

ON THE ESSENCE, THE CONTENT, THE FORM, THE PHENOMENON AND THE APPEARANCE OF THE PROCESSES OF REALITY

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I. ESSENCE

Returning to the philosophical logic of (Rosental & Iudin, 1971, p. 148) , it must be started by saying that both essence and phenomenon are philosophical categories that reflect facets necessarily inherent in each object of reality. We can define *Essence* as the set of properties and relationships of the object that are:

- 1) The deepest. That is, *the most fundamental ones* , those that define its internal structure.
- 2) Stable. *That is, they do not change, decay or disappear significantly over time* . Likewise, they are those that allow the object to maintain or regain its internal balance [\[1\]](#).

Thus, this set, which we will call the essential set, generally determines the object in relation to :

- a) *Origin* . Understand this as principle, motive, moral cause, birth, source, root, generating cause.
- b) *Character* . It is understood as the set of qualities or circumstances of a thing that distinguishes them by their way [\[2\]](#) of being (existing) of the others.
- c) *Directorate of Development* . That is, the course that the subsequent evolution of the object will follow.

Thus, the essence can be understood as *that intermediate place between two opposites* , but not intermediate in the sense that necessarily that place is at the center of the evolutionary trajectory of the system or subsystem; it is that intermediate place between the point of arrival and the point of departure, *the essence is in the process of development of objects* . In Hegel these two opposites are being and concept, which are in their system the point of arrival and the starting point, respectively, while in the system of Marx and Engels being is the starting point and the concept is the point of arrival, which represents a reversal of Hegel's logic. However, that statement would be hollow if it is not defined what dominates in the *Aufheben* . Dominance is precisely an analytical aspect that characterizes Hegel and Marx as so similar and at the same

time so different. *In both, the origin always dominates, which is the foundation of the process and presents dominance in the result, however, it is in the definition of the origin that Hegel and Marx differ* . The second emphasizes this in (Marx, 2007, pp. 14-18) when addressing the dynamic relationships between production, consumption, distribution and exchange:

“Nothing simpler, then, for a Hegelian than to identify production and consumption. And this happened not only in the case of socialist essayists, but also in that of prosaic economists like Say , p. For example, they think that if a town is considered, its production would be its consumption. Or also humanity in abstract. Storch proved Say's error by noting that a town, p. For example, it does not simply consume its production, but also creates means of production, etc., fixed capital, etc. (...) Furthermore, to consider society as a single subject is to consider it in a false, speculative way- In a subject, production and consumption appear as moments of an act. What is most important here is to emphasize that if production and consumption are considered as activities of a subject or of many individuals, both appear in each case as moments of a process in which production is the true starting point and therefore it also the prevailing moment. Consumption as a necessity is the same internal moment of productive activity. But the latter is the starting point of the realization and, therefore, its predominant factor, the act in which the whole process repeats itself. The individual produces an object and, by consuming it, returns to himself, but as a productive individual who reproduces himself. In this way, consumption appears as the moment of production. In society, on the other hand, the relationship between the producer and the product, once the latter is finished, is external and the return of the object to the subject depends on the latter's relations with other individuals. It does not get hold of it immediately. In addition, the immediate approval of the product is not the purpose of the subject when producing in society. Distribution is interposed between the producer and the products, which determines, through social laws, its share of the world of products, thus interposing itself between production and consumption (...) Now, does

distribution exist as an autonomous sphere next to production and outside of it? (...)
Although this appears as an assumption for the new period of production, it is itself
a product of production, not only of historical production in general, but of specific
historical production. "

Thus, the essence is "a place" because the essence is relations of at least one element
with its environment and / or with itself (the case "and" applies to systems, the
case "or" only if the universal system is analyzed, in which there was only the
internal relationship –since there is nothing outside the universe–), in which one has
dominance over the other in that relationship, regardless of whether it is possible to
determine that dominance or not. So, it is those relationships that we call essential
(or nuclear, which is the same), because their relative weight is greater in terms of
the other relationships (both internal and external) and this also means that the
elements involved (in these essential relationships) will have dominance in general
in their connection with elements involved in non-essential relationships. On the
basis of Hegel's definition of essence as an intermediate place between being and
concept (which refers to space and time) it is possible that Soviet philosophers have
constructed this more abstract definition of essence as a set of relationships and links
internal

Thus, (Rosental & Iudin, 1971, p. 147) define essence as the “ *Sense of the given thing,
that which the thing is in itself, unlike all the others and the variable states of the thing when
experiencing the influence of such or such circumstances* . The concept of "essence" is very
important for every philosophical system, to distinguish philosophical systems from
the point of view of the solution given to the problem of how essence is related to
being and how the essence of things is related to consciousness, to thinking. For
objective idealism, being, reality and existence are in dependence on the essence of
things, understood as something independent, immutable and absolute. In this case,
the essences of things form a peculiar ideal reality, which engenders all things and
governs them (Plato, Hegel). For subjective idealistic tendencies, the essence is a

creation of the subject, which projects the essence outside itself and represents it under the aspect of things. The only correct point of view is to recognize the reality of the objective essence of things and their reflection in consciousness. *The essence does not exist outside of things, but in them and through them, as their main general property, as their law* . Human knowledge gradually assimilates the essence of the objective world, increasingly delves into it. This knowledge is used to retroactively influence the objective world with a view to its practical transformation (...) "This is complemented by what is stated in (Frolov, 1984, p. 142) :

II.PHENOMENON

When analytically introducing the category *Phenomenon*, one must begin by saying that essence and phenomenon constitute a unit: *just as there cannot be "pure" essences that do not appear, there are also no phenomena devoid of essence* . This means that in the apparent there are also at least minimal elements of the essential set, that is why, although the senses lie, they never lie at all. *The phenomenon must be understood as the set of properties and relationships of the object that are :*

- 1) *Various* [\[3\]](#).
- 2) *External* .
- 3) *Mobile* .
- 4) *Immediately accessible to the senses* [\[4\]](#) .

This set represents the way in which the essence manifests itself, reveals itself.

In addition, it is added in (Nabi, 2021, pp. 89-90) on the definition of essence that:

" In my opinion, the essence is only one, but it should not be understood as an object, but rather as a place, in which not necessarily a single object will exist and in which there will necessarily be at least one relationship [be at least that of the only object with itself (as in the case of the *Big Bang* , which is a relationship between the internal structure of the object and its external structure, but the external structure of the same object, not the external structure understood as the

structure of the exterior, since there was no such exterior, since it was self-contained, it was self-contained)]. There is a hierarchical relationship between the components of the essence, *ie* , the elements that exist in that place [that considering any mathematical structure is expressed in its topology and the place where that set of relationships exist is the topological space as such; Although formally speaking, Topology deals with forms and not with essences, it deals with special forms, specifically with forms determined by the relative position of the points that make up the geometry studied, conceived as the internal structure of geometric forms (which are the forms studied from the metric perspective), that making an analogy with the phenomena of reality the geometric form would be equivalent to the form and the topological form to the essence of the objects-)] and between the different types of relationships that these components may have , both analyzed in isolation from one another (at the level of the relationships of each of the components -if there are more than 1-), comparing relationships that occur within one (s) with those that occur within another (s) or, the relationships that occur between them. In some cases it is observed that it is easier to be able to rank elements and interrelationships between them, than interrelationships of the elements with themselves, as is the case of quantum theory. Of course, this is due to the complexity of the phenomenon under study^[5], to the limitations (both qualitative and quantitative) in the measurement capacity and in the available information, not because there is any specific law that prevents it. In addition, it also seems that it is easier to rank elements (objects, particles) than to rank the relationships between these elements, since it moves towards a greater depth level, for which more precise measurements will also be necessary, which involve more robust measuring instruments. "

III. DIALECTIC RELATIONSHIP BETWEEN ESSENCE AND PHENOMENON

Thus, the essence appears as the determining factor; the phenomenon, as the determined; the phenomenon occurs immediately; instead, the essence is hidden; As for the features, the phenomenon is richer than the essence, but the latter is deeper than the phenomenon; the essence of an object is always one, although it manifests itself in a multiplicity of phenomena; the phenomenon is more mobile than the essence; the same phenomenon can be a manifestation of several essences and even contrary ones; the phenomenon can express the essence in a distorted way, in an inadequate way, which is nothing other than the appearance of objects within the universal system called *reality*.

When this occurs, that the essence manifests itself in the phenomenon in a partial and analytically insufficient way, or that the phenomenon manifests the essence in a distorted way, the researcher could reach conclusions inverse to reality. This occurs by confusing the real (what has an existence immediately accessible to the senses) with reality.

"However, the contradiction exists not only between essence and phenomenon, but also within essence itself, and these contradictions are the fundamentals of the object, whose *general* development^[6] determine." (Rosental & Iudin, 1971, p. 148). The essence has mutability. "The contradiction between essence and phenomenon conditions the complex and contradictory character of the knowledge process," (...) if the form of manifestation and the essence coincided directly, all science would be superfluous "(C. Marx and F. Engels, t. XXV, part II, p. 384). Delve without limits from the phenomenon to the essence, discover the essence of things behind external phenomena, find the foundation of why the essence manifests itself in one way and not another, such is the end of knowledge. By means of immediate contemplation, man enters the knowledge of the things that appear on the surface, he enters the knowledge of the phenomena. The knowledge of the essence is achieved thanks to

abstract thinking. In science, the transition from knowledge of the phenomenon to knowledge of the essence acquires the specific aspect of passing from experiment (observation) to explanation through *description* . " (Rosental & Iudin, 1971, p. 148) .

IV.SHAPE

Following the line of (Rosental & Iudin, 1971, pp. 190-191) , both form and content are philosophical categories that serve to highlight the internal sources of unity, integrity and development of material objects. Thus, these are philosophical categories that reflect facets necessarily inherent in each object of reality. By saying "inherent" we refer to "That by its nature it is so attached to something that it cannot be separated from it." (Royal Spanish Academy, 2020) .

The form then also partially expresses the content^[7], but an analysis based only on the form (assuming that it has been properly identified) in most cases will lead to an analysis, in the best of cases, significantly incomplete and, therefore, significantly flawed, prejudicially biased .

V.CONTENTS

Content should be understood as "(...) *the set of elements and processes that constitute the basis of objects and condition their existence, the development and the substitution of their forms* . The category of form expresses the internal link and the mode of organization, interaction of the elements and processes of the phenomenon both with each other and with external conditions. *The development of form and content is that of two aspects of the same phenomenon, it is the unfolding of one, unfolding that gives rise to contradictions and conflicts that lead to discard the form and modify the content* . " (Rosental & Iudin, 1971, p. 191) .

In this sense "The unity of form and content is relative, transitory and alters as a result of changes, conflicts and the struggle between one and the other. The source of the conditions between form and content lies in the difference in their functions in development. " (Rosental & Iudin, 1971, p. 191) .

VI. DIALECTIC IN THE INTERRELATION BETWEEN FORM AND CONTENT

Thus, in the line of Soviet authors, content is the basis of development, form is the way of existence of the thing; the content has its own movement (it has within it the essence of the thing), the form depends on the content; the content contains within itself possibilities of development beyond what the form can allow; content is the guiding element of development, form is relatively independent, can facilitate or hinder development, and so on. The change in form takes place as a result of a change in the content itself, which determines its guiding role in development. The form never remains unchanged. But the change of form, its elimination, does not always occur suddenly; most often it occurs as a result of a gradual accentuation of the contradictions between form and content. Furthermore, external conditions, factors and links that do not directly concern the content also exert a certain influence on changes in form. The form possesses a relative independence, which is intensified all the more the greater the history of the given form. The stability of the form is a factor that guarantees the progressive development of the content. But that same stability that stimulates development in the early stages becomes, over time, a source of conservatism. The contradictions between form and content are not a passive part and an active part. The real process occurs as a result of their reciprocal action because they are opposites that actively influence the development of the thing, of the object. The lack of correspondence between form and content, due to the delay of the first with respect to the second, although it is of great importance for development, characterizes only one of the contradictions of the latter.

The solution of the contradictions between form and content depends on the character that they have, their degree of development and the conditions in which they occur. The solution can occur by changing the form in line with the content changes, by changing the content in line with the new form, by rejecting the form, subordinating the old form to the new content, etc. When passing from one qualitative state to another, either the old form is liquidated or it is transformed,

with the particularity that the old form cannot be liquidated before the premises and elements have been prepared in itself to pass into a new form. more perfect shape. This is the dialectical process of the *Aufheben*^[8], in which the old way is seldom completely and absolutely discarded; the new form does not always suddenly become dominant, but gradually begins to prevail; the old forms ensure development to a lesser extent than the new ones and for this reason the new form, over time, occupies an increasingly important place. Such character of the *Aufheben* of the old form also makes possible a regressive development, the restoration of the old forms. The dialectic of content and form is brilliantly manifested in the process of constant renewal and progress of society.

As indicated in (Frolov, 1984, pp. 85-86) , form and content are categories that "(...) reflect the interconnection of two aspects of natural and social reality: a set ordered in a certain way of the elements and processes that they form the object or phenomenon, that is, the content, the mode of existence and expression of this content and its various modifications, that is, the form. The concept of form is also used in the sense of the internal organization of content, thus acquiring successive development in the category of structure the problem of form. In pre-Marxist philosophy, especially in idealist philosophy, form was reduced to structure, and content was identified with a certain unordered set of elements and properties (with "matter"), which contributed to the fact that during a long historical period, idealistic representations about the primacy of form over content were consolidated and preserved. In the materialist dialectic, structure and internal ordering are seen as necessary components of content. As the structure and organization change, the content of the object and its physical and chemical properties change substantially. By fixing the multiple modifications of the content and the modes of its existence and manifestation, the form also has a structure. The interaction of the content and the form necessarily includes in the development process both the action of the different components of the content on the form and those of the form on the content, taking into account the objective subordination of the content and the form. In the

interaction of content and form, content represents the governing, determining side of the object, and form, the side that is modified, changes depending on the change in content and the specific conditions of its existence. In turn, the form, possessing relative autonomy, exerts an inverse active influence on the content: the form that corresponds to the content accelerates its development, while the form that ceased to correspond to the modified content slows its development. The interrelation of content and form is a typical example of the interconnection of dialectical opposites that are characterized both by their unity and by the contradictions and conflicts between them. The unity between content and form is relative and fleeting; mutual conflicts and contradictions inevitably arise in the course of development. As a result, the lack of correspondence between the content and the form appears, which is ultimately resolved with the "dispossession" of the old form and the emergence of a new one, appropriate to the modified content. The emergence, development and overcoming of contradictions between content and form, the struggle between them (mutual transitions of content and form; the "filling" of the old form with a new content; the inverse action of the form on the content, & c.) constitute an important component of the dialectical theory of development. The interrelation of content and form in the process of development of society is particularly complex and contradictory in the dialectical sense. The contradictions between content and form in the spheres of the *mode of production*, the *base* and the *superstructure*, and the *economy* and *politics* constitute an extremely important driving force for social development. " In addition, he points out that "In thought, content and form are fundamental concepts of logical science. In the materialist dialectic as logic (Dialectic Logic) the content of thought is understood as the natural and social reality in the aspect in which it appears before us as an object of theoretical-scientific thought: in the form of a set of concepts, representations, theories, various abstractions and idealizations, which are established in the course of the historical development of knowledge. The forms of thought are various modes of action of the social subject with the object in the ideal plane, oriented to reproduce the regularities and

properties of objective reality in the content of thought (categories, ascent from the abstract to the concrete, different forms of relations, & c.). The set of thought forms organizes the cognitive content in a certain way and guides the advancement of the subject's thought in the processes of obtaining new knowledge.

VII. EQUIVALENCE BETWEEN ESSENCE AND CONTENT IN SOVIET MARXIAN PHILOSOPHY

Within Marxism, it has been historically assumed that the *essence - content* and *essence - phenomenon* category pairs are equivalent to each other, which simply live in different worlds. In what worlds? To determine this, let us help ourselves by studying some of the reflections within the research carried out by Rosental in 1961 entitled *The problems of dialectics in Marx's CAPITAL*, marking with bold and italics the specific components of the reflection that will be analyzed after making reference to it (in case it is pertinent to add something to the reflection studied).

“Therefore, the concepts, which reflect the concrete reality, must be linked to each other and transform into each other because otherwise they would not faithfully reflect the reality in perpetual development. All this explains why Lenin considered that the essential content of logic resides in the relationships between concepts, in their conversions and in their connection. ” (Rosental, *The problems of dialectics in Marx's "THE CAPITAL"*, 1961, p. 414) .

“ This is how it is, as Capital shows, how the categories of phenomenon and essence express degrees, the deepening of knowledge, which goes from external and superficial aspects to internal and essential aspects. This movement that goes from the phenomenon to the deepest essence is the one that confers a dialectical character to the process of knowledge. ” (Rosental, *The problems of dialectics in Marx's "CAPITAL"*, 1961, pp. 279-280) . Here it is implied that essence and

phenomenon are theoretical descriptions of the evolutionary process of knowledge.

" We have just examined the logical relationship of the categories of chance and necessity. But these categories, which fix particular aspects of the whole, are closely linked by relations and conversions with categories such as the essence and the phenomenon , the singular (or the particular) and the general, the content and the form, the cause and the effect, interaction, etc. For example, the relationship between value and price is intimately reflected in the mutual connection, not only of the categories of necessity and chance, but also of the essence and phenomenon, the general and the singular, the of content and form, etc. The problem of essence and phenomenon is closely linked to that of the abstract and the concrete. Linking the essence with the phenomenon, the law with its concrete forms of expression, supposes an advance from the abstract to the concrete. The intermediate links on which Marx insists so much are discovered precisely in the course of this advance, which will be discussed later. " (Rosental, The problems of dialectics in Marx's "THE CAPITAL", 1961, p. 446) . Here it is made explicit that there is a conversion between the pairs of categories, among which are the two pairs of categories that are of interest in this research.

"For example, if the category of content is directly linked, in dialectical logic to the category of form, this is not due to arbitrariness, but because, in the actual phenomena and processes themselves, the aspects that are reflected in the concepts of content and form do not exist without each other and they mutually penetrate, at the same time that they oppose each other . " (Rosental, The problems of dialectics in Marx's "THE CAPITAL", 1961, p. 440) . Here he explicitly establishes the direct link between content and form, as well as its gnoseological foundation. In this sense, it would seem to imply that the categories "content" and "form" are categories used to study the historical trajectory of the phenomena and processes

of reality; However, this still does not resolve the question of which sphere of analysis the essence-phenomenon pair belongs to.

" The value (the content) and the exchange value (the form) constitute a unit. The exchange of commodities collides with the limits of an outdated form of value and demands the advent of a new, superior and more complete form, which engenders a contradiction between content and form. " (Rosental, The problems of dialectics in Marx's "THE CAPITAL", 1961, p. 442) . Here we see the same implication noted with respect to page 440.

" If Kant is believed, the phenomenon and the essence, the singular and the universal, constitute two worlds without any link to each other, totally separated from each other. totally separated from each other . For the "empiricist" idealists (Berkeley, Hume and others), sensations constitute the only reality, and outside of them

there is nothing else. For all idealists, in a word, the problem of the phenomenon and the essence of what is singular and the universal, the sensible and the abstract, was insoluble. " (Rosental, The problems of dialectics in Marx's "THE CAPITAL", 1961, p. 253) . When mentioning Kant, mentioning the categories of "the singular" and "the universal" and describing an epistemological problem that the idealists cited by Rosental could not solve, it is plausible to consider that the essence-phenomenon pair are categories used to study the historical trajectory of historical phenomena and processes as a historical trajectory of the evolution of thought.

"To know the price of the merchandise, no analysis is necessary, but to know the value as a basis for the price, a scientific analysis is essential. With regard to the forms of expression and the base, Marx writes: "The first breed of one directly and spontaneous as mental forms that develop on their own, the second is the science that has to find out." Consequently, the phenomenon and the essence indicate the degrees of deepening of knowledge . Marx writes that, to know, for example, the

hidden base, the secret of the salary, it took a long historical period, but once known this base nothing is easier to understand b need for this form of expression.

" (Rosental, The problems of dialectics in Marx's "CAPITAL", 1961, pp. 264-265) .

This reflection would seem to verify the inferred implications regarding page 253.

In fact, the same author, who is a compiler of *the Philosophical Dictionary* of 1965, as well as earlier and later versions^[9], points out the following in this dictionary regarding the philosophical category of *phenomenon* :

"(From the Greek φαῖνόμενον : representation, phenomenon). ***Concept that designates what is given to us in experience and we know through the senses . In Kant's philosophy, the phenomenon in principle differs from the noumenon, which is beyond the limits of experience and is not accessible to the contemplation of man .*** Kant, through the concept of phenomenon, tried to radically separate essence and appearance, considering the former unknowable (Agnosticism). From the point of view of dialectical materialism, there is no sharp boundary between phenomenon and essence; the essence comes to be known through the phenomenon. (*Phenomenalism , Phenomenology*). " (Rosental & Iudin, *Philosophical Dictionary*, 1971, p. 171) .

The previous reference also seems to confirm what has been established about the essence-phenomenon pair when studying (Rosental, The problems of dialectics in Marx's "THE CAPITAL", 1961, p. 253) .

Thus, it is possible to conclude that:

1. ***Content - Form are categories used to study the historical trajectory of the phenomena and processes of reality.***
2. ***Essence - Phenomenon are categories used to study the historical trajectory of historical phenomena and processes as a historical trajectory of the evolution of thought.***

**VIII.TOWARDS THE DIFFERENTIATION AND
GENERALIZATION OF THE IMMANENT DIALECTIC TO THE
PAIRS AND BETWEEN THE PAIRS OF THE ESSENCE-
PHENOMENE AND CONTENT-FORM CATEGORIES
THROUGH THE BOHR-MARX PRINCIPLE OF
CORRESPONDENCE AND THE GENERALIZATION OF THE
BOHR-MARX COMPLEMENTARITY PRINCIPLE**

VIII.I. Differentiation and Generalization

What is the *Bohr-Marx correspondence principle* ? It is the *principle of correspondence* stripped of its idealistic garb by the Soviet school of Marxian philosophy, which stated it in the following terms:

“It is one of the fundamental methodological principles of the development of science; its philosophical meaning lies in expressing the process of the movement of knowing that goes from the relative truths to the absolute truth, more and more complete. It was first formulated during the period of the total collapse of the concepts of classical physics (Bohr, 1913). According to the principle of correspondence, every time there is a breakdown of scientific conceptions, the fundamental laws of the new theory created as a result of said breakdown, always present such characters that, in an extreme case, if the appropriate value of certain characteristic parameter inserted in the new theory, are transformed into laws of the old theory. For example, the laws of quantum mechanics are transformed into laws of classical mechanics when the magnitude of the quantum of action can be neglected. The validity of the principle of correspondence can be registered in the history of mathematics, physics and other sciences. It reflects the connection, subject

to law, between the old theories and the new ones, derived from the internal unity existing between qualitatively different levels of matter. Such unity not only conditions the integrity of science and the history of science, but also the immense heuristic role of the correspondence principle in entering a qualitatively new sphere of phenomena. The scientific interpretation of this principle allows to discover the dialectic of the process of cognition, it allows to demonstrate the inconsistency of relativism. " (Rosental & Iudin, Philosophical Dictionary, 1971, p. 375) .

Entering the subject, it must be said that in the previous section the theoretical equivalence between the essence-phenomenon and content-form pairs of categories was determined, however, it is also within the reasons for their equivalence that the reasons for their differences are also found. .

What was previously determined is that the essence-phenomenon pair belongs to the objective world, while the content-form pair to the subjective one (which, as it was implied, is nothing more than the objective delayed in time and stagnant in the individual's head.).

However, part of the effort and need to systematize dialectical logic [which is not only a personal effort, but also an effort previously attempted on a philosophical level by the entire school of Soviet philosophy for approximately seventy-two years (from 1917 to 1989), by the great Mexican philosopher Elí de Gortari and others] implies a greater specification in the description of natural and social phenomena, so that if you want to fill all the concepts of science with dialectical-materialist philosophy, it would not seem convenient express in only two categories the description of, for example, systems with strange attractors in the meteorological context. This would imply, for example, greater restrictions in the design of the explanations of the experimental results, these restrictions being of an artificial nature and, in these circumstances, also useless and counterproductive [artificial in that there does not seem to be any real law that prevents it, useless because they would not seem to be able to contribute anything in systems that cannot be described

logically-formally (where dichotomies are hegemonic) and harmful because precisely because of the richness of their complexity, chaotic systems cannot be modeled logically-formally, so these restrictions they would imply restricting the power to optimize the realism of the explanation about this or that natural or social phenomenon].

The above applies, both at the level of the sphere of action of the essence-phenomenon pair and that of the content-form pair, that the analytical layers that can be designed to build the material with which the *analytical synthesis will* be carried out are expanded [to which throughout (Nabi, 2021) is called by Marx and Rosental simply as a *synthesis*] of the natural and social phenomena and processes studied, *ie* , it allows to build more "tailored" the material with which it is intended to study from different angles feasible to the natural or social phenomenon in question. Thus, the generalization of abstract-scientific categories of thought always offers advantages that are not always immediately perceived in temporal terms.

Therefore, the proposal that is made here, conceptually simple, but it is expected that it will be of operational utility when systematizing the dialectical-materialist philosophy to direct scientific practices under it and unify the sciences under the same philosophical paradigm, is that a category is built dual "artificial" (insofar as it does not belong to the classical basis of Marxism). This category, as anticipated, is made up of two relationships. The category in question, called here under the name of *essential content* , would serve, on the one hand, to refer to the content that is the most important within itself (in the sphere of *content - form*), while on the other hand in the context of the The study of the historical trajectory of the phenomena and processes of reality can be simply referred to as *essence* , which is its classic name in the sphere of action of the *essence - phenomenon* pair (thus avoiding generating any confusion or inefficient use of language). In the case of the other extremes of the pairs, *ie* , between *phenomenon* and *form* , such a question is not necessary because the concept of *appearance* exists . Examples of the usefulness of this conceptual

differentiation are represented by the investigations (Nabi, Some Reflections on the Negative Binomial Distribution II (A Theoretical and Applied Analysis), 2020) and (Nabi, A Multidisciplinary Interpretation of Characteristic Spaces, Characteristic Vectors and Characteristic Values , 2021) .

As can be seen, the logic used in the construction of the category described above is a generalization of the logic behind the Bohr-Marx principle of complementarity, since this concept has been built with a similar logic, adding the differentiating characteristic that it is the The same category is divided in terms of its use according to the historical trajectory that is analyzed (that of reality or that of its reflection in thought, the trajectory of logic) and no two categories are needed as such, since Marx's own logical framework allows this because of the way in which the pairs "essence-phenomenon and content-form", "historical trajectory and logical trajectory" are linked. That is why here it is considered fair to call it the Bohr-Marx complementarity principle, since this generalization is also added to the work done on this principle by the legendary Soviet school of Marxian philosophy.

However, there is one last theoretical pitfall to be resolved. The classic definition of appearance establishes that it is the "External Manifestation, given directly to the senses, of the essence of things or, more accurately, of some part of the essence. In this sense, the appearance is equivalent to the phenomenon. In it there is a subjective moment: the phenomenon expresses in an inappropriate, disfigured way, the essence of the subject (an object partially submerged in water seems broken, the Sun seems to revolve around the Earth, etc.). However, it would be wrong to reduce appearance only to such a subjective moment, since in one way or another it is linked to the objective essence, of which it is a manifestation. That very subjective element that gives rise to a wrong representation of the essence of the phenomenon is often conditioned by objective factors. It is up to knowledge to reduce appearance to its essence and explain how it manifests itself in the first (*Essence and phenomenon*). " (Rosental & Iudin, Philosophical Dictionary, 1971, pp.

20-21) , which is in flagrant contradiction with what has been said above, or at least in appearance.

Thinking about this problem in the context of complex systems and latent variable models (such as the hierarchical models used in *probability theory* and alternative models to give deterministic explanations of Quantum Mechanics such as the models that conceive the quantum theoretical framework as rigorously probabilistic or models such as that of Louis- Victor de Broglie), to mention examples in the line of research of those who have the pleasure of addressing the reader, it is easy to realize that, in general, when penetrating the phenomenology of processes that orchestrate reality, this penetration has a greater degree of mediateness (and less immediacy) in the aforementioned contexts than in classical contexts [with the sole exception of classical statistical mechanics, which was very influential in the appearance of the probabilistic approach to quantum mechanics (on which there is abundant literature in the English language and available on the web for free)], so the same thing happens as described when raising the theoretical need for a category that synthesizes *essence* and *content* .

Thus, for classical cases the categories *appearance* and *phenomenon* will remain equivalent, while for cases of complexity and probabilities (here quantum mechanics is considered as a probabilistic system -which in some way is a natural generalization of Max Born's interpretation of the Schrödinger wave function and this is precisely the genesis of the *quantum theory of probabilities* mentioned in the previous paragraph). This completes the generalization advanced in the title of this section based on the Bohr-Marx correspondence principle, closing in this case with the philosophical foundation of the generalization made through the correspondence principle, the most important of both principles. . All these categories are meeting places between elements of the study phenomenon, that is, they are relationships, and the more complex such relationships are, the greater the

need for the generalization of abstract categories that describe such and such complex phenomena of a natural nature. or social.

Note that both *Essence* , *Form* and *Content* are levels of abstraction in the study of the objects that make up reality (in the process of analyzing the thing) and, consequently, also in the study of the manifestation of the thing, in the study of how an object of reality is immediately apprehensible to the senses, *ie* , in the study of the phenomenon through which an object of reality is expressed (when this reality is social, it is called in Sociology as a *social fact* , following the terminology of Émile Durkheim), a reality for which *what is real* in it always has a material foundation.

Just as the first generalization made was justified based on the two referred investigations [one of an abstract nature and the other concrete-abstract, in the sense defined in (Nabi, Lecciones de Gnoseología Marxiana I, 2021) by Enrique Dussel as the concrete thought] Thus, the second generalization will be justified, relative to differentiating the categories "phenomenon" and "appearance".

VIII.II. First Case Study: Hidden Relationships between the Earth's Magnetic Field and the Weather System

Then analyze the above in relation to the study carried out on the links between the Earth's magnetic field and the climate by (Kilifarska, Bakhmutov, & Melnyk, 2020) , which is obviously in itself a complex analysis.

To carry out the above work, it is necessary to introduce some concepts. The first of these is, of course, the concept of climate^[10]. Based on (Kilifarska, Bakhmutov, & Melnyk, 2020, p. 43) , *climate* should be understood , strictly speaking, "(...) the *prevailing meteorological conditions (including temperature, wind direction and speed, amount of precipitation, clouds etc.) for an extended period, i.e. 30 years or more* . In addition to the atmosphere, meteorological conditions are also influenced by the other components of the climate system, which include the hydrosphere, the cryosphere, the earth's surface with its different absorptions and emissivity, and the biosphere. " In the previous reflection, the phenomenon of study is the climate, for

whose study a system known as *the climate system* is generated and within such system it is considered, based on the empirical experience of the union, that a large sample is from 30 observations. In a broad sense, *climate* should be understood as the state of the climate system in terms of its averages and its deviations from such averages, in a given time interval and a certain geographical location.

The elements of a climate system continually interact with each other, but they all depend on the volume of solar radiation they absorb. According to the authors, "(...) historically observed climatic variations had been suggestively attributed to changes in the intensity of solar radiation (Herschel, 1801)." (Kilifarska, Bakhmutov, & Melnyk, 2020, p. 44) .

What follows is to define what the *forcing factors* are , as well as which of these are defined as external. Regarding the first, it is read that “ *All environmental processes that influence the Earth's climate are called forcing factors* . Which can be external to the Earth or generated in some of the components of its climate system (atmosphere, hydrosphere, cryosphere, etc.). The existing differentiation between external and internal forcings is relatively controversial and depends on the definition of the concept of climate system. ” (Kilifarska, Bakhmutov, & Melnyk, 2020, p. 44) , while regarding the latter it is verified that “ *Based on the IPCC definition, external forcings are forcings related to: (i) variations in magnetic activity and radioactive from the Sun; (ii) variations in the intensity of the flow of particles (of solar, galactic or extragalactic origin) continuously bombarding the Earth's atmosphere; (iii) lithospheric activity (ie volcanoes; plate tectonics and related movements of continents and changes in their relief and/ or climatic zones; regional geomagnetic field changes, etc.); and (iv) changes in the orbital parameters of the planet. Internal forcings, in turn, include: (i) oceanic circulation; (ii) planetary albedo; (iii) atmospheric composition; and (iv) life systems and particularly human activity* . As noted above, all components of the climate system receive their energy from the Sun, so the following sections emphasize various

manifestations of solar variability and their possible influence on climate. " (Kilifarska, Bakhmutov, & Melnyk, 2020, p. 44) . A synthetic taxonomy of such factors is presented below.

Source: (Kilifarska, Bakhmutov, & Melnyk, 2020, p. 43) .

Take as simply the role played by lithospheric activity^[11] in the variations of the climate, specifically (since it is not the only one within that set of factors) the movement of the tectonic plates. Since the previous example was chosen since it allows an easier understanding since it implicitly evokes geometric intuitions under which most of the people have been formed. Next, two images are presented, in the first the tectonic structure of the planet is broadly evident, while in the second it is revealed

From a perspective

Source: (Kilifarska, Bakhmutov, & Melnyk, 2020, p. 56) .

While the second image shows the centuries-old variations in the temperature of the air surface in winter at different scales (in the red and gray lines) and the intensity of the geomagnetic field (in the black line). These are only two of the elements (just)

of the set of elements that, through a highly complex analysis, the referred authors manage to synthesize and capture in the form of research; This, obviously (due to the complexity of the study phenomenon -which has two components, the one related to its essence and the one related to the state of the measuring instruments, both factors coexist simultaneously in time-), does not exhaust the feasible explanations on the phenomenon studied, so it would be necessary to contrast the different investigations on the phenomenon in question to determine which of it has greater epistemological value. Of course, this research is alien to such ends and, instead, the complexity of the researchers' analysis serves to construct and answer three questions.

The first is, would it be possible to represent and explain through geometric intuitions the reciprocal action between the figures presented above through the exclusive use of the *content and form categories* ? The second is, would it even be possible to do it with one of them? And finally, what can the same be said about the joint analysis carried out by the authors throughout Chapter 3 and synthetically described by the image presented here above titled *OUTLINE* ? Obviously the answer is negative. Not to mention his ability to join the conduction of some scientific research on the subject (in the same sense that Marx conducted his investigations in Political Economy), in a context in which there is a large number of variables [and, with it, statistical criteria for classification and prediction available - for all this the probability distributions and, consequently, probability theory are implied)] and a huge number of natural sciences involved [with what all this implies at the level of compatibility of frames theoretical and instrumental (since each of these frameworks imply contexts, theoretical formulations, different types of idealistic clothing of scientific categories -since their coining was carried out from non-Marxian philosophical perspectives-)].

Take now only the layers of the earth as an example, as shown in the image below.

Source: (A Blog of Drawings, 2021) .

The image above allows you to visually express three fundamental ideas. The first is that the essence, although it is only one, is the meeting place of two objects (be they simple or composed -of several elements-), in this case the inner core and the outer core.[\[12\]](#). The second is that, in terms of the study of the phenomena that occur inside the Earth (known as *Internal Geodynamics*), the earth's crust expresses the component of the *form* that is less relevant to the study, so relatively irrelevant that it is not taken into account. Consideration, isn't the crust also part of the *shape* that encloses the nucleus (which is the object of study interest) in which the Earth presents itself to the researcher's eyes? Obviously, and then why is his study rigorously scientific in principle (beyond gnoseological and methodological details that may exist) and simultaneously that of Marx when the latter did consider the immediate *form* (the price) in which the phenomenon of analysis (the commodity, in the context of the process of mercantile exchange) as a relevant component (but not essential)? The answer to this question can be formulated as follows: on the one hand, because the essence of the political economy system (recalling the definition of *essence* as a "place") has a nucleus that harbors relationships that are both

quantitatively and qualitatively different; on the other hand, because as a result of the previous reason, the *phenomenon* manifests itself differently, *ie* , the essence is enveloped by a different content [in the geodynamic case the essence is not equal to content, while in the case of the economy political yes (however, someone could say that value is defined both in terms of use value and exchange value and that in such dual essence what is dominant is use value, so it would also become necessary to use the generalization carried out here on the category “content”) and this (that essence is different from content) implies (at least in general) that the studied systems will have a different structure and hierarchy] and, furthermore, in the geodynamic case there is a part of the *form* that is irrelevant for its study -the cortex- by the very nature of the phenomenon, while in the case of political economy the price is not irrelevant), which proves the epistemological value of the concepts *pl anteados* (in the latter case to differentiate *appearance* of *phenomenon* or *form* for certain study cases).

With the generalization previously presented, it is possible to model phenomena and processes in a more robust and efficient way, as well as to efficiently strengthen the design of experimental practices for the empirical confirmation of the designed models. The above is affirmed since the generalizations previously exposed make Marxian philosophy more easily adaptable to the object of study because, without losing the rigor of everything exposed in the *Lessons of Marxian Gnoseology I* (and of what is exposed in the others), allows generating as many subdivisions of the form or phenomenon as needed (*ie* , according to the theoretical and empirical needs of the research).

In relation to the above, note that in Mathematics the objects of study of Topology and Geometry are, in terms of their structure (both internal -topological- and external -metric or purely geometric-), analyzed through a wealth of categories (referring to the structure of the object [\[13\]](#) which goes far beyond the mere categories of *open sets and closed sets* defined in terms of *complements* . So, come into play other

concepts such as *neighborhood* , *border* , *dimensioning* , *connectedness* , *disjoint sets* , among others. Of course, this abstract modeling of the relationships observed in nature and in society is of a logical-formal nature and, consequently, the categories appear static and immutable, so their epistemological potency is very limited, but it is not valuable. lose sight of the quantitative wealth of abstract categories with which they approach the abstract modeling of internal (topological) and external (metric) forms, which must be taken up by Marxism.

However, it is possible to go even further with the aforementioned questions and ask that if value is the essence of goods, how can they be grouped and hierarchized together, through the use of the categories *essence* and *phenomenon* [together with the others? gnoseological aspects pointed out in (Nabi, Lecciones de Gnoseología Marxiana I, 2021)], the two types of price, *ie* , the price of production and the commercial price (the interest rate and rent could even be added to this questioning)? This grouping and joint ranking at a higher level of detail (since it would simultaneously consider the production price together with the commercial price) is possible with the use of the generalizations previously exposed.

VIII.III. Second Case Study: Dynamo Theory

VIII.III. I. General aspects of the dynamo theory

VIII .III. II Pseudo-forces

What are fictitious forces? This concept is, as will be seen, of capital importance in the process of understanding natural phenomena from a dialectical-materialist perspective. To do this, take the example extracted from (StackExchange, 2012) , for which in turn some preliminary concepts must be synthetically introduced.

In accordance with the gnoseological descriptions set out in (Nabi, Lecciones de Gnoseología Marxiana I, 2021, pp. 184-185) used by Marx at the time of constructing the simple and extended reproduction schemes, since the categories that will be exposed below are Relating to non-inertial reference frames, the inertial reference frames must first be introduced.

The inertial reference systems are those that are true not in the laws of motion of the mechanical classical, specifically the second law, which states that a body which is not subject to any interaction (free or insulated body) remains at rest or travels with constant speed; These systems would be the equivalent at the level of physical systems with respect to capitalist political economy systems with simple reproduction of capital. Thus, non-inertial reference systems would be physical equivalents with respect to systems with expanded reproduction of capital, and are precisely defined as those in which the first law described above is not fulfilled.

The above can be synthesized technically by using the theoretical framework of the special theory of relativity: "The special theory of relativity is based on the following postulate, which is also satisfied by the mechanics of Galileo and Newton. If a coordinate system is chosen so that, relative to it, the physical laws are valid in their simplest form, the same laws will also be valid relative to any other coordinate system that moves in uniform translation relative to . We call this postulate the "Special Principle of Relativity." The word "special" is intended to imply that the principle is restricted to the case in which it has a uniform translation movement in relation to I (, but that the equivalence of and does not extend to the case of non-uniform movement of relative to . " (Einstein, 2005, p. 66)

Once the above concepts are clear, it is possible to proceed with the exposition of the content discussed in (StackExchange, 2012) on fictitious forces.

As in the mentioned place it is pointed out, whenever a system is seen from an accelerated frame (ie, inertial reference system), there is a "false force" or "pseudo force" that seems to act on the bodies. It should be noted that this "force" is not actually a force, rather something that appears to be at work.

Consider the following example. Suppose you are accelerating in space (expressed in the vector \vec{a}) and you see a small ball floating in that space. It is known in advance that space is a place free of fields (which are those that generate forces), that is, a perfect vacuum, without electric, magnetic, gravitational, and / or other fields, and it follows that the ball cannot be accelerated. However, from the perspective of the observer, the ball accelerates with acceleration \vec{a} , ie, at \vec{a} towards to \vec{s} in relation it or \vec{n} with the observer. Two things can be deduced from the above: 1) that the ball is accelerating, 2) that there is an unknown force \vec{F} , acting on the ball, which is precisely the *pseudo-force*.

Thus, according to (Lumen Physics, 2021), "What do taking off in a jet plane, turning a corner in a car, riding a merry-go-round and the circular motion of a tropical cyclone have in common? Each exhibits fictitious forces, unreal forces that arise from motion and can appear real, because the observer's frame of reference is accelerated or rotated." Although the use of the word "seem" may seem to have subjective implications (because someone could misunderstand it as an implication that the being of the phenomenon is a function of subjectivity), the previous reference is only describing the immediate transposition (the mediate in last instance is *the concrete thought*) in the psyche of the researcher of a concrete fact: the non-uniform acceleration of inertial systems affects measurements made with instruments designed for reference frames in which acceleration does not exist or occurs uniformly, which generate the impression (hence they are "pseudo" forces) that there are other forces involved that affect the measurements made by the instruments described above, when in reality it is a problem in the conception and design of the measurement instruments and not involvement of *forces*, in the sense

defined by theoretical physics[14], which affect the measurements made by said instruments[15].

Due to the aforementioned, the appropriate thing in gnoseological terms is, for this case, to readjust the theoretical framework under which such measurement instruments are designed (which leads in practice to modifying the instrument in question). Of course, in other cases it is the practice that leads to the modification of the theoretical framework.

Thus, the gnoseological foundation of the fact that Physics has traveled in the historical trajectory of the practical construction of the knowledge of pseudo-forces has multiple components. In the first place, mathematically speaking, as indicated in (StackExchange, 2012) , it allows to look at the world from the point of view of an accelerated frame (which involves the germ of dynamic systems) and to derive equations of motion with all values relative to that framework, which is not only a gnoseological improvement of a logical-formal nature, but also in terms of the spirit that animates the *dialectical-materialist philosophy* , which precisely expresses the universal laws of movement, beyond purely movement. physical; The latter is so since the purely physical movement is only a moment of the dialectical-material movement in general of reality, as can be verified in the analysis carried out in all the work of the famous Mexican philosopher of science Elí de Gortari entitled *Dialectic of Physics* .

An analogous situation occurs in the economic system in terms of the effect that capitalist competition has on labor-values [which are the effect of the action of labor, which is the force that creates value (whose analogue in the physical system is energy)], since, as a result of such deformation, production prices are generated. These prices of production, which are the effect of the action of a pseudo-force of the production process (specifically of circulation), which is not a creator of value, but a consequence of the dynamization of the political economy system through competition capitalist generated by the need to realize the values produced and

resume the productive cycle. Thus, in both sciences, the above not only gives a more realistic and holistic interpretation of reality (in terms of its dynamics, its movement), but also, in the case of Physics, it simplifies the empirical estimates [this last pointed out in (StackExchange, 2012)]. Finally, what completes the gnoseological foundation of its inclusion in the theoretical framework of Classical Physics is the fact that its empirical estimation is carried out precisely, according to the last source referred to, multiplying the mass of the body in question by the acceleration of the frame, in the opposite direction of the *force* , which denotes, even at the conceptual level, that it does not express the inclusion of a force in the analytic-synthetic study[16] of motion, but rather the inclusion in the category system of the role of non-uniform acceleration in the result obtained from the measurements made.

VIII.III. II. The second case study as such

Study another example. Within the framework of the *dynamo theory*[17], it is suggested that both *convection*[18] in combination with the *Coriolis effect*[19], are the generator set of the Earth's magnetic field. Research in recent decades indicates that even though the solid inner core has temperatures that are too high to maintain a permanent magnetic field, it is likely that it acts as a stabilizer of the magnetic field generated by the liquid outer core.[20].

The above does not reflect solely

The previous example also allows another series of reflections. The main difficulty in distinguishing the philosophical categories raised that the structures that contain the different sets of relationships and characteristics mentioned is that these complex structures interact with each other (by means of which the elements of the different sets mentioned are related) in a dynamic and non-linear way, causing these relationships to result in the generation of new elements, of new information within the system, which is self-organizing as a result of complex systems being self-organizing.

Thus, the *Essence* interacts with the *Form* in a mediate way, through the content (which interacts with both as what is mediate in the first instance, ie, in an immediate way - understood as less mediate, not necessarily as immediate simply and simply-) . This complexity also lies in the fact that all these elements mentioned are, as it would be popularly said, "together and scrambled", but not scrambled enough to make a logical analytic-synthetic separation impossible, since their unity is relative, not absolute[\[21\]](#).

As said, the phenomenon is the way of manifestation of the thing, of the object. It expresses at least minimal features of the essence (these are the internal links it contains) and the external links it contains are the links of form and content. The content has elements that are more exterior and related to the forms, but also elements that are more interior and related to the essence (the radius will depend on each specific object). In fact, in other geological classifications, as can be verified in (Gass, Smith, & Wilson, 2008, p. 52) , the Earth's mantle is separated into two categories, namely, "upper mantle", which is the part of the mantle closest to the crust, and dry "mantle", which is the part of the mantle closest to the core, which is immediate to the outer core.

Thus, the phenomenon analyzed very superficially is what in this research is called *Appearance* , which leads to misunderstanding objects. As the analysis of the object of study is deepened, one goes from its phenomenology to knowing its form, content and finally its essence, where it is finally apprehended by the intellect.

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[1] Equilibrium should be understood as that state of an object in which its internal general component forces are found and compensate by mutually destroying each other, without reaching absolute annihilation, only relative.

[2] Aspect that before the observer presents a being, an existence.

[3] Note that in essence there is a greater tendency to homogeneity. This is to guarantee a minimum stability in the internal structure of the object as a whole, ie, seen as a whole.

[4] In the case of the essence, in general it does not turn out to be accessible to the senses immediately, but rather mediate. The reader will notice that the characteristics with which the phenomenon has been defined are exactly the opposite, qualitatively speaking, to those used to define the essence.

[5] As the reader will surely know, *Heisenberg's uncertainty relation* establishes that "(...) the impossibility that certain pairs of observable and complementary physical quantities are known with arbitrary precision. Succinctly, it states that certain pairs of physical variables, such as the position and momentum (momentum) of a given object, cannot be determined simultaneously and

with arbitrary precision in quantum physics. " (Wikipedia, 2021) . Regarding the uncertainty relationship, it must be stated that it is a "Thesis, formulated by Heisenberg in 1927, on quantum mechanics about the impossibility of simultaneously determining the position of a particle and its momentum with exactitude. The uncertainty relationships are expressed under the aspect of quantitative relationships between the so-called indeterminacies of conjugate variables; of position and momentum, as well as time and energy. The smaller the indeterminacy of the particle's position, the greater the indeterminacy of its momentum, and vice versa. An analogous relationship exists between the determinations of the moment of time and the energy of a particle. The relation of uncertainty constitutes an objective characteristic of the phenomena of the microcosm related to the corpuscular and wave nature of the same; the "indeterminacies" are inherent to the real state of the microobject and do not denote, in any way, any limit of knowing. Heisenberg and Bohr inferred the uncertainty relation of the influence of the instrument - determining the position of the particle - on the impulse of the latter (for example, of the influence of the hole in the diaphragm through which the electron passes, on the impulse of the electron) and the influence of the instrument determining the momentum of the particle on the position of the latter in space. In a similar way, the action of the instruments that measure time on the energy of the particle is described, and the action of the instruments that measure the energy on the possibility of the exact determination of time. From the relation of uncertainty, philosophical conclusions of a positivist sense have been inferred, such as the denial of the causal conditionality of the states of the elementary particle and the denial of the objectivity of the microcosm, of its independence with respect to cognitive activity (the so-called idealism " instrumental "[Instrument]). The criticism, from materialistic positions, of such idealistic distortions of quantum mechanics, has contributed to clarify the true meaning of said mechanics. " (Rosental & Iudin, 1971, p. 398) . Special emphasis should be placed on the fact that "The uncertainty relationship constitutes an objective characteristic of the microcosm phenomena related to their corpuscular and undulatory nature; the "indeterminacies" are inherent to the real state of the microobject and do not denote, in any way, any limit of knowing ", on which some issues must be mentioned. The first is to remember that the indeterminacy principle, which states that dynamic variables (such as position, angular momentum, linear momentum, etc.) are defined operationally, that is, in terms relative to the experimental procedure by means of which they are measures said variables, which shows that the intellectual birth of this principle was driven by Heisenberg's philosophical positivism, although this did not mean that he did not discover an objective fact of physical reality; however, not in the sense that he philosophically interpreted it. It shows its philosophical positivism insofar as it is a conception of the sciences in which the gnoseological validity of the methodology used is determined exclusively by the experimental results; in fact, the position will be defined with respect to a certain reference system, defining the measuring instrument used and the way in which such instrument is used (for example, measuring with a ruler the distance from such point to the references) . However, when the experimental procedures by means of which such variables could be measured are examined, it is verified that in each experiment the measurement will always be disturbed. Indeed, if, for example, we think about what would be the measurement of the position and velocity of an electron, to carry out the measurement (*ie* , to be able to "see" the electron in some way) it is necessary that a photon of light collides with the electron, which is modifying its position and speed; that is, by the very fact of carrying out the measurement, the experimenter modifies the data in some way, introducing an error that is impossible to reduce to zero, no matter how perfect our instruments are; however, it is necessary to mention the fact that if the position of a particle or immaterial point is measured, determining the perturbation generated by the particle in the gravitational field that surrounds it, the error can be reduced to zero. Because every particle is affected in different measures by the fields generated by others.

[6] Here the word "global" has been replaced by "general", so as not to imply that the essence is the only absolute determinant of the object, far from it, but it is categorically general. We will expand on this later.

[7] On most occasions he expresses it minimally, and never in its entirety.

[8] The translation of the work of Soviet authors called this process "overcoming", therefore it will be necessary to make certain logical, theoretical, linguistic and historical clarifications. "Overcoming" seeks to be precisely the translation of what is known in Hegel as *Aufheben*, which according to Hegel himself "(...) has a double meaning in the [German] language: it means both the idea of preserving, maintaining, and, at the same time, that of making cease, putting an end." (Hegel, 1968, pp. 97-98). On these questions must be added. It must imply relative but not absolute elimination, but this in turn implies conservation and, again, for there to be movement, conservation cannot be total either, because then everything would be static, so it must also be relative (not in the same magnitude necessarily). Thus, Hegel's *Aufheben* must in turn involve three components or moments: eliminate, conserve and overcome, not just eliminate and overcome. However, it does not seem that any such *ad hoc* German word existed or exists, so it could be thought that Hegel sought to imply "conserve" in the transition from "eliminate" to "overcome" (which are the two meanings of the word German *Aufheben*). Thus, "In the *Phenomenology of the Spirit* the subject goes through different configurations (*Gestaltel*), in each of which the previous one has been eliminated-conserved-surpassed. The new configuration is the overcoming of the previous one." (Dri, 2007, p. 48). On the other hand, as he also points out (Dri, 2007, p. 49), care must be taken when studying the Hegelian system, specifically in the use of the word "overcoming" and the word "synthesis". The synthesis occurs between two opposites, completely heterogeneous, it is the logical equivalent of what would be popularly called "mixture", such as mixing two flavors to generate a new flavor, that would be equivalent to making a synthesis. However, overcoming is not at all mixed because it does not take place between heterogeneous but within the scope of a totality [and the totality as such is homogeneous, independently internally there is heterogeneity (this is equivalent to the divergence between the macrostate and the microstate posed by both the process of transformation of values into prices of production and the wave-particle duality posed by Quantum Mechanics)], that is, of a subject, be it an individual or a group, since an individual can be analyzed as a whole (*ie*, as a system, provided its components are known in a sufficient proportion).

[9] If the reader wishes to know the importance of Rosental in Soviet philosophy, the following links can be consulted:

- 1) Philosophy in the Soviet Union: <http://filosofia.org/urss/index.htm>
- 2) Philosophical Biography of Mark Moisevich Rosental: <http://filosofia.org/urss/qfq.htm#rose>

[10] This and all the concepts used in the authors' research are aligned with the theoretical framework of the IPCC (Intergovernmental Panel on Climate Change), established in 1988 by the World Meteorological Organization (WMO, for its acronym in English.) and the United Nations Environment Program (UNEP). Their reports cover scientific, technical, and socio-economic information relevant to understanding the scientific basis for human-induced climate change risk, its potential impacts, and options for adaptation and mitigation. This is verified in (Kilifarska, Bakhmutov, & Melnyk, 2020, p. Viii) and with the reading of the research itself.

[11] Relative to the lithosphere, which is the outer and rigid layer of the Earth, with a depth variable between 10 and 50 km, basically made up of silicates and made up of the crust and part of the mantle.

[12] Interestingly, speaking at the nucleus level of "interior" and "exterior" can lead to forgetting the fact that both are, ultimately, interior. This in the sense of being as a unit the deepest, most intimate component of the planet.

[13] And this fact is important, since here it is not affirmed that Marxism studies reality only with these two categories (*content* and *form*), much less that it only possesses these two categories, but rather to scientifically describe the historical trajectory of the phenomena and processes of reality

(they appear as phenomena, but in general they are a process -which has phenomenological manifestation among its characteristics-) it is necessary to generalize such categories in a harmonious way with the entire Marxian gnoseological edifice. This is so because humanity's knowledge of reality and the real is constantly evolving (for two reasons, the first is because its present knowledge of reality is always imperfect, the second is because reality itself evolves) and, consequently, it is necessary to strengthen the gnoseological framework for studying this reality and what is real in it, through the generalization of abstract categories produced by thought.

[14] In Physics these are defined, in general, as that cause capable of modifying the state of rest or movement of a body, or of deforming it. Thus, pseudo-forces are fictitious insofar as they are the result of the action of real forces, although they nevertheless distort the effect of the real forces in question. That is why they are also called *inertial forces* .

[15] Remember that, for the technological level of humanity at the time of writing this research, it has not been possible to make Relativistic Mechanics compatible with Quantum Mechanics (this kind of "alchemy" is the so-called *quantum theory of gravity*), as well as explaining why despite their apparent incompatibility (not only in mathematical but also gnoseological aspects) neither refutes the other and both have found increasing applications in nature and in society. Therefore, they are not well-defined (and they are hardly raised in a few pioneering investigations whose publications date at most a decade).

[16] In terms of an analysis and a synthesis or improvement, as can be seen from the research in (Nabi, Lecciones de Gnoseología Marxiana I, 2021) .

[17] "In physics, the dynamo theory proposes a mechanism by which a celestial body such as the Earth or a star generates a magnetic field. Dynamo theory describes the process through which a rotating, convecting fluid that conducts electricity can maintain a magnetic field on astronomical time scales. A dynamo is believed to be the source of the Earth's magnetic field and the magnetic fields of Mercury and the Jovian planets (...) The dynamo theory describes the process through which a rotating, convective, and electrically conducting fluid acts to maintain a magnetic field. This theory is used to explain the presence of magnetic fields of abnormal duration in astrophysical bodies. The conductive fluid in the geodynamic is liquid iron in the outer core, and in the solar dynamo it is ionized gas in the tachocline. The dynamo theory of astrophysical bodies uses magnetohydrodynamic equations to investigate how the fluid can continuously regenerate the magnetic field. ", He points out (Wikipedia, 2021) based on [Axel Brandenburg (2007), Scholarpedia , 2 (3): 2309. DOI: 10.4249 / scholarpedia.2309], which can be found at http://www.scholarpedia.org/article/Hydromagnetic_dynamo_theory .

[18] One of the three physical processes that transports heat between zones with different temperatures (this occurs only through materials, the evaporation of water or fluids; convection itself is the transport of heat through fluid movement) .

[19] The Coriolis effect is one of the pseudo-forces, fictitious forces or inertial forces that make up the set of pseudo-forces in Classical Mechanics and Relativistic Mechanics; however, the Coriolis effect should not be confused with the pseudo-force known as the *centrifugal force* . Como stated in (StackExchange, 2014) , 1 to centrifugal force is the force that physically a human being may experience, for example, to the stand at the edge of a huge carousel. In such a scenario, the person would feel a "force" (but as you know, do not rely solely on the senses, because they are misleading) seems would push the the outside , which actually is the result of it is some distance from the axis of rotation, which is being rotated [and such rotation generates an action that is in turn reaction of the initial action (performed by the *forces*) and distorts the final result of the action of the *forces* under study, without However, one should not lose sight of the fact that its action was not the creative action of the whole dynamics, but is a consequence of the fact that in the referential system there is non-uniform acceleration (as with any pseudo-force or inertial force); mathematically, at the level of classical mechanics, it is expressed as . Thus, the mathematical expression for *the Coriolis effect* is . Mathematical differences are due to their conceptual differences. Imagine that you are spinning on a merry-go-round (a carnival re-creation consisting of several seats arranged in a

rotating circle) , immobile with respect to the Earth. Now suppose you start walking toward the center of rotation at a constant speed. When on the edge (which expresses the edge of the merry-go-round, the part furthest from the center), the observer of the reference system referred to (the merry-go-round) moves at a tangential speed (the derivative of the position vector with respect to time and has the purpose of allowing to know the speed of an object moving along a path in infinitesimal time intervals), say v . When it is closer to the center, there is nothing to prevent to the observer move it with the same speed v , so v , although the observer perceives subjectively who is traveling in a straight line, actually is drifting course and traveling along a curved road. Thus, it is clear from the previous discussion that the Coriolis effect does not depend on position, only on the angular velocity and the angular velocity of the reference frame. Therefore, the Coriolis effect is observed pseudo-force in the context of the movement of a reference non-inertial qu and rotates in the direction of its radius r . That it does not depend on position reveals that it is not subject to topological considerations, but to metric (purely geometric) considerations, which is consistent with their being effects and not causes, *ie* , fictitious forces .

[20] See for example (Buffett, 2010) , research by Professor Bruce Buffett of the University of Berkeley, who is a specialist in dynamics and evolution of planetary interiors, including mantle convection, tectonic plates and planetary dynamos. This research not only supports what is stated here regarding the probability that the solid inner core serves as a stabilizer for the magnetic fields of the liquid outer core, but also points out a diverse series of philosophically important elements. In the abstract of the research document, the author begins by stating that "The magnetic fields on the surface of the Earth represent only a fraction of the field within the nucleus", a question that serves to clearly see the differences between form and essence. This claim is supported by the author based on the research of (Aubert, Labrosse, & Poitou, 2009, p. 1414) , which maintains that "Specifically, the most significant increase in the internal magnetic field that we predict is associated with the increase sudden power output resulting from the nucleation of the inner core, but the dynamo sits deeper into the core, thus greatly canceling out the increase in the core and Earth's surface, and diminishing the prospect of observing this event in the data of intensity of the paleo. ". In the same vein, the scientific news website *Science 2.0* collects the most important findings of the research carried out by Buffett, as well as its importance from different angles, as can be read in (News Staff, 2020) . As the news outlet notes, "About 60 percent of the energy generated within the earth probably comes from the exclusion of light elements from the solid inner core as it freezes and grows, he said. This constantly accumulates dirt in the outer core. " The previous statement is important in that it captures the notion that in essence always one of its two components will be the one that will, in general, mark the pattern of the evolutionary process of the thing, of the object analyzed.

[21] At least not in the genesis of the object of study.