conditio sine qua non* for sustainable culture.

APPENDIX
A LEASE ON PLANET EARTH

A LEASE ON PLANET EARTH

Preamble: Human beings appeared on the planet Earth, a world teeming with life, at the end of the Tertiary Period. They were unable to understand philosophically the evolutionary forces of the living nature that they had unwittingly adapted to. The human psyche controlling the process of conquering Nature was programmed to an attitude of indifference towards any general consequences in the distant future. Today we have conquered and occupied the Earth, disturbed her precious body by cultivating the land, shackled her with motorways and cities, and pushed back her frontiers with buildings, concrete and asphalt paving. In spite of all this, it will be Nature that makes the final decision about the continued existence of our species. To prevent our premature extinction we will have to put a brake on different kinds of cultural expansion and sign a leasehold agreement with Planet Earth.

The Earth is probably the only life-supporting planet in our galaxy, the Milky Way. This planet, which is the natural home to all of the mutually interdependent, living creatures on it, cannot belong to any one of them; it cannot belong to any single population or biological species. It cannot belong to human beings, who as a species have created what we think of as culture. We are only temporary occupants of the Earth.

Life is the great experiment of cosmic evolution on our planet. Living systems contain fantastic amounts of natural information inscribed in the language of nucleic acid. The direct and indirect extinction of biological species as a result of man's culture is therefore not only an unnecessary biological loss but also an irretrievable loss of information.

Culture is the global creation of humankind as a species. It is the means by which natural evolution not only tests the relevance of human performance in relation to the host environment of the Earth, but also tests the success of the human biological structure. It tests the human constitution: the resilience of human creativity and human submission relative to the older and greater creative forces of the universe.

The conflict between Culture and Nature, resulting in the depletion of the Earth's natural environment, cannot destroy Nature, but it can destroy Culture. If we want to survive this existential crisis we must willingly give way to Nature; we have to naturalize our anti-natural spiritual and material cultures. This will require a change in the structure, range and strategy of cultural systems, not a change in human beings as an organism.

Globalized Culture also impairs the traditional structure and contents of education and schooling. Even though schools continue to present a great deal of knowledge that is useful for everyday living, schools fail to develop respectful attitudes towards Nature during the sensitive period of human ontogenesis when knowledge is so easily connected with values. Schools do not tell us what Nature and natural evolution are; we are not taught that man, after his origination as a species, also initiated an evolutionary process – Cultural Evolution, which is both potentially threatening to humanity, and also inherently anti-Nature.

Technical progress, which has too easily been identified with human progress as such, has become a threat to humanity itself. It depreciates amongst other things the self-preservation role of traditional human humility. We can no longer rely on the natural submissiveness of inconsequential human beings towards the tremendous powers of Nature; there can only be a philosophically-justified humility based on an analysis of the destructive effects of our civilization's unscrupulous forces upon the delicate fabric of terrestrial life.

For the first time humanity is responsible for the survival of its own species. An understanding and acceptance of this responsibility requires abandoning narrow-minded moral, physical and technological approaches; it requires biological and medical approaches and an evolutionarily ontological view of the world. It is only this type of perspective that can possibly persuade the general public that the existence of the human species is critically dependent on the diversity, integrity and evolutionarily achieved maturity of the biosphere. In a disrupted biosphere, mankind will not even have the status of a Nature-protected species.

An ever increasing number of our problems are caused by the fact that individuals and institutions operate and make decisions based on an obsolete view of the world, and by the additional fact that these decisions stand in opposition to the principles of a mutually-advantageous lease on their natural home. **That is why we appeal not only to scholars, but to politicians and all responsible citizens as well to think and act in accordance with the long-term principles of a sustainable partnership with the Earth.** Unless Culture reserves some part of our planet for the evolution of Nature, people will not be able to enjoy the biologically-determined lifespan of their own species.

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ABOUT THE AUTHOR

Josef Šmajs (1938) is Professor at the Department of Philosophy, Faculty of Arts, and the Department of Corporate Economy, Faculty of Economics and Administration, Masaryk University in Brno, Czech Republic. He is the author and co-author of several ecologically oriented books including The Threatened Culture (Brno 1995; Praha 1997; translated to English in 1998 and Slovak in 2006), Drama of Evolution (Praha 2000), Evolutionary Ontology (Brno 2003, co-author J. Krob), and Philosophy Written in Italics (Brno 2003), The Broadcast Ecological Essays (Brno 2003). His works reflect the role of philosophy in recent global ecological crisis. Evolutionary ontology represents a new ontology that studies the conflict between natural and cultural evolution.

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