

Articles

IS BIOSPHERE DOING THEOLOGY?

by Ludovico Galleni

Abstract. Three theories about evolution are presently under discussion: the genocentric theory, the organismocentric theory, and the biosphero-centric theory. A brief discussion of the three theories is presented. These theories have different implications for theology. The genocentric theory is related to the Darwinian interpretation and, for theology, means the end of an apologetic vision of natural science and for this reason the end of natural theology. The organismocentric theory is mainly related to events of autoorganization and follows the path of the geometrical harmony of nature. But it is far different from the apologetic interpretation of natural theology which cannot be restored. The biosphero-centric theory, on the contrary, contains many fruitful perspectives. This theory, which counts Teilhard de Chardin among its founders, allows the development of a new approach to the theology of nature. In this approach, it is actually the biosphere herself that is doing theology thanks to her thinking sphere: the noosphere.

Keywords: evolutionary biology; Galileo; natural theology; Pierre Teilhard de Chardin; theology of nature.

THE THREE THEORIES OF EVOLUTION

The theoretical landscape of the present day's discussion of biological evolution is worthy of interest and can be considered a necessary starting point for every new discussion between biological evolution and theology. We are confronted with the problem of a pluralism of theories. One of these

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theories is strictly related to the Darwinism of the modern synthesis (Dawkins 1995; Eldredge 1995), a second to autoorganization effects (Goodwin 1994; Kauffmann 1993; 1995), and a third to the presence of connections between the various components of the biosphere (Galleni 1995a).

A brief epistemological discussion is therefore necessary. Actually we are not dealing with theories in which one theory will finally supplant the others over time. On the contrary, they will remain together and will be used to explain different events within evolutionary biology. This fact implies that the theories will coexist in time. From this point of view it has to be underlined that, inside the evolutionary paradigm, many different attitudes are present. These attitudes can be represented as the points of the area of a triangle whose vertices are represented by three different interpretations of evolution. All of us who study evolution locate ourselves inside the triangle in a point whose distance from the vertices is related to an affinity with the three theories. In addition, every evolutive event has its location inside the triangle. The vertices represent the three different theories in their own specific organization, and for this reason every theory can be directly confronted by theology. A brief exposition of the three theories can be useful.

The Genocentric Theory. The fundamental unit of evolution is the gene, considered as a segment of DNA that codes for that particular type of protein necessary for obtaining a particular phenotype. Genes supply the information for that particular character, and the phenotype is the result of the sum of the different genes. Genes freely evolve according to their own rules, and the only force that is able to organize ordered structures is natural selection. This theory is the nearest to the Darwinian formulation according to his own metaphor: the architect has the task of building a house using the stones produced by a landslide. The metaphor was presented by Darwin in the book *Variations of Plants and Animals Under Domestication* (1868) and was usefully summarized by St. George Mivart in his book *On the Genesis of Species* (Mivart 1871, 254–55).

The diversity of the stones is of course the variability of individuals in a species; this variability is formed and inherited by its own mechanisms. Natural selection—the architect of the metaphor—will act as an ordering factor on this variability with the mechanisms summarized by Alfred R. Wallace (1895) and Julian Huxley (1942). A connection between natural selection and the origin of variability is absent. For this reason the theory could also be called the disconnection theory. This is the philosophical key of the genocentric theory. The laws of Mendel and all the novelties of the genetics of the first years of the nineteenth century have provided corrections to this interpretation of evolution. Ronald A. Fisher (1958, 37–41) proposed a theoretical background that is fundamental for understanding

his way of modelling: a population or a species could be represented by a cloud of gas where the single molecules represent various alleles. As the molecules of a gas they can be represented with stochastic models. The evolution of the gas molecules is determined by external forces acting on them such as temperature and pressure. Similarly the evolution of genes is determined by external forces such as natural selection, genetic drift, and migrations (Gayon 1992, 338). This is, of course, a strongly reductionistic approach, quite different from the present-day discussion about complexity!

The work of Fisher allowed biologists to make models of the evolution of sets of genes in order to make predictions and to test for experimental results. Many examples were analyzed, and a specific branch of genetics, ecological genetics, was established (Ford 1971). Results obtained in ecological genetics are very well known, as for instance the evolution of industrial melanism in the moth *Biston betularia*. All the examples are based on the fact that the relationships between genotype and phenotype are quite simple, as they were in Mendelian genetics, and that forces acting on phenotypes influence the evolution of the corresponding genotypes (see Groessens-Van Dyck 1994). A recent interpretation of the beak adaptation of Darwin's finches was related to this theory (Grant and Grant 1993). Evolution is then represented by the metaphor of a river: a river of DNA, whose course is directed by external forces such as selection and branched by external forces such as changes in the geographical distribution of a species. It is this metaphor that is used by Richard Dawkins, who could be considered the current extreme representative of this theory (Dawkins 1995).

The Organismocentric Theory. Darwin considered his theory as a strong tool to eliminate from the history of science and from the history of culture the ideas of harmony among living beings and in this way to eliminate natural theology and the idea of a universe created by a divine watchmaker (see Gillespie 1979, 82–108). The idea of harmony was not invented by theologians and then passed to scientists. On the contrary, it was an idea that was present as a research program in Occidental science and then transferred to Christian theology (see Hankinson 1988 concerning the attitude of the classical biologist Galen toward natural theology). As a matter of fact, harmony, intended as the presence of a geometrical and mathematical organization of the universe, was not a biblical statement but is directly derived from Greek philosophy. Harmony was present not only in astronomy and physics but also in biology. At the beginning of the thirteenth century Leonardo from Pisa (universally known as Leonardo Fibonacci) proposed a series of numbers, called the Fibonacci series, in which every term is the sum of the two preceding numbers (Leonardo Pisano 1857). Fibonacci proposed the series as a model to describe the increase in number of an isolated rabbit population, but this series is frequently present in nature, from the organization of plant phyllotaxies to

the architecture of the *Nautilus* shell (Neveux and Huntley 1995). This harmony (in this case harmony means the presence of regularities in the mathematical and geometrical construction of the living being) is difficult to explain by the action of natural selection. Actually the way natural selection works is based on an ordering of casual mutations. Its action is similar to the action of a *bricoleur* as stated by François Jacob (1981). Harmony, on the contrary, is similar to that of a snowflake, which is not, of course, the product of natural selection but of forces produced by atoms and molecules. The landscape metaphor is still useful: evolution takes place in a landscape of valleys and hills that is created by autoorganization. This metaphor was used by Sewall Wright in his theory of the adaptive landscape and then by C. H. Waddington in his theory of the epigenetic landscape (Gayon 1992). Moreover, a recovering of the importance of the organization of form in biology was underlined by D'Arcy Thompson (1917) and, more recently, by Lima de Faria (1988) and Brian Goodwin (1994). Goodwin has contributed the most organized version of the theory and its experimental supports. The experiments on the regeneration of the cap in the unicellular alga *Acetabularia*, simulated with the aid of a computer, or the organization of plant phyllotaxies, simulated using drops of a ferromagnetic liquid, are reported in Goodwin 1994 and are used as proof that the patterns of morphogenesis of living beings can be simulated without the aid of a program written in DNA. According to this theory, the geometrical order that is present in living beings is mainly a phenomenon of autoorganization, while only local adaptations (such as the black or white forms of the moth *Biston betularia*) are due to natural selection.

Other developments of this theory are those regarding the origin of order proposed by Kauffmann (1993; 1995) and the concept of autopoiesis or autoorganization (Maturana and Varela 1980). A nonsecondary aspect of autoorganization is the emergence of novelties, unforeseeable from the single interacting components. This is a point worthy of attention because it is one of the novelties related to the science of complexity. And this aspect introduces the third theory, the biospherocentric theory.

The Biospherocentric Theory. This theory looks for connections between the different parts that constitute the biosphere and takes into consideration the whole biosphere as the evolving entity. It could be considered an attempt to apply the system theory to evolution. The beginning of a biospherocentric theory can be traced back to the English naturalist James Hutton and its modern interpretation to the Russian geochemist Vladimir Vernadsky (Grinevald 1988) and the French paleontologist Pierre Teilhard de Chardin (Gallenì 1995a). In Teilhard's writings the problem of a biospherocentric theory is connected with that of complexity. Actually Teilhard is one of the first authors to take into consideration biology as science that studies complex objects. The final object to be studied by

evolutionists is the biosphere, construed as an evolving whole. He proposed, during his Chinese exile and the Second World War, a new branch of science: geobiology, devoted to the study of the evolution of living beings on a large scale and over a long period of time, which seeks to discover the general tendencies of this macro level of evolution (see Galleni 1995a, 29).

The method of geobiology is applied by Teilhard and his collaborators to many animal groups of the Chinese subcontinent. China, wrote Teilhard, is the best place for the application of the geobiological method, because only on a continental scale do we find processes that do not distort the patterns of the evolution of the biosphere. (For a detailed reconstruction of the scientific research program of Teilhard see Galleni and Groessens-Van Dyck in press). The results are that the phyletic trees present parallelisms and canalizations, which Teilhard describes with the landscape metaphor. An example is that of a river tracing its course in a landscape of valleys and hills. Many forces are responsible for this event, representing also a phenomenon of coevolution: the river is making its course in relation to the landscape, but its action is changing the landscape. Teilhard spent his last years thinking about mechanisms of the events which he had described as a paleontologist. In his last scientific paper, Teilhard wrote:

... followed along major tracts of time, chromosomic characteristics are not the inert "grains" and "isotropes" that geneticists suppose, but in fact elementary vectors, consisting of very short orientated segments, reacting additively, always in a single favored direction, to the complex 'topography' of the geographical and biological milieu in which they find themselves. (Teilhard 1966, 272, reported in Galleni 1995a, 36)

The biospherocentric theory as the theory of connection between living and nonliving components of the earth's surface was recently reorganized by J. Lovelock and Lynn Margulis. In Lovelock's hypothesis the connections among the different parts of the biosphere interact in order to maintain stability. Stability is reached thanks to diversification and the increase of complexity. Here there emerges a new interpretation of evolution as the mechanism used by the biosphere in order to maintain its stability (Lovelock 1991). As I recently wrote: "Evolution is the way Gaia maintains homeostasis and for this reason evolutionary processes *per se* have adaptive value" (Galleni 1995c, 49).

THEORIES OF EVOLUTION AND THEOLOGY

The theory of disconnections represents the end of the possibility, at least on biological grounds, of natural theology (here the terms *natural theology* and, later, *theology of nature*, are used in the sense proposed by Barbour 1990). The possibility is closed by the noncausal interpretation of biological phenomena and the lack of design. Disconnection means the interruption of the chain of causes which was one of the bases of the cosmological

proof of medieval natural theology. Moreover, the presence of dramatic events related to the action of natural selection argue strongly against the vision of a provident Creator. The apologetic value of natural theology, that is, the use of nature in order to prove God's existence and/or relevant aspects of theology, is lost.

Undoubtedly we have some examples where natural selection works according to mechanisms that are clearly related to those laws considered by Wallace: the laws of equilibrium or harmony of nature (Wallace 1895, 143). They are examples in which the individual no longer possesses value when compared with its own species (Galleni 1995b; 1997a, b). In human biology and pathology, the Mediterranean anaemia is a genetic illness that allows the colonization of extreme environments such as the malarial coastal areas. Individuals in whom the gene is in a heterozygotic condition are free from the malarial illness. It seems an example of a refined action of natural selection, but it cannot be interpreted in an apologetic way: children with the gene in a homozygotic condition are seriously ill, and they die in the first years of life. Adaptation has a heavy cost on the human side!

These dramatic events confirm the impossibility of using natural selection within an apologetic organization of natural theology. In spite of Wallace's efforts, natural selection closed off any further attempt of natural theology. (For a competent discussion of Wallace's position, see La Vergata 1990, 515–615.)

On the other side, the organismocentric theory reminded evolutionary biologists of the problem of the regularity of living structures. These regularities are similar to those presented by many natural forms and are explained without alluding to the action of natural selection. There is a precise geometrical harmony (the "harmony" of natural theologies) related to interactions among the single parts which are the components of the whole, as the geometrical organization of a crystal is related to the interactions among atoms. Nevertheless, this harmony is not a proof of the providence of the Creator. Natural theology eliminated by Darwin cannot be reintroduced by the organismocentric theory.

On the contrary, an approach based on a theology of nature is still possible and in our opinion is best attained in a discussion of the biospherocentric theory.

Some comments about the theology of nature are clearly useful. We refer to the definition given by Ian Barbour. Theology of nature, like natural theology, is not a demonstration of God's existence or of some of the divine attributes with an apologetic reasoning based on the discoveries of science. On the contrary, "it starts from a religious tradition based on religious experience and historical revelation" (Barbour 1990, 26).

According to this definition it is a theology that takes into consideration the description of nature as proposed by science in order to confront it with a peculiar revelation of God (the Bible in the Judaeo-Christian tradi-

tion) and gain new insights for a better understanding of God's providence. Karl Heim asserted that it is impossible to make any inquiries about God as Creator without the description of creation made by science (see Pannenberg 1988, 6).

Problems arise for a natural theology when scientists and philosophers have to deal with an external revelation, for example in the religions of sacred scriptures. There is a dichotomy between science and theology because theology is an intellectual operation that has to take into great consideration a book the authority of which is warranted directly by the Divinity, while science is an intellectual operation that looks to nature and not the authority that is based on a direct revelation of God.

The continuing duel between faith and reason began from this point. A first example is well represented by the Al Gazhali–Averroes debate in the Islamic world. In this situation we have the heavy presence of a book more or less directly revealed by an external active God who presents the divine will through it. This authority largely overcomes that of natural philosophy. For this reason two books are present: that of revelation and that of nature. The two-books theory proposed by Galileo in the so-called Copernican letters, written in the years 1613 and 1615 and devoted to defending the Copernican system and to discussing the relationships between the two books, was a good way to solve the problem of recovering the importance of natural philosophy (Galilei 1995).

Actually in this theory the book of revelation has to be in common agreement with the book of nature studied by scientists, because both originate directly from God. The main difference is that the book of revelation is presented in language adapted to the local situation of the people receiving it, while that of nature was written in a more universal language, that of mathematics, at least in the opinion of Galileo.

This distinction is the beginning of a theology of nature. Two aspects must be underlined. The first is the autonomy of science in searching for the structure of creation; the tasks of the book of revelation and of the book of creation are quite different. For Galileo, the Bible tells us how to go to heaven, not how heaven works. The second is that the description of nature is written in a more general language and so is more universal and comprehensible than that of the Bible, which is written in a language limited to the understanding of an ancient people far distant in time from us.

According to Galileo's vision of a theology of nature, science working in complete autonomy gives us a description of creation that is necessary to understand God's plans, and this is actually the starting point of the modern theology of nature. A further development was made by one of the first biologists who worked on the age of Earth and in the very early days of evolutionism: Georges-Louis Leclerc de Buffon (1778).

For him, the novelties proposed by science in its endeavor to describe creation are a gift from divine providence that urges us to prepare new

methods for understanding the Bible and to develop new attitudes toward the word of God.

It is of interest that the new attitude toward the natural science proposed by Galileo in his Copernican letters also initiates the *hermeneutic circle*, which is one of the tools that allows us to do contextual theology (see Segundo 1985, 7–13). The new attitude toward the word of God also implies, actually, a new understanding and a new attitude toward the book of nature.

This is the first meaning of the theology of nature: a theology that looks to nature, or, better, to the results of the inquiry of experimental science into the structure of creation.

A problem has arisen related to the way science works. Some attempts of modern and postmodern epistemology seem to deny any cognitive value to science: science is an intellectual construction without the ability to derive ontological and definitive values of the real world which it describes.

In this way, as was clearly stated by Karl Popper (1956) in the discussion between Bellarmine and Galileo concerning essentialism and instrumentalism, the risk is that the modern and postmodern epistemology is on the side of Cardinal Bellarmine. Popper proposed a third option as a resolution of the problem: that of critical realism. Science works with theories and scientific research programs (Lakatos 1978), which are incessantly submitted to revision. The sociological ideas of the environment where scientists actually work and their metaphysical positions play a role in the construction of their scientific research programs. All of these tools of science have to be submitted to critical testing. They allow humankind to reach some conclusions about the structure of creation that have to be taken into consideration by theologians.

Here we underline the work on epistemology done by J. Wentzel van Huyssteen (1989) and Nancey Murphy (1994), among others, and all the papers published about the structure of creation and the free action of God by John Polkinghorne (1986), Arthur Peacocke (1993), and Niels Gregersen (1998).

This approach to theology of nature proved to be useful, but it is ambiguous. It offers a way to use nature as described by science. Theologians take into consideration that part of science that is useful to them for a better understanding of God as the Creator and God's plans and actions. This constitutes an instrumental relation with nature. Nature is still something that is outside the experience of theologians: it is a book to be read and a tool to be used but not a reality in which to live. An important consequence is that this kind of theology of nature risks becoming anthropocentric, which is a major source of the present exploitation of nature, including the interpretation of the biblical statement of the dominion over creation and its creatures whose terrifying effects were underlined by Lynn White (1967).

On the other side of the problem is the fact that if we describe evolution only by the laws of competition and of survival, then again nature has no value in itself, because there is no reason to preserve anything: the strongest being will survive, and everything is under its domination (see Haught 1986).

There are other paths that can be useful and that avoid the problems I have mentioned, if they are pursued within a different framework. Within a general evolutionary framework, value may be placed on creation as a process of continuing transformation that moves toward freedom. A natural philosophy that so values freedom will grant it ontological status, and in so doing it probes the very structure of creation. In my view, freedom grounded ontologically does not pertain to the free action of the Creator but to the free action of the thinking creature. This freedom is a force for a process of constructing the earth on a course toward the Omega point, the second coming of Christ (Teilhard 1955), toward the City of God (Theodosius Dobzhansky, in a letter reported in Greene and Ruse 1996), or to the preservation of a creation that is a source of delight for the Creator in his/her seventh day rest, the Sabbath (Moltmann 1985).

But all these paths, if they are to be brought to fulfillment and avoid anthropocentrism and male-centeredness (Daly 1973), involve a major change in the way we do theology of nature. We must give a different meaning to the theology of nature. To do so we must apply to the theology of nature the techniques of the theology of the terrestrial realities and of contextual theology.

The theology of the so-called terrestrial realities was born (at least in Roman Catholic theology, which is my own religious and intellectual environment) just after the second world war as a tool to insert the perspectives of everyday life into the general reasoning of theologians. A theology of everyday work, a theology of lay people, a theology of women, and a theology of the countries of mission were developed. These were called genitive theologies because they were theologies “of” something, and this something was some specific attitude of the terrestrial reality to which theologians turned their attentions.

These theologies were also called the theologies of the objective genitive because the “of” was related to the object of theology. Theologians did not make an active experience of the object of their theology but made their general experience as theologians and their own intellectual experience normative for the specific reality they studied. A clear example of this attitude is the theology of women, which was a theology made by male theologians who incorporated women into the revelation and the experience of their own churches.

From a historical point of view these theologies were useful because they brought theological attention to some problems that had been neglected or considered not worth studying. Also of interest is the development of

third-world theology, which started as a theology of missions and then as a theology of countries to be developed. Still it was a theology made by first-world theologians who used their traditional intellectual tools to find a place for the emerging realities of other peoples.

This approach soon showed its limitations, because it was not able to bring any actual change to the way of doing theology. Then a revolutionary approach (in the meaning of Kuhn 1962) was proposed, and the theologies of the genitive were subjected to a profound change in their epistemological structure. They become theologies of the *subjective* genitive, because the “of” was related to the subject doing theology, meaning that persons living within a particular situation were now the subjects who actively did theology. The theologians who looked at a peculiar terrestrial reality lived actively inside that reality. The first consequence for doing theology was an in-depth knowledge of the experiential horizon where the theologians lived. The second step was to confront this reality with the religious and intellectual structures that emerged from the revelation and the experience of their own churches.

An example is the change from a theology of women to feminist theology, a theology made by women who, starting from their everyday experiences inside the churches and inside the society, find a new way of compelling theology to reconsider the role of women in Christian revelation.

Another example is the passage from a theology of mission to the theology of liberation (Segundo 1985). Actually the theology of liberation is a theology made by theologians living the experience of poverty and exploitation of the third world who are able to insert this experience in the liberation announcement that characterizes a large part of the biblical message.

There are many additional consequences of this different approach. We see here theology that starts not from the general and universal teaching of a common holy book that reports God’s revelation but from the many, various, and different experiences of life. These experiences are the first source of theologians. The confrontation with the universal teaching of the book of revelations is then the second step.

This is the critical point: the passage from the universal teaching of theology, which reduces the diversity of everyday experience by looking at it through the universal glasses of theology, to a theology that moves from the actual diversities of the real world to the general teaching of the revelation. In this way diversity is preserved and is a source for enriching theology rather than an unwanted diversion from theology’s task.

Here we introduce the concept of noosphere. Among the various envelopes, the different “spheres,” which constitute planet Earth, and as the result of the biosphere’s evolution, there is the noosphere, the union of all the thinking creatures, i.e., of humankind. The term was created by Teilhard, together with Edouard Le Roy and Vernadsky, to denote “the psychically reflexive human surface” (Teilhard [1956] 1971, 103). If biological

diversity allows the biosphere to maintain stability, in the same way cultural diversity can be the way to maintain the noosphere's stability. Presently the scientific enterprise is, all over the world, subjected to Western standards and tools. Theology may be the vehicle for preserving all the richness of noosphere diversity.

As we can see, according to the present discussion of diversity, the approach of the theology of the subjective genitive is the proper tool: it is useful to preserve cultural diversity.

Some other points are worth noting. First, this approach is not always useful or this kind of intellectual revolution possible; see, for instance, what David Pailin (1992) wrote about the theology of handicap. Second, when the approach can be applied, it is open to the wide richness of the diversity of reality and then to the richness of the context. The theologies of the subjective genitive are open to the present day's richness of contextual theologies.

The problem is whether and how to apply this peculiar technique to theology of nature. How to find a way for nature herself to do theology? The biospherocentric perspective indicates a possible solution.

In a biospherocentric perspective, the single human being (the person) is the result of the process of evolution, but in this theory the process involves the whole biosphere and is the way used by the biosphere for the maintenance of the stability of its parameters.

As we have seen in the scientific papers of Teilhard, the evolving biosphere, as a whole, presents parallelisms and canalizations which are the result of the tendency of evolution toward increasing levels of complexity and cerebralization. These tendencies indicate the presence of directionality, the main tendency of which is formed by the increasing growth of the brain and the emergence of the thinking creature. An eventual result of the emergence of the thinking creature is the formation of the thinking sphere of the whole human culture: the noosphere (Teilhard, Vernadsky, and Le Roy definition; see Teilhard [1956] 1971). Here a new evolutionary passage is present. The biosphere is no longer evolving passively and maintaining stability through negative feedback mechanisms that were established by its components, but it is also behaving actively, due to the rational capacity of the noosphere for this task.

As stated many times by Teilhard, the task of building the earth is not a task to be accomplished against the evolutionary forces but inside them and with respect to them.

Noosphere is not only the last step of biospheric evolution and the result of mechanisms whose task is to maintain biospheric stability, it also includes a symbiotic relationship. Noosphere is dependent on biosphere but also provides the biosphere a more active process to preserve stability. Here we have the means for a new way of doing theology: a theology of nature whose context is that of nature, because it is a theology made by the

biosphere and its thinking sphere, with the task of maintaining its stability and its survival. The result is the preservation of the biosphere, which is the context where the theologians of noosphere do their work.

In this perspective we recover the concept of *alliance* or covenant. This alliance is not only the source of the individual's salvation but also an alliance for the building up of the actual earth, in which the biosphere can survive. Furthermore, it is the thinking within the noosphere that maintains the stability of the biosphere and thus ensures its survival.

With this interpretation, Teilhard's proposal of building the earth is clearly developed as a perspective of building an earth in order to maintain biospheric stability. The tools are not so much natural selection and competition as symbiosis and cooperation.

Here we can trace the theological consequences of this third evolutionary theory. In this perspective the theology of creation has a changing role because it is generated by the biosphere itself and its thinking sphere, and it intends to think about its relation to the Creator and the future.

This approach is useful because it suggests a respectful aptitude toward nature without referring to solutions which, in our opinion, are not easily acceptable to theology.

1. *The approach is not pantheistic.* God is different from nature: God is nature's Creator, but God is not the same as nature. Pantheism is not acceptable to Christian theology.

2. *The approach is not panentheistic.* According to this approach God does not sustain creation through active engagement (apart from the general relationship between the Creator and creature) or by using indeterminism for actions on creation. Freedom, as an ontological value of an evolving universe, is the freedom of the free-acting creature and not the freedom of the Creator.

The true problem is not whether God can act, since by definition God can act when, where, and how God will without any previous room for action. The problem for theologians is why God is not constantly acting to remove suffering and pain from the world.

In our perspective God is involved with the world because of love for creation, but God is not interacting continuously with creation (see Peacocke 1993, 372–74). The problem with panentheism is that a connection between God and nature or any active engagement of God in directing nature's evolution (top-down causation) has as a consequence the risk of giving directly to God the responsibility for those evolutionary events which inevitably are sources of pain. If God is active in creation, why so often does God not seem to act to avoid suffering? The proposal of the action of God as amoral (Gregersen 1998, 355) is in our opinion not sufficient, because an amoral act is in fact immoral when it leaves room for suffering in the very structure of creation.

The question is not any more escapable after the Auschwitz experience, as stated by Hans Jonas (1987). The absence of the action of God in this tragedy presents an uneasy choice between the love and the omnipotence of God. To save the love of God we must consider that God places self-limits on omnipotence. These limits are related to the freedom of the creature. In our perspective God creates creation in its wholeness (see for this aspect Pailin 1992, 146–80); then creation evolves with its own mechanisms, which are fundamentally characterized by freedom (see Peacocke 1993, 125–26, 156–57). God the Creator respects the freedom of creation. The free spaces are those necessary for the emergence of a free creature: freedom is the distinctive feature of this universe (Segundo 1993, 405–25; Jonas 1994; Brun 1999).

Mechanisms of creation, like the mechanisms of the first six days (see Moltmann 1985), are characterized indivisibly by freedom, pain, death and suffering, together with a movement toward consciousness that gives rise to humankind.

3. *The approach is anthropocentric.* Some kind of necessity for the thinking creature is preserved. Christian theology is still, in fact, anthropocentric. The thinking creature is the result of parallelisms and canalization events described by Teilhard as well as of the tendency in the biosphere toward complexity and stability as described by Lovelock. There is some kind of process not strictly deterministic that may very well be represented in a way similar to the Lorentz attractor (see Stewart 1989), which makes possible the birth of the thinking creature, an entity that will be able to accept or to refuse the alliance proposed by God.

4. *The approach is biospherocentric.* This approach takes into consideration humankind as a product and a part of the biosphere.

With the emergence of the noosphere, an alliance is proposed from the side of God. This alliance is proposed in order to build an earth for the Creator's delight. It is proposed not only for the noosphere (represented in its unity, with the biblical metaphor of the original couple, Adam and Eve) but for the whole biosphere to which humankind is connected by the evolutionary process.

Again, God's action is not amoral but moral, because it is a call for the alliance to maintain biospheric stability and to develop attitudes of symbiosis and cooperation within the biosphere and the noosphere. But the alliance is freely refused by the noosphere, and this is the source of all troubles.

In the traditional interpretation of original sin, another theological hint can be uncovered: that of a disorder determined by humankind's refusal of the alliance, and which is suffered by nature. A consequence of this refusal is the exploitation by humankind of other peoples and of nature. The thinking creature is part of nature because it is connected to nature by

links of biological evolution. When the alliance is accepted, nature actively does theology. Theology of nature is no longer a theology that reasons about nature but a theology made by nature. In this way the theology of nature is inserted in the great tradition of contextual theologies and, as the others, it is submitted to a conceptual revolution.

In contextual theologies, the context in which the theologians live, including their intellectual and experiential background, is the tool for doing theology (see Potente 1995). In our approach the context is nature, which is itself the subject that is doing theology, through its thinking sphere, the noosphere. The conceptual framework is that of the stability of biosphere, which is the value toward which the biosphere is moving. Evolution is the tool that allows this peculiar case of adaptation. Today the experiential context is that of exploitation of nature and of the risk of the loss of stability. The task of this theology will be to give a purpose to the alliance between creatures and their Creator in order to build an earth that can be a source of its Creator's delight.

The idea of building the earth is a typical idea derived from Teilhard. In what he called the "pious book," *The Divine Milieu*, Teilhard (1960) proposed to Christian theology the necessity of developing a theology of the building of the earth. Earth is not only the place where one finds personal salvation but also the place to be built in order to prepare humankind for the second coming of Christ.

But how to build the earth? This is the main problem. We cannot build an earth that delights its Creator using a Western-centered construction in which all the values of non-Christian and non-Western cultures are destroyed or an anthropocentric construction in which the diversity of the biosphere is not respected.

But with our approach, which inserts the act of doing theology within the mechanisms of biospheric evolution and survival, we can return to the ideas of building the earth with fewer risks for the biosphere. First, the mechanisms that allowed the emergence of the noosphere are those that allowed biospheric evolution in order to maintain stability. For this reason stability is the main aim of humankind's action on earth. The earth can and must be constructed, but without altering the mechanisms of stability. Second, diversity must prevail. Again, the noosphere can be useful for building the earth only if it maintains its profound diversity; it cannot be connected only to Western culture. Finally, the value of nature's preservation is recovered because only within a healed nature is it possible to do theology of nature.

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