ON THE EVOLUTION OF HUMAN FREEDOM

by Karl Schmitz-Moormann

Abstract. The age-old dilemma of free will and determinism is attacked by proving that both sides are flawed with contingencies, that the notion of eternal law is a theologically tainted projection rather than a reality of the real world that is understood to be evolutionary. Determinism is dissolved into conditionalism. This excludes materialistic scientific explanation of the deterministic style. As it brings forth freedom, evolutionary reality transcends essentially the explanatory possibilities of statistically structured natural laws. The dilemma of determinism and free will based on a logic of contradiction is replaced by an ontology of polarity.

Keywords: contingent law; determinism; eternal law; evolution; freedom; natural law.

As far we can look back into the history of philosophical theology the question of the possibility of free will, of human freedom, in a world with deterministic traits has been discussed. The greatest theologians have considered this question, from Augustine's *De Libero Arbitrio* to Thomas Aquinas's articles on human freedom in the *Summa Theologica* and the *Summa Contra Gentiles*. Yet they obviously were not able to settle the question. The famous struggle between the Jesuit and Dominican schools of theology, marked by the names of Michel Baius, Luis de Molina, and Domingo Bañez, never reached the point of answering and settling the question of free will; the Roman Catholic church finally resolved the struggle by interdicting both parties from declaring the other one heretical.

The central argument of the discussion of free will almost always has hinged on the issue: how can we overcome the logical impossibility of accepting, on the one hand, a completely determined reality and, on

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the other hand, the existence of a free will, which by definition is not predetermined? The actual semantic expressions of the problem have changed through the ages. While in the medieval period scholastic theologians discussed the opposition between an all-encompassing predestination rooted in an all-knowing, almighty God and human free will, modern discussions oppose an all-encompassing natural law against the existence of free will, since humans are considered to be subject entirely to the laws of nature.

The Roots of Natural Law in Theology

It would be interesting to consider in what way and to what extent the modern "faith" in an all-encompassing natural law is only a secular version of the scholastic belief that all physical events in nature are determined by God's unchanging will and thus happen by necessity. We must leave that discussion for another time; however, one important difference between the medieval and modern belief systems is quite interesting. The medieval thinker grounded determinism in the free decision of an eternal, personal God. As a result of his freedom God could interfere and manifest himself in the world through miracles. Nevertheless the world was considered perfect enough not to need any extraordinary intervention; the normal ways of nature, especially of heavenly or astronomical nature, assured the perfect running of the world according to God's will. Thus, in scholastic thought, because of the free will of God there was some room for human freedom, although this does not allow us to understand how God's all-encompassing predetermining will can coexist with some created human free will. Today the problem has become even sharper: all-encompassing natural law is not thought to have an almighty, personal, free law-giver behind it. Thus the acceptance of such natural law excludes, at least logically, the possibility of human freedom.

However, we do experience ourselves as persons who, within the contingencies of human existence, will and act freely. How do we reconcile this with natural law? We might declare our own innermost experience to be an illusion in order to save our unshakable faith in the all-encompassing natural law. We might also follow the thinking of Ludwig Feuerbach, who viewed God as a human projection, and argue that the all-governing natural law is simply a construct of our human mind. While it may have some basis in nature, nonetheless to a large extent eternal natural law is the result of our desire to generalize and to have something upon which we can absolutely rely. Thus, if there is no eternal God, then at least we can posit eternal natural law to which everyone is subject. This law is not to be questioned by the existence of

something such as free will, which then becomes an epiphenomenon omitted from the scope of scientific reflections.

Within the realm of scientific argument the strong belief in eternal natural law is unshaken; free will is limited to arguments in the realm of the courts of justice, where it is a necessary condition in any judgment of guilt and punishment. Of course, scientists as well as judges and everyone else act in everyday life on the assumption that they are responsible for what they do; that is, that humans are fundamentally free, even free to make sacrifices. However, this does not solve the dilemma. We still have, just as in past ages, human free will on one side and eternal natural law (which has replaced the all-predetermining, almighty God) on the other.

Natural Laws and the Existing Universe

The idea of an eternal natural law is not a necessary idea. In this it differs essentially from the laws of geometry and algebra. Mathematical propositions are valid in relation to freely defined axioms; their validity does not depend upon their application to any concrete reality. Certainly, the concept of eternal natural law is supported by the formulation of the laws of physics in mathematical terms; however, the possibility of using mathematics to create formulas such as $E=mc^2$ and applying them meaningfully is no proof that they are valid, unless they can be applied to some reality. Even the most basic laws of physics, which allow us to calculate the earliest moments of our universe up to the limits of Planck time (10^{-43} seconds), become meaningless if there is no energy, no mass, no velocity of electromagnetic waves. Even though we might postulate, as some do, that there must have been something before the "big bang," we have no possibility of knowing this to be the case; any assertion that the laws of nature were valid before the "big bang" is just a confession of faith proclaiming that there were laws of nature before any nature was in existence.

If we dare to take a closer look at the history of nature, at evolution as we have come to call this history, we discover that it is impossible to find many laws that can take us back very far into history. Particle physics takes us the furthest, but under one condition, that we consider only particles and then hadrons and nuclei, that is protons and neutrons, and alpha particles (helium nuclei). For a very long time these were the only inhabitants of the expanding universe. For several billion years a hypothetical physicist studying the history of the universe would state that the universe consists of one billion parts of electromagnetic waves and one part protons and alpha particles, which give rise to hydrogen and helium. Nothing else would be observed in an essentially unchanging, expanding universe. It would take considerable speculation (if

hypothetically we were present during the first several billion years without our present knowledge of a more evolved physical reality) to predict the complex structures of the carbon, oxygen, and uranium atoms, not to mention the newly created atoms of our own century.

In light of this we might ask if the laws that today govern the behavior of atoms were existent when there were no atoms to obey them. This same question may be asked at every stage of cosmic evolution or as the history of the universe unfolds: Did the laws of chemistry exist before molecules were formed? Did the laws of life exist before life evolved? The more complex the realities with which we are concerned, the less hesitant we are in answering, "No, they were not existent!" For example, if we consider the laws governing the genetic transfer of information from one generation to the next, we must state that there is no natural necessity for such a transfer to occur through DNA. The DNA code does not exist out of necessity; we know at least two different versions of the code that are functional. Thus the laws governing the genetic transfer of information could not be predicted or deduced before life and DNA became a reality. The laws of genetics simply did not exist before life existed.

In short, we have no reason for believing that the laws of nature are the only realities in our universe that did not evolve. It seems more reasonable to expect the laws of nature to follow the general line of evolution: they become real, come into existence, only as the realities of whose functioning they are an expression emerge into existence. Thus, the reality of eternal natural law, which excludes any possibility of free will as a reality, begins to fade; it becomes more like a ghost, existing as an illusion constructed out of our desires by our own minds.

The Statistical Character of Natural Laws

The idea of eternal natural law fades even further when we consider the structure of natural laws in detail. As Pierre Teilhard de Chardin frequently has pointed out, natural laws are always concerned with large numbers in a population, not with individuals. Even the most complete knowledge of the status of an individual atom, a knowledge always limited by the uncertainty principle, will not allow us to predict the future of this atom for any length of time. Whatever will happen to an atom is not predetermined by its inner constitution. Certainly, there are not countless possibilities for it, although the possibilities of a carbon atom, for example, becoming part of a protein molecule are greater in number than all the matter in the universe could allow.[1] However, there is no way to predict the career of a particular carbon atom after its creation in the inner nuclear fire of a blue giant star. It might become part of a living creature for a time, or of a thinking

creature, or it might float forever through interstellar space. The laws of nature do not allow us to predict the future of an atom, but with our retrospective insights into atomic careers we know about the concrete possibilities open to any carbon atom. Natural laws set limits to such possibilities. They tell us what *cannot* happen, not precisely what *will* happen.

Natural laws are thus not very deterministic; rather they describe the conditions that must be fulfilled for the realization of any evolving reality. For example, atoms without incomplete outer shells do not tend to form compounds. However, if the structural conditions of the atom are right, molecules can be formed, depending on the fulfillment of many other conditions such as the availability of other atoms. There certainly will be many different possibilities; and some will be more viable than others. Some will be preferred, others less probable.

The more the possibilities are limited, the greater the predicting power of natural laws. The nucleus of a hydrogen atom may be either a proton, a proton plus a neutron (deuterium), or a proton plus two neutrons (tritium). It is hardly possible to predict which of the three will come into existence, although the longer viability of the proton will allow us to predict which will survive longer than the others. Natural laws allow us to understand why there is such a quantity of protons, but they do not explain why this particular hydrogen nucleus has only a proton and is not deuterium or tritium. The laws predict statistical values but not individual careers.

The lack of predictive power of the laws of nature becomes even more evident when we study the more complex history of evolution from the "big bang" to human beings, who in the known universe are the only species that asks questions about this history. If we follow the many paths of evolution, we are not able to predict the future of any species, although we might predict its extinction. From our knowledge of amoebas or other protozoans as they appeared about one billion years ago on earth, we cannot predict the existence of any vertebrate animal any more than we could predict the eukaryote cell from our knowledge of bacteria and viruses. Of course, a number of theories have been proposed to explain the emergence of a new species, for example, the idea that available niches will be filled. However, if the statement is correct that all species will have to find their niches, it also is quite well known that there are many niches that are never filled.

Eternal Laws Humanly Constructed

The points made thus far—the origin of ideas of natural law in ancient theologies, the fact that there have been enormous lapses of time when most laws of nature had no point of application to the existing universe,

and the statistical character of natural laws making it impossible to predict individual careers—should normally be sufficient to argue against the notion of any eternal natural law. Rather, this idea seems to be rooted in the human psyche so that we can act consciously and probably freely (we will leave this last point open for the time being). To be able to act, human beings need to rely on reality. Who, for example, would ever enter an airplane, a space shuttle, a car, or even an elevator if he or she did not count on the reliability of the laws of nature? Who would ever try to grow corn or apples if not convinced that the laws of nature could be trusted? In order to use its capacities by acting consciously and responsibly, the human mind must be able to assume that there is a reality on which it can rely. We might even go so far as to say that reliable natural laws are the *conditiones sine qua non* for free human acts deserving the characterization "responsible." Psychologically, we can thus easily argue that the idea of an unchanging, reliable, and all-ruling eternal natural law is a product of the human mind, which needs a reliable world, a world that does not change like a willful Proteus. It therefore is somewhat amusing that nineteenth-century epigones could applaud Feuerbach for having argued that God is just a projection of the human mind while they themselves were adoring a similarly projected eternal natural law.

A short overview of known reality makes it evident that there never has been an eternal natural law; its eternality exists only in our mind, on the basis of our prejudices. Like all other natural realities, the rules we name laws have evolved along with the evolution of the matter to which they apply—atoms, molecules, cells, living things, and human beings.

Like everything else in our experience of evolving reality, natural laws have only relative authority. They originate in time, and they apply with predictive authority only to their level of evolution. Nuclear physics is not able to predict the information value of an hydrogen atom and the hydrogen bondings in a DNA molecule inside a cell. On the other hand, the properties of elements on a lower evolutionary level, for example the properties of hydrogen atoms as such, are not altered by their integration into a higher level. That is, properties as defined on a nuclear level are not annulled on a higher level; they have to be respected as one of the conditions for the functioning of the higher evolutionary level, which normally is reached through the unification of elements into more complex unities. Speaking more generally, we may say that the past does not determine the future; however, it represents the necessary conditions for all the future, delimiting future possibilities by the properties of already evolved realities. These necessary conditions are expressed more generally as laws of nature.

As has already been stated, the laws of nature are not deterministic but are statistical. They do not apply to individual cases with absolute certainty, for example, predicting which two hydrogen atoms will combine with an oxygen atom to form water; instead they apply only to large numbers. As is well known, statistics describe possible, mostly preferential distributions between extreme values that limit the possibilities. Thus all natural laws, at least all laws about an evolving universe with its past and future, describe more or less probably events. In large numbers, as a whole, these events bring about results that are reliable. Yet, within the range of possibilities open to individual atoms taking part in one event such as an hydrogen-oxygen explosion, there is no determinism at work. No individual careers can be predicted, even though the range of possibilities open to the elements is quite narrow. At all levels of the evolving universe, statistics might be understood as the description of freely evolving elements within more or less narrowly defined ranges of possibilities created by past evolution. Instead of being determined, the universe appears only to be conditioned on all levels. Thus, determinism is replaced by conditionalism.

The old antagonism of determinism versus free will can no longer be upheld in such an evolving world. Since nothing is absolutely determined but is only more or less probable within limits of possibilities, there is no reason to eliminate the possibility of free will from the natural world. The dilemma of natural law versus free will is, at least on the side of natural law, the consequence of the human desire for the absolute, a desire that is generalized over time to create the construct of an eternal and unchangeable law of nature.

We are probably correct in claiming that the desire to find the absolute in nature is rather poorly invested; as far as we can see, nature appears throughout all its history to be a contingent reality, which in itself exhibits no capacity for transcending the limits of space and time. This point seems inescapable when we look at our universe that begins with a *singularity* called the *big bang*. This expression does not describe reality; it rather serves as a screen to hide our ignorance. We have no way of knowing anything beyond this screen, at least as far as the big bang is concerned. Speculations in this field do not allow for verification, which is replaced by some kind of faith. Within our known universe we have no reason to oppose any natural law against the possibility of free will, because all natural laws are relative to their level of evolution. They neither predetermine the future evolution of beings nor that of the laws applying to these beings. Having freed ourselves from the strict bonds of one side of the dilemma by placing it into an evolutionary context, we shall now have a closer look at the other side, that of free will.

Human Free Will

As stated at the beginning of this essay, we experience ourselves acting as directed by our free will. Our own societies, which hold us responsible for what we do, have thus far not ceded to the arguments that sociological or psychological laws determine our behavior so as to eliminate free will and with it our responsibility.

This does not mean that the human being is absolutely free, not subject to any restrictions. Such a notion of absolute free will may be set in opposition to some kind of eternal natural law. However, both absolute free will and eternal natural law are quite incompatible with an evolving universe. If there is free will in humans, it does not come from nowhere; like everything else free will must have evolved.

What we know about free will has been discussed mostly by looking at ourselves. Therefore, we can best begin our discussion with us and then work backwards retrospectively to discover the origins of evolving freedom. We experience our freedom as we make decisions of greater or lesser importance throughout each day. As we do this we also know that our decisions are not made with absolute sovereignty. We cannot do whatever we dream of doing; our concrete actions are limited by the conditions of our human body-mind reality, our mental and physical existence. Thus we, with our freedom, are caught in quite a network of conditions upon which we act and which in turn act upon us. Those who eat too much probably get fat. Those who jump from roofs will probably break their legs. Those who shout at their bosses will probably lose their job. In other words, human freedom does not set us free from the conditions of human existence.

Yet this does not make us conditioned stimuli-response black boxes, like the Pavlovian dog which functions best if one removes large parts of its brain. We are still free to make real decisions, saying no when so-called natural drives would make us say yes. This can be easily experienced whenever eating, drinking, and sexuality are concerned. No one is forced to succumb to temptation. We also know of many examples when even the fundamental drive to survive is resisted because of immaterial values such as those of the Christian faith. The names of Dietrich Bonhoeffer and Maximilian Kolbe, along with those of many other men and women, illustrate precisely this fundamental reality of human freedom. Human beings have been able to dispose of themselves freely, abandoning themselves to the "hand of God" at the price of their biological lives.

Of course such abandoning of oneself to God escapes all scientific understanding. Freedom, as it appears here, is directed towards encountering a reality that transcends the capacity of scientific knowledge. Scientifically we can only say that human beings do such things

on the basis of value judgments. However, values cannot move humans in an absolute way; they must be accepted as such and internalized. Perhaps the expression *internalized* is already a psychologist's illusionary conception that confuses the experience of a reality—which therewith becomes part of oneself—with the process of having conveyed to oneself the more or less arbitrary (or sociobiologically based) value system of the micro and macrosociological environment.

Certainly many essays have been written attempting to create scientific foundations and thus criteria for value systems. However, so far no one has been able to argue against the sophist's reasoning for egocentrism or to show scientifically (i.e., on the basis of arguments from our known contingent world) that human dignity is just a vain claim. In our traditional world, which is our biologically and culturally evolving world, values are not the subject of or taught by the sciences (although scientists may convey some values in their existentially lived search for truth); rather values are transmitted through religions, and religions are based on transscientific and transrational experiences, although they might also search for a reasonable, communicable expression of values. Freedom on the human level is primarily exercised under the guidance of values. The latter, at least according to our experience, have evolved as has everything else. However, having evolved does not make anything the subject of scientific explanation. As I have argued above, higher levels of evolution are never explained completely by lower levels. Thus, those values that most specifically appeal to the human mind are not to be explained by biological necessities. Human freedom and human values, the more they are human, transcend the conditions of human existence upon which they act but which they must consider.

Still, the point remains that the number of possible decisions are not infinite. Because all human actions must be carried out in the framework of this evolutionary universe, we cannot decide to do things that transgress the limits of the possibilities that have evolved in the past, even though it is apparently difficult to know the actual limits that are still evolving. Thus, there are probably no limits on phantasies and phantasmal willing; yet, we cannot jump up to the North Star. We are still in this universe, and we are rather earthbound. Most of our daily decisions—what we will eat and drink, when we will sleep and work—are conditioned by our evolutionary past. Many of these decisions are necessary in their generality if we want to survive, at least for the time being.

However, such decisions are far from being a pure response to a stimulus; we know this by our own inner experience. The fact that human behavior, even in everyday life, seems to follow statistical "laws"

is no proof against human freedom; on the contrary, statistics apply essentially to events that are not determined but are only limited in possible outcomes. Thus we can regard any statistical law as describing free behavior under limiting conditions; any laws that cannot be expressed other than statistically contain a degree of freedom in their very formulation. Therefore, so-called laws of sociology or psychology—which exist only in statistical expressions—contain implicitly the assumption of some freedom and therewith, in the field of human behavior at least, the assumption of free will.

Evolution of Free Will

Statistical laws already apply to levels of evolution prior to the human level. Yet, we know about free will by introspection, and for many centuries philosophers, theologians, and most other people were convinced that no other creature on earth could claim such an ability. Even the human body was considered to be subject to strict natural laws. Aristotle stated and Aquinas repeated, *homo generat hominem et sol*: man alone cannot be the efficient cause generating a human being; the sun must cooperate to move the matter in the right way. In Rene Descartes's world of *res extensae* animals had no minds; they were conceived as elaborated mechanical automata. It is not yet apparent why modern psychologists—from Freudian mechanists to Skinnerian behaviorists—tried to apply this notion to human beings instead of using their own introspective experience, which recognizes that human bodies, obviously within the limits of their capacities, follow the freely decided intentions of human minds.

In an evolutionary world, this finding should warn us not to make human free will an exclusive and unique event without any solid roots in the past that allows for its evolution. Certainly what emerges in evolution is somewhat new, transcending the past. Yet at the same time there cannot be anything without its past, which in one way or another has prepared for the emergence of the new, in this case of human free will.

If we look into the evolutionary past, we do not find any mechanical automata among animals. The closer we remain to the human level of evolution, the less we find only internalized mechanization, such as in certain arthropods or mollusks. Instead, many animals show fairly free behavior, although they do not dispose of their freedom as do humans, who can reflect on their freedom.[2] Thus we do not expect animals to make free decisions self-reflectively, but they certainly are not just bundles of reflexes. Many animals, such as dogs, exhibit the ability to play, and they are quite able to communicate their desire to do so to their human playmates. They do not act like black boxes or automata.

The donkey of Buridan (which in the original writing was a dog) is a purely intellectual construct. Neither a dog not a donkey is such an ass as to be unable to make up its mind between two perfectly equal food stimuli. Neither would die of hunger; they are quite able to be guided by their own deciding will, even though they do not reflect about this capacity.

While human free will obviously transcends the range of freedom we find in other animals, it nevertheless has many features in common with their freedom. For humans, as for animals, the range of freedom is limited by conditions that define the extremes of variability. Within this range—which can be widened by our human capacity to design changes in our own environments—actions are decided freely. There seems to be one difference in the quality of human free action: the human being is more *eu-centric*, in Teilhard's sense of the word, than other animals whose centricity is more diffuse. Still, both animal and human actions are free in the sense that they depend only on the more or less centralized entity we call animal or human being and not on a black-box kind of mechanism.

This is not the place to engage in a large scale controversy with the behaviorist-mechanist position. However, I hope it has become clear that in our normal experience of our living environment we are not confronted with such behaviorist mechanisms, that some kind of free will—although not human, self-reflective free will—is present and evolving within living species. This must be expected if we consider evolution as a step-by-step process and not as a process based on some kind of outside injection (like the Chariots of the Gods). If Theodosius Dobzhansky is correct and the "gods of the gaps" are dead, then we have to accept human freedom as something emerging from a process in which freedom is becoming.

Of course, we cannot observe many decisions being made once we begin to go further back in evolution. Observing a school of herring reveals little choice of movement for the individual, although no single herring is fixed in a stable position within the school. If we go still further back in evolution, for example to oysters, we barely discern any degree of freedom. As a general rule, we might say that as the complexity and consciousness of beings disappears and the more we approach the early stages of life—those living fossils with great survival capacity such as bacteria and countless species of protozoa—the less we discover anything resembling signs of free will. Still, such beings might move of their own accord; however, this movement looks to us only like some kind of reaction without any element of freedom. This is to be expected, because when examining this ancient level of evolution we do not have any insight into the inside of living creatures and we have

considerable difficulty imagining anything based on analogy with our own experience about the free will of such beings. The origins of freedom are no more visible to us than the origins of consciousness: both are lost in the more and more diffuse past.

The only thing we might say regarding those early times—and this extends to the beginning of the universe—concerns the limits of freedom; these limits can always be seen, more or less clearly but without any doubt. To recognize the limits is to make a twofold statement: on the one hand, there is only so much freedom possible; on the other hand, that much is possible. On this level of discussion we may consider that aspect of freedom which opens up different possibilities for the future—that with which free will is always concerned, since by willing I cannot change the past! Thus, the first condition for freedom to evolve is that evolution itself be nondeterministic. This means that the future of evolved elements of reality is nowhere predictable. At the same time new future possibilities are not realized without the fulfillment of new conditions. At the atomic level, for example, hydrogen can have three different possible forms of existence; however, only after the evolution of more complex forms of atoms can hydrogen become part of molecules. Molecules, in turn, open up quite a new range of possibilities, which are likewise transcended by the possibilities opened up by living beings. In all these cases we can say two things: first, earlier evolved elements—atoms, molecules, and macromolecules—are the conditio sine qua non for new stages to emerge. Second, new possibilities for existence are supported by the structural elements that are the necessary conditions for holding the possibilities open.

Structure and Freedom

The opened possibilities can have two aspects: one is the ontological future of further evolution; the other is (please allow me to abuse the term by altering its meaning somewhat) the existential future of the individual that lives its own freedom, its own circle of possibilities. The process of evolution has always been in a polar tension between the structural elements of the becoming beings and the radius of freedom supported by these elements. If we try to describe the evolutionary process as a whole with these two aspects, we can draw in a very simplified way the following picture, symbolizing the structural elements by squares and the radius of possible actions, of ontological and existential freedom, by circles (see Fig. 1).

Although we can say today that evolution has succeeded in bringing forth human free will, we should not imagine that this outcome was reached by following a straight line. If we had to draw the lines of evolution as if we were outlining a contemporary day-to-day chronicle,

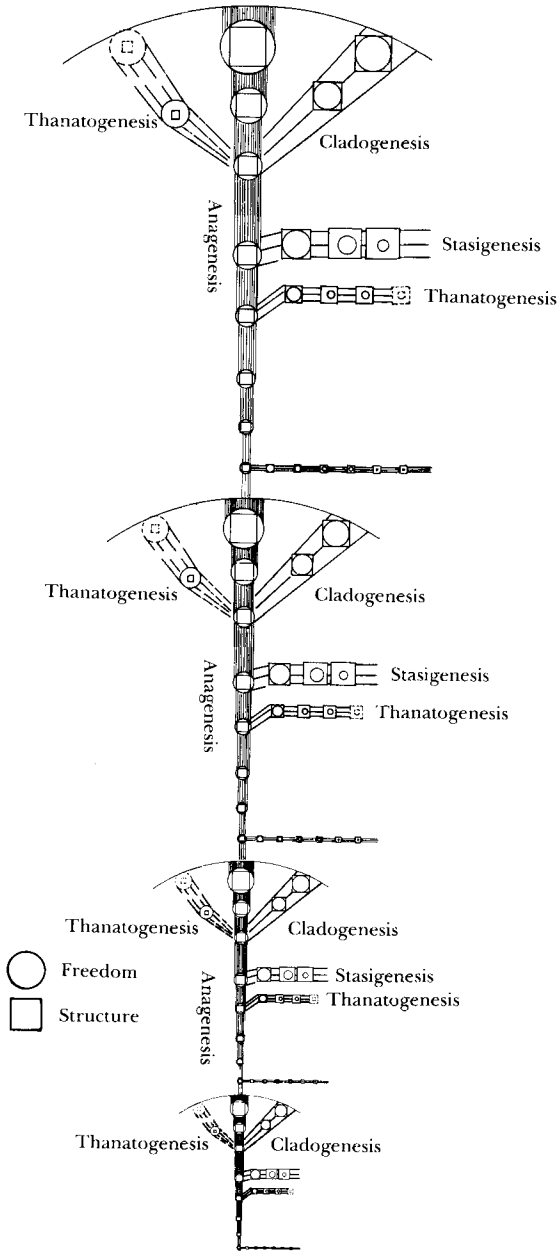

FIG. 1.—Structure and freedom. For the development of this figure I am indebted to the late Miguel Crusafont-Pairo, professor of paleontology at the University of Barcelona, and director and founder of the Instituto Provincial di Palentologia in Sabadell (Barcelona).

we would come up with a zigzag line like that in Figure 2. Thus we have to regard our schema of evolving freedom-structure reality as something highly idealized. Nevertheless, we can see that, on the one hand, evolution on its way to human free will has always been in danger of being dominated by the structural elements. Such domination could mean an evolutionary dead end: without any ontological future evolution ceases to be active in species so dominated. They reach a status we call *stasigenesis*. This—especially within a changing environment—can easily become a form of *thanatogenesis* or the death of a species that is dominated so much by its inner structure that it has lost all its adaptive capacities. Other species are dominated by their inner structure in such a way that they gain a special perfection, opening up very special possibilities. Their ontological future is so narrowed by the perfection of their specialties that certain existential possibilities are opened up while others are closed out. We find this kind of evolution in those many forms of *cladogenesis* that circumscribe the evolution of the many specialized living species, for example the equidae.

Human evolution, on the other hand, is along the line of what we call *anagenesis*, a term that might be open to being criticized as anthropomorphic. However, since humans are the only creatures that, in the horizon of our experience, can reflect on and know about free will as an evolved reality and since this free will is most evolved in humanity, this anthropomorphism is justified. On this line of anagenesis the radius of freedom is always supported but not dominated by inner structure.

This evolutionary direction has its own special dangers. The structural element must be strong enough to support the radius of freedom. If the latter is extended beyond the limits of strength that the inner structure can support, it will result in death. Thanatogenesis can thus happen not only by a crushing structural dominance but also by transgressing the support-strength of the structure by an exploding, ballooning freedom. The evolution of freedom has thus always been forced to find its way between the menacing Charybdis of structural death or fossilization and the devouring Scylla of devastating, inviable freedom that destroys the infrastructure necessary to support it.

With evolution as the description of our concrete universe, freedom cannot exist without structure and structure, if it is not to fall back into the past, into death, must support freedom. The relationship between structure and freedom is not one of contradiction but one of polarity; one cannot exist without the other. In order to exist freedom requires the support of structure, while structure, in order to subsist, needs the radius of freedom. This is the logic of concrete reality; in contrast, the logic centered on the notion of noncontradiction seems to exclude or at least delimit one at the cost of the other.

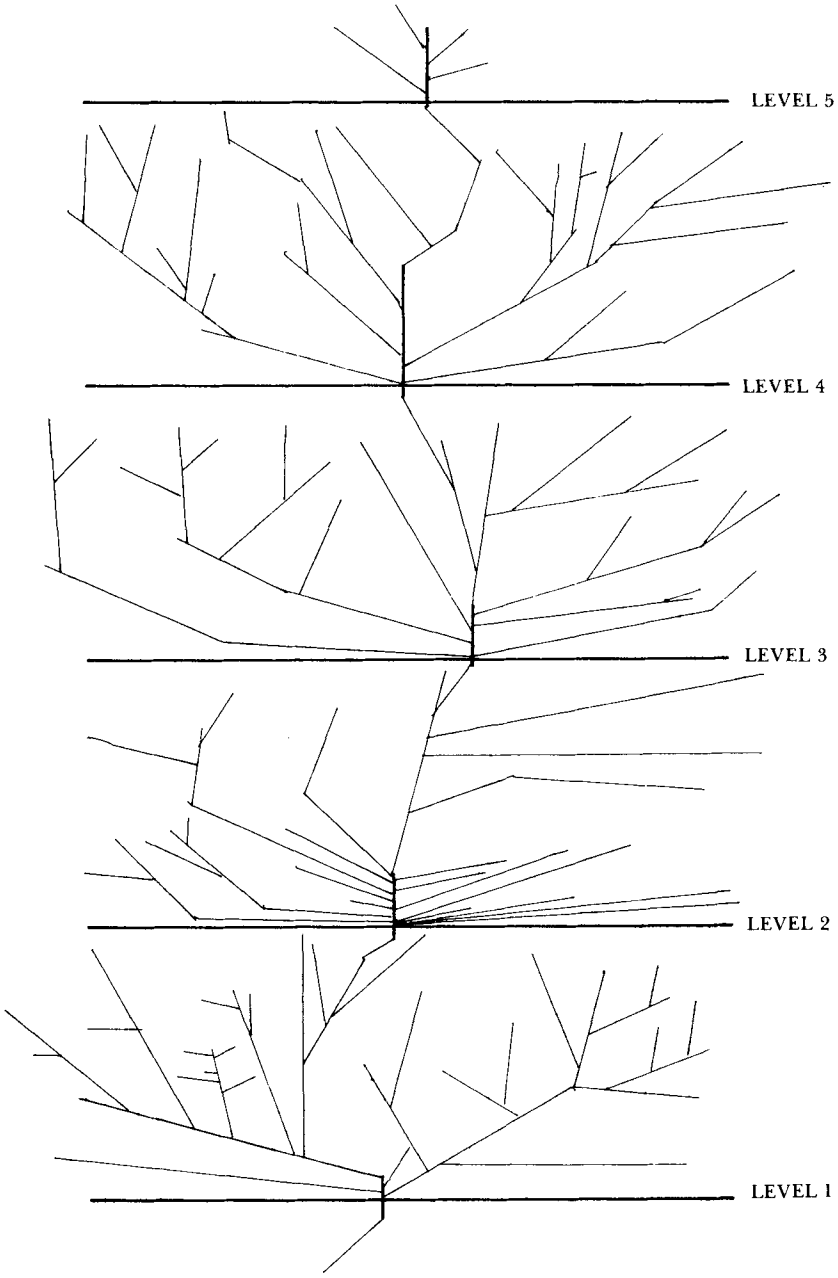

FIG. 2.—A hypothetical chronicle of evolution.

Steering Evolution

Understanding this polarity of freedom and structure—of open possibilities and necessities—as a basic and evolving feature of our becoming universe will prevent us from opposing one idea against the other in an exclusive way. The fact that human free will is structurally limited does not make it unreal, no more than the existence of human free will denies the reality of the structure that supports it. Both are part of the human reality, of individuals as well as of societies. Also, insofar as we are still evolving, we humans shall have to steer between the same Charybdis and Scylla. The important point is that we no longer are the willing or unwilling subjects of evolution; instead we have to decide on the future. In humanity evolution has become conscious and self-deciding through human free will. However, being free does not allow us to escape from the conditionality of the universe. We shall have to steer the ship of evolution, at least inasmuch as it has become conscious and free in humanity, into a future that is characterized by *more structure supporting more freedom*, or we will end (as many societies of the past ended) in an anarchical death by unsupported freedom or in a dying society dominated by sclerotic structure.

However, to hopefully find a way between these two monsters, we must recognize that no one side of the freedom-structure, the free will-determinism dilemma can reach a state of perfection if this world is to remain human and viable.

NOTES

1. If one were to create one single molecule of all possible proteins (which require carbon atoms), all the matter in the universe, suitably transformed, would not be sufficient to realize such a utopian project.

2. If we remain at the primate level, for example, we see mostly unmechanized, planned behavior (though no long-range planned behavior as far as we can judge). However, anthropods such as mason wasps, whenever the normal course of events has been disturbed, resume mechanical behavior.