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Modern Paradigm (Hypothetical-deductive), an Approach That Threatens Biodiversity, a Hermeneutic Approach from a Sociocritical Perspective

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Abstract

Francis Bacon, who systematized the steps of the general scientific method, published *Novum organum scientiarum* in 1620, known as *Novum organum*, who conceived science as a technique, capable of giving human beings control over nature. This is the reason for its subtitle: The Great Restoration. In fact, the first Book is titled: Aphorisms on the interpretation of nature and the kingdom of man. On the other hand, The Bible, from the perspective of literary genres, hermeneutics and "history", is full of apparent contradictions. However, their expressions and ordinances have had an impact on culture specifically, and even on ecological education. Expressions such as: "And God blessed them and said to them: grow, multiply, fill the earth and subdue it" (Gen. 1: 28), have taken root to the point of considering biodiversity as an entity inferior in category to that of the human being. Hence Leonardo Boff denounces a kind of predation based on submission; Even in the Preface of the Mass (Catholic-Latin Christian rite) we hear the following: "you made him master of a marvelous world, so that in your name he would dominate the entire creation." The ecological era, as Leonardo Boff calls it, is the return to the earth as a common homeland. The earth is sick (we have made it sick, rather) and threatened (we are threatening it). The basic meaning was well formulated by the founding fathers of our modern paradigm: Galileo Galilei, Rene Descartes, Francis Bacon, Isaac Newton, among others. Descartes taught that our intervention in nature seeks to make us "maitre et possesseur de la nature" (master and possessor of nature). Francis Bacon said: we must "subjugate nature, press her to give us her secrets, bind her to our service and make her our slave." With this, the myth of the human being as a civilizing hero, indomitable Prometheus with the pharaohism of his works, was created. In a word: the human being is above things to make them conditions and instruments of human happiness and progress. The present writing, based on documentary research, at an exploratory level, seeks to analyze and interpret the elements of the culture dominated by the modern paradigm, whose purpose is to place the human being as "lord" and "owner" of creation, understood as biodiversity; to unravel its pernicious intention of dominance, whose consequences are the threats and deterioration of nature.

Keywords

King of Creation, Dominate, Subdue, Owner of Nature, Lord of Biodiversity

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1. Introduction

Edgar Morin [1], in his famous work The Lost Paradigm, highlights the following reality:

> Since Darwin, we have accepted that we are children of primates, but not that we ourselves are primates. We are convinced that, once descended from the tropical family tree where our ancestors lived, we have forever distanced ourselves from it, and that we have built, outside of nature, the independent kingdom of culture.

The above constitutes a critique with which he begins the first chapter of his work, where he characterizes science as closed. He then accentuates his diatribe by considering that no matter how much effort human beings make, the evidence before them proves fruitless. It is as follows:

> We know very well that we are animals of the mammalian class, of the primate order, of the hominid family, of the Homo genus, of the sapiens species; that our body is a machine of thirty billion cells, controlled and procreated by a genetic system, which was constituted in the course of natural evolution over two to three million years; that the brain with which we think, the mouth with which we speak, the hand with which we write are biological organs. Now, this knowledge is as ineffective as the one that informs us that our organism is made up of combinations of carbon, hydrogen, oxygen, and nitrogen [1].

That is, part of an ecosystem, part of a whole, where biodiversity is not an environment alien and foreign to the very nature of human beings.

2. The Problem

Francis Bacon [2], who systematized the steps of the general scientific method, published *Novum Organum Scientiarum* in 1620, known as Novum Organum. He conceived science as a technique capable of giving humankind dominion over nature. This explains its subtitle: *The Great Restoration*. Indeed, the first book is entitled: Aphorisms on the Interpretation of Nature and the Kingdom of Man.

“Be fruitful, multiply, fill the earth and subdue it” (Gen. 1: 28). The Bible, from the perspective of literary genres [3], hermeneutics [4], and "history," is full of apparent contradictions. However, its expressions, teachings, and ordinances have had an impact on culture specifically, and even on education, especially in environmental education or on the care of biodiversity:

> So, God created man in his own image; in the image of God, he created him; male and female he created them. And God blessed them and said to them, be fruitful, multiply, fill the earth and subdue it; rule over the fish of the sea and the birds of the air, and over every living thing that moves on the ground. And God said, Behold, I give you every seed-bearing plant on the face of the ground, and every tree that bears seed, you shall have it for food; and to every beast of the earth, to every bird of the air, and to every creeping thing on the ground—every living thing that has breath—every green herb shall be for food (Gen. 1: 27-30).

That is, the ordinance that humankind be made king of creation to subdue and dominate their environment. In this same context of contradictions, we are surprised by the following expression, “How great are your works, O Lord..." (Psalm 92: 6).

On the other hand, regarding the antecedents of the dominant paradigm of modern science, specifically the hypothetico-deductive method, Bertrand Russell [5] had already launched a critique of the unquestionable authority of Aristotle, the precursor of this methodology. He puts it critically and sarcastically, and it can be summarized as follows: "it was impossible for Aristotle to be wrong" [5]. Practically if Aristotle had raised a question, it was impossible for it to be questioned; and, conversely, if he had not outlined it, it was implausible that such an argument existed.

Indeed, Russell [5] continues, “Greek genius was deductive rather than inductive, and therefore dominated mathematics. In subsequent ages, Greek mathematics was almost forgotten, while other products of the Greek passion for deduction survived and flourished, especially theology and law.” Perhaps this explains the rooting of the dominant vision that the Bible acquired in the flourishing neo-Christian culture, as well as its versions of creation. Let us recall that the genius of the Church Fathers (successors of the apostles) wove the Christian doctrine of the first centuries of our era considering Greek philosophy [6]. For example, deduction in the Holy Book consists of considering the human being as superior to all living beings and, therefore, king of creation to dominate it. Indeed, Russell [5] emphasizes, “in textbooks the deductive order is adopted, the inductive order is followed in the laboratory.”

In the field of biology, Darwin’s contributions [7] were revolutionary in considering that humans are just one of many species in the process of evolution. Therefore, they belong to an entire ecosystem on equal terms. Thus,

Darwin's importance [7] lies in the fact that he forced biologists, and with them the public, to abandon the ancient belief in the immutability of species and to accept the view that the various genera of animals have developed through variation from a common lineage. Like all innovators of modern times, he had to contend with the authority of Aristotle [5].

And, to “top it off,” Bertrand Russell [5] exclaims: “Aristotle could be said to have been one of the great misfortunes of humanity. Even today, the teaching of logic in most universities is full of nonsense, for which Aristotle is responsible.”

In the field of astronomy, Galileo disputed Aristotle and the Scriptures, thereby destroying the entire edifice of medieval knowledge [5]. However, this astronomer's “sin” was not so much having questioned the Bible but rather having cast doubt on Aristotle's authority and his arguments. That is, the first traces of the hypothetico-deductive method. However, Galileo himself ended up absolutizing, in the words of Leonardo Boff

[8], the modern paradigm that ultimately took root and became an adversary to the biodiversity environment, as it laid the groundwork for considering human beings as superior to the ecosystem. This is also the view of Michelangelo Buonarroti, for example, with his anthropocentric worldview in art. From this we can generally conclude that the modern hypothetical-deductive paradigm is profoundly anthropocentric, with pretensions of superiority.

Indeed, Francis Bacon reinforces the idea that the Greeks were deductive and that "the sciences we have come to us almost entirely from the Greeks" [2]. However, such a methodology is rooted in their perspective and deduces an inferiority of nature to human beings. "Man, the servant and interpreter of nature, neither acts nor understands except in proportion to his experimental and rational discoveries about the laws of nature; beyond these, he knows nothing and can do nothing" [2].

Psalm 8: 4-7 reads as follows:

[4] When I consider the heavens, the work of your fingers,
the moon and the stars you have set in place,
[5] what is man that you are mindful of him,
humankind, to give him power?
[6] You made him a little lower than the angels,
you crowned him with glory and honor,
[7] you gave him dominion over the works of your hands,
you put all things under his feet.

It is like a poetic commentary on the work of creation narrated in the first chapter of Genesis (Gen 1). Man is God's representative in the work of creation, and everything has been created for his service, and everything in God's service, being made in "his image and likeness." The poet, enraptured by such cosmic grandeur, marvels that the omnipotent Creator cares for a being as insignificant as man. However, man is the king of creation, bearing the seal of the divine in his soul.

The Jerusalem Bible, the Catholic version of the Bible compiled in French under the direction of the French Biblical and Archaeological School of Jerusalem, gives this psalm the title "Power of the Divine Name." For its part, the Nacar-Colunga version, that is, the translation of the Bible printed with Catholic ecclesiastical authorization, its first edition is from 1994 and whose translators were two scriptural scholars and priests, the Dominican Alberto Colunga Cueto and Eloino Nacar Fuster, puts as its title Psalm 8: *Goodness of God in subjecting all creation to man.*

Thus, it seems from the outset that the dominant word, both in the modern paradigm and the Judeo-Christian tradition, is "subdue."

In the Fifth Preface for the Sundays of Ordinary Time, called the Fifth Sunday Preface of the Roman Missal (Catholic-Latin Christian rite), entitled: Creation Praises the Lord, we read the following:

> For you created the universe with all its contents; you determined the cycle of the seasons; but you formed man in your image and likeness: and you made him master of a marvelous world, so that in your name he might rule over all creation and, contemplating the greatness of your works, might always praise you...

Thus, in the Book of Genesis, as well as in Psalm 8 and in the Fifth Sunday Preface, the expressions "subdue," "master," "dominate," creation in the service of man stand out.

The modern scientific paradigm, denounced by Leonardo Boff [8], the dominant paradigm, that of Isaac Newton's modern science, is developed around a mechanistic, linear, and fragmentary worldview that speaks of a determined reality, independent of human beings [9]. It is a threatening and subjugating perspective or vision of nature.

3. The Sociocritical Alternative

The sociocritical alternative is presented by considering, in line with the position of Thomas S. Kuhn [10], that:

> Scientific revolutions begin with a growing feeling, often also restricted to a narrow subdivision of the scientific community, that an existing paradigm has ceased to function adequately in the exploration of an aspect of nature, to which the same paradigm had previously shown the way [10].

This perspective (paradigm) considers the deductive and inductive foundations (processes) of science because:

Both [8] states that the deductive and inductive methods have fostered the advancement of science. They cannot be considered two opposing approaches, but rather complementary. The inductive model cannot test the logical validity of the empirical generalizations it arrives at, and it is necessary to resort to the deductive method. The need to integrate the deductive and inductive paths into a single method gives rise to the hypothetico-deductive or scientific method.

Sometimes, the scientific process begins with an inductive method. Driven by the need for information about a problematic situation, the scientist may start with a series of observations, informal, depending on the case. From these exploratory observations, it is possible to conduct a more planned data collection, seeking common characteristics in the information collected. Data are frequently reduced by eliminating irrelevant information [11].

Regarding the concept of Paradigm, from Thomas S. Khun [10], they are "universally recognized scientific achievements that, for a certain period of time, provide models of problems and solutions to a scientific community." In contrast, Alvira [12] defines it as the "set of beliefs and attitudes, as a worldview "shared" by a group of scientists that specifically implies a certain methodology". We underline the second because, in the tone of our writing, it fits in with considering that the modern hypothetical-deductive Paradigm is predominantly governed by this set of beliefs and attitudes towards biodiversity; a shared vision of subjugation and lordship of that which is considered "inferior" and must be subjugated, its greatest wealth extracted.

Specifically, the Sociocritical Paradigm [11] proposes a stance and methodology of change and emancipation. Paulo Freire, Leonardo Boff, and Enrique Dussel subscribe to this paradigm. It groups together a family of research approaches

that emerge as a response to the positivist and interpretive traditions and seeks to overcome the reductionism of the former and the conservatism of the latter, admitting the possibility of a social science that is neither purely empirical nor merely interpretive [13].

The critical paradigm explicitly introduces ideology and critical self-reflection into the processes of knowledge. Its ideological principles aim to transform the structure of social relations and are based on the Frankfurt School (Horkheimer, Adorno), neo-Marxism [14]; Giroux [15], Habermas's critical social theory [16], the work of Freire [17] and Carr & Kemmis [18], among others.

This perspective aims to analyze social transformations and respond to certain problems generated by them. Some of its principles are: a) knowing and understanding reality as praxis; b) uniting theory and practice: knowledge, action, and values; c) orienting knowledge toward emancipating and liberating humankind; and d) engaging teachers through self-reflection [19].

The sociocritical paradigm, as an exploratory and documentary research process in this case, is positioned critically, as it considers reality to be shared, historical, constructed, dynamic, and divergent, with a fluid relationship with the environment, in which the researcher is a subject, and shared values [11], among them human responsibility and care for biodiversity, not as its "master."

This paper, based on exploratory documentary research, seeks to analyze and interpret the elements of a culture dominated by the modern paradigm, whose purpose is to position human beings as "masters" and "owners" of creation, understood as biodiversity, in order to unravel its pernicious intention of domination, the consequences of which are threats to and the deterioration of nature.

4. Patterns of Cultural and Religious Meaning

We often hear expressions like: “Enjoy today all the beautiful things the Creator has created for us and found in nature.” That is, subjugation disguised as “enjoyment,” true euphemisms that seemingly blur the underlying intention: to tame, to domesticate, to plunder. From the polysemy of the term “pattern,” the meaning that most closely matches the intention of this writing is represented by the expression: *cut with the same pattern*, which refers to a person or thing in which a strong resemblance to another is noted [20]. A pattern of meaning can be a term, a concept, an expression, or even an idea, where the symbolism (meaning) of an event, thing, or tradition is noted. These are manifested in individual, group, organizational, social, and even religious behaviors, apart from economic interests [21], influenced by perspectives (paradigms) of rigid or univocal tendency [22].

That is, with respect to the modern paradigm and the hypothetical-deductive method, we can affirm that, in our approach to biodiversity, we have been "cut" from the same cloth (or template). Patterns of meaning [21] from the cultural, educational, and religious order constitute a way of seeing the world, as evidenced by the following:

1) You crowned him with glory and dignity, with reference to the human being. This indicates a halo of superiority, like that of a king: "you crowned him." Because this is the king of creation, bearing the seal of the divine in his soul.
2) You have put all things under his feet, in the sense of subduing something of a lower order. That is, subjecting all of creation to man.
3) Man is God's representative in the work of creation, and everything has been created to serve him.
4) The dominant society is utilitarian and anthropocentric because it is culturally and educationally governed by the modern hypothetico-deductive paradigm.
5) And, most impressively, taken from the Fifth Sunday Preface: You made him master of a marvelous world, so that in your name he might dominate all of creation. Perhaps this constitutes the greatest threat to the Judeo-Christian tradition.

Thus, the core of this kind of "denunciation" is the reflection of Leonardo Boff: the dominant paradigm of modern science, of Isaac Newton, among others, is developed around a mechanistic, linear and fragmentary vision of the world that speaks of a determined reality, independent of the human being, where the perspective is to extract all possible wealth from nature (biodiversity) so that the owner of creation can make use of it.

5. The Proposal

Regarding a kind of proposal on environmental care, sustainability, and education, the ecological era, as Leonardo Boff [8] calls it, stands out. It is the return to the earth as a common homeland/motherland. Every year since 1984, the World watch Institute of the United States of America publishes a report on the "state of the Earth." This state is increasingly alarming [8]. The earth is sick (we have made it sick, or rather) and threatened (we are constantly threatening it). A sick planet: human beings have exceeded all limits for its safety [23]. Among the many pieces of evidence, two stand out: the first is that the most threatened being in nature is the most deprived, as revealed by the figures and statistics that support this statement; the second is that life species experience a similar threat, a statement also supported by countless studies, numbers, and statistics. Thus, derived from these general observations, a couple of questions arise: How can human beings and the environment survive together, given that we share a common origin and destiny? [1] How can we safeguard what has been created in justice, participation, integrity, and peace?

To answer these questions, various diagnoses have been developed and various ecological therapies suggested, aimed at preventing or curing the disease, according to Leonardo Boff [8]:

1) Ecotechnology: attempts to develop techniques and procedures aimed at preserving the environment or reducing the undesirable effects produced by the type of development we have created, negative effects on populations and nature.
2) Ecopolitics: ecological justice. Behind technical projects are policies, whether implemented by the state (industrial, agricultural, various networks, urban, energy, or population development policies) or by private companies. These are placed in the market under the pressure of competition and the need to guarantee profits, often at the cost of pollution, deforestation, and the impoverishment of workers due to low wages. All of this is done from the perspective of the dominant paradigm. Ecopolitics seeks to implement sustainable development strategies that guarantee the balance of ecosystems, including the work system, while also fostering solidarity with future generations. They have the right to an equitable, just, and participatory society with a healthy environment.
3) Human ecology and social ecology: cosmic community. Human beings and society always establish a relationship with the environment, because the former arises from a long biological process; without the elements of nature of which it is a part and parcel (Morin, 2005, p. 17), without viruses, bacteria, microorganisms, the genetic code, and primordial chemical elements, it would not exist. Societies always organize their relationships with the environment to guarantee the production and reproduction of life.
4) Mental ecology: nature is within us. The state of the world is linked to the state of our mind. If the world is sick, it is a symptom that our psyche is also sick. There are attacks against nature and a desire for domination because within human beings, visions, archetypes, and emotions operate that lead to exclusion and violence. There is an inner ecology as well as an outer ecology, and they mutually influence each other.
5) Ecological ethics: responsibility for the planet. The ethics of the dominant society are utilitarian and anthropocentric. It views all beings as something at the service of human beings; it assumes they can be used as they please, according to desires and preferences; it believes that the human being—man and woman—is the crown of the evolutionary process and the center of the universe. The ethical thing to do would be to develop a sense of the limits of human desires, since these easily lead to seeking individual advantage at the expense of class exploitation, the subjugation of peoples, and the oppression of the sexes. The human being is essentially, and primarily, a being of communication and responsibility. The ethical thing to do would be to foster generational solidarity, in the sense of respecting the future of those yet to be born. And, finally, the ethical thing to do would be to recognize the relative autonomy of other beings; they too have the right to continue and coexist with us and with other beings, since they have existed before us and, for millions of years, without us. In short, they have the right to the present and the future.
6) Radical or deep ecology: crisis of the spirit [4]. A final path that does not seek to invalidate the others but does seek to descend to the roots of the issue. That is why it is called radical or deep ecology. What it attempts is to discern the fundamental question: that the current crisis is a crisis of hegemonic civilization (the modern paradigm). This means that it is the crisis of the paradigm of domination and of our determining model of relations. What is the primary meaning of global societies today? We have already said it: it is progress, prosperity, the unlimited growth of material goods and services. How is this progress achieved? Through the utilization, exploitation, and empowerment of all the forces and energies of nature and of people. The great instrument for this is science and technology that have produced industrialism, computerization, and robotization. These instruments have not arisen out of pure curiosity but from the will for power, conquest, and profit.

The basic objective, concluded by Leonardo Boff [8], was well formulated by the founding fathers of our modern paradigm: Galileo Galilei, Rene Descartes, Francis Bacon, Isaac Newton, among others. Rene Descartes taught that our intervention in the ecosystem seeks to make us “et ainsi nous rendre comme maitre et possesseur de la nature,” “and in this way, make us like masters and possessors of nature” [24]. Francis Bacon [2] proposed “subjugating nature, pressuring it to give us its secrets, binding it to our service and making it our slave.” With this, the myth of the human being as a civilizing hero, the indomitable Prometheus, was created, with the pharaonic quality of his works. In a word: human beings are above things to make them conditions and instruments of human happiness and progress.

6. Conclusion

We have attempted to critique the modern paradigm, typifying it as a threat to biodiversity, as embodied in the hypothetical-deductive process. However, we have arrived at postmodernity [25]; Lyotard [26] and, practically, we remain in the same condition. The procedures of contemporary science continue to perpetuate a vision and practice in which human beings continue to dominate their environment, characterized by a utilitarian, mercantilist, and industrial view of everything around them, solely for economic purposes. That is, various forms of denying the common biodiversity that gave rise to our culture.

From theological anthropology [27], the meaning of humankind being created in the image and likeness of the Creator means that we must be in harmony with Him, with others, with ourselves, and with nature. Human beings, instead of dominating nature, must seek harmony with it, for that is what they were created for. Furthermore, the vision of indigenous

people throughout the Americas regarding the relationship between humans and nature speaks of a relationship of harmony, care, and respect; the indigenous people of the Andes, for example, speak of Pachamama (Mother Nature).

Leonardo Boff's proposals aim to reduce this constant utilitarian approach to responsibility and call for our responsibility and ethical commitment to nature. Will we succeed? We cannot continue to degrade our ecosystems and exploit their immeasurable wealth.

7. Recommendations

The author questions not only the procedure of the hypothetical-deductive scientific method but also its theoretical, philosophical, and epistemological foundations. He argues that the figures who fostered its development—such as Descartes, Bacon, Galileo, and even Newton—believed that nature should be subjugated and exploited for the benefit of human beings, who, by virtue of their rationality, were considered superior to all other living things—creatures that, in this view, existed to serve them. But it also puts forward a proposal aimed at preventing and trying to cure the disease, according to Leonardo Boff, centered in ecotechnology, ecopolitics, human and social ecology, mental ecology, ecological ethics and deep ecology, to avoid ecological collapse. But, more than the above, the meaning of humankind being created in the image and likeness of the Creator means that we must be in harmony with Him, with others, with ourselves, and with nature.

Abbreviations

UPN	National Pedagogical University
RAE	Royal Spanish Academy
BAC	Library of Christian Authors

Author Contributions

Enrique Reyes Chavez: Formal Analysis, Investigation, Methodology, Resources, Validation, Writing – original draft

Conflicts of Interest

The author declares no conflicts of interest.

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