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PERSPECTIVES OF CRITICAL EPISTEMOLOGY: THE FUNDAMENTAL QUESTION ABOUT A NEW SCIENCE

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Abstract

Many current problems surrounding science revolve around the complex epistemological framework that shapes a new vision of knowledge about reality. The traditional epistemological positions are characterized by the explanation of nature by means of concatenated facts; that is, as bricks attached to each other giving shape to the edifice of science. A conception of this nature showed that the idea of certainty was nothing more than a mere illusion, opening the way, on the contrary, to the idea of the uncertainty of knowledge based on the descriptions of quantum physics, also a product of the non-reductionist conception of reality, thus criticizing the specular representation. This article addresses the main problems surrounding the critical conceptions that the emerging epistemology reveals about knowledge, pointing towards a much more complex vision of reality.

Keywords: traditional epistemology, critical epistemology, complex epistemology, modern science, new science.

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PERSPECTIVAS DE LA EPISTEMOLOGÍA CRÍTICA: LA CUESTIÓN FUNDAMENTAL ACERCA DE UNA NUEVA CIENCIA

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Resumen

Varios de los problemas actuales acerca de la ciencia giran en torno al entramado epistemológico complejo que le da forma a una renovada visión del conocimiento sobre la realidad. Las posiciones epistemológicas tradicionales se caracterizaron por explicar la naturaleza mediante hechos concatenados; esto es, como ladrillos adosados que dan forma a su vez al edificio de la ciencia. Una concepción de esta naturaleza demostró que la idea de certeza no era más que mera ilusión, abriendo paso, por el contrario, a la idea de la incertidumbre del conocimiento con base en las descripciones de la física cuántica, producto además de la concepción no reduccionista de la realidad, criticando así la representación especular. Con el presente artículo, se abordan los principales problemas en torno a las concepciones críticas que la epistemología emergente devela acerca del conocimiento, apuntando hacia una visión mucho más compleja de la realidad.

Palabras clave: epistemología tradicional, epistemología crítica, epistemología compleja, ciencia moderna, nueva ciencia.

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*A knowledge is not the mirror of things or of the external world.
All perceptions are at the same time translations and cerebral
reconstructions, starting from stimuli or signs captured and codified by
the senses; (...) To the error of perception is added the intellectual error.*

Edgar Morin (2000)

Introduction. State of the Art: Modern Epistemology and Science

The epistemological critique of the last thirty years has centered around the characteristics of scientific knowledge, which has been built on Cartesian foundations through a fractioning thought, disseminated through the world by the worldview of the West as an axiomatic formula to unveil the intricacies of reality as truth.¹ Science and epistemology, as central tools of the so-called progress, fixed the nuclear problem of the production of knowledge in the postulates of logical positivism, at least after the 1930s.² According to these, the world is composed by facts, from which the pertinent language is extracted, logically to obtain the so-called “representation of reality”. In this way, a valid and infallible knowledge is obtained: science unveils the logical world because it discovers the framework of which it is made up. In turn, this allows to establish, gradually and safely, given the certainty of the knowledge it proclaims, a truth also of a logical type, thus founding a tautological knowledge (a matter which contains its results, at least those expected by its proponents).

This way of looking at science became a paradox: science is science if in its logical framework there are no metaphysical statements, that is, those that cannot be verified by means of some kind of experience, in spite of starting from subjective conceptions about reality which would acknowledge that “reality does not always manifest itself in an unequivocal way, since the intellect can err in judgment, reasoning or in the conclusion of what is real and generate in the subject an appearance of what is

¹ Miguel Martínez Miguélez, *El conocimiento científico y la ciencia en el siglo XXI, y sus dificultades estereognosias*, 1a. ed. (México: Editorial Trillas, 2016), 17.

² Germán Silva García, “Sobre la naturaleza epistemológica de la criminología: Una polémica con Carlos Albert” in *La criminología como crítica social. Ensayos de homenaje a Carlos Albert*, ed. Sergio Sánchez (Santiago de Chile: Editorial Metropolitana, 2013), 629. También en Stadler, Friedrich Stadler, *El círculo de Viena. Empirismo lógico, ciencia, cultura y política* (México: Fondo de Cultura Económica, 2018), p. 325.

real”³. However, it was the so-called “experimental science” that led the scientific apparatus to the supposed unveiling of nature, to its phenomenal explanation and to the epistemological conformation of the world. From this perspective, there is nothing but scientific discourse, everything else is mere sophistry, according to the old expression of empiricism. The crisis of science is due to the eminently fractioning character of reality, taken from the epistemological conceptions of Cartesianism, that advocates its division as many times as possible, in order to obtain a “clear” and “distinct” knowledge, as we can read in the *Discourse of the Method* of the French philosopher of the Renaissance.⁴

In this conception of the edifice of science, some chinks can be made out through which to take a sharp look at the science we do. And what stands out is the aforementioned fractioning conception of reality and the dogmatic perspective paradoxically fixed in the beliefs about the scientific method. In this constructed scaffolding errors are considered impossible because the guarantees of truth emerge by virtue of the mathematical nature of knowledge. If the world is written in mathematical key, and these are exact sciences, then all those descriptions-explanations product of the calculations of reality are infallible, that is to say, they are not erroneous. This illusion of infallibility is the cause of the great crises of the scientific system of the West. For this reason, we have reworked some epistemological ideas that we consider central and exposed them in a hermeneutic key around the conceptions of the new episteme and the method, or rather, methods, of science.

The New Science and the Perspective of the Contemporary Sciences of Man: The Emerging Paradigm. Postulates and Characteristics

We have reached this point in the journey through the world of science and epistemology, clarifying the core doubts that have arisen throughout the study of the relationship between both forms of knowledge. The questions that have arisen over the years about the concept of science have had the purpose of illuminating the paths along which it was necessary to travel. But now science and the world are at a new crossroads, where new doubts arise and, consequently, new paths for scientific and epistemological action: In another paper we inquired about the

³ Rojas González, Gregorio. 2016, “Educar en filosofía para saber estar en la realidad jurídica”, *Novum Jus*10, no. 1: 6.

⁴ René Descartes, *Discurso del método* (Buenos Aires: Losada, 1964), 98.

new parameters of research in contemporary social sciences, focusing on what Habermas⁵ calls the pragmatic turn, which consists of establishing science on the foundations of the pragmatics of language (the pragmatic dimension), that is, on the meaningful framework that human beings construct in order to interact with their fellow human beings, producing what the author calls the meaning of the understanding of actions.

However, the idea of science in these times of crisis and paradigm change is presented to us in a much broader and deeper way than in this pragmatic turn. It even goes beyond the sense of understanding, since knowledge about nature is seen more as descriptions-explanations-understandings, product of a reality that is known to be dynamic and complex, where the human being is seen as integrating a very small part of it, rather than in the sense of mere phenomenal explanations based on a conception of reality that is fixed and predetermined by traditional scientific methods. This leads us down new paths, since other questions arise in the light of the growing understanding of the complexities of nature, the latter wielded as an approach to reality that has been emerging from the epistemological critique of the classical paradigms; from this critique of reality, its flowing and dynamic character is affirmed, rather than a fixed and static one; with characteristic features of being systemic, and of course, in constant change, moving from order to disorder and from disorder to order again. We thus witness the paradox of the “stable instability,” placing the relationship between nature-reality-human life, as the task of science, in the vortex of the evolutionary and complex interaction of the open and changing circuit of order-disorder-order.

Based on the evidence of complexity, during recent years the unity between man and nature has been affirmed, the latter formed by interconnected parts that integrate a whole, including human society as a tiny part of it.⁶ Therefore, several questions arise regarding the possibilities of knowledge of the reality, given such characteristics: Is the human being immersed in the changes that occur in nature? Is the dynamics of nature the cause of changes in the sphere of human relations? Can the changes observed in the human-nature relationship be explained by the theory of linear causality (cause-effect), or do they rather obey another type of

⁵ Jürgen Habermas, *La lógica de las ciencias sociales* (Madrid: Editorial Tecnos, 1996).

⁶ Miguel Fuentes, *La evolución de las teorías científicas. Aproximación a innovaciones epistemológicas desde la ciencia de la complejidad* (Valparaíso: Ediciones Universitarias de Valparaíso de la Universidad Católica de Valparaíso, 2021), 25. See also Frank Wilczek, *Las diez claves de la realidad* (Barcelona: Editorial Crítica, 2022), 195-203.

causality? Could this new theory of causality be characterized by non-linearity, which is based not on the cause-effect relationship, but on the three-dimensional cause-effect-cause relationship, and thus link an endless relationship of phenomena and natural, social, and human events of a complexity that cannot be simplified or reduced by the traditional method of science?

These questions show us how deep is the reflection on science and on the complexity of the elements that characterize it. In what follows, we will briefly address the questions of greater relevance to the new meanings of reality and to the science that describes and explains it, assuming as a premise that human life is changing and dynamic, as is the reality of nature, since today human life is known to be part of it, which is why we must protect it. Let us remember the phrase of the Spanish philosopher, master of dissertation and critical thinking, who in the face of human misfortune and aggressions to the vital environment of the human being, expressed his convictions about life; José Ortega y Gasset said more or less the following: if we do not save the circumstances of human life, then we succumb as a species: “I am me and my circumstance; if I do not save it, I will not save myself either”.

Precisely, the ideas of reality and scientific knowledge of the modern paradigm, which have accompanied it throughout human history (science has been in constant crisis), are one area through which the crisis of the modern paradigm is discussed and manifested. The concepts that emerge in the light of a dynamic nature and bearer of a changing structure, contribute to the critique of the scientific method, since traditional science conceives nature rather in a static, fixed form, based, as we know, and doing a historiographic tracing, on the conception of the pre-Socratic philosopher Parmenides, according to which being is definitely given, that is, being is immutable, it does not change; but based also on the Aristotelian maxim, “there is no science of the particular”, which means that knowledge is based on universal statements. This issue is delegitimized by the qualitative paradigm, which bases its epistemological framework on the idea that every human being is a valid interlocutor, as expressed by the Spanish philosopher Adela Cortina, thereby stating the possibility of founding knowledge about the particular of each human being, as a valid and reliable knowledge, since each person is a member of the community of communication.

The method that since Modernity has been able to give explanations, according to established criteria, about the events and the nomothetic (legal) regularities of phenomena (that is, about the laws of nature) is positivism. Positivism or logical

empiricism legalistically structures reality as if it were a clock, or as if it behaved as a living organism disconnected from the complexity of the world (these are the mechanistic and organicist visions of the world, to which traditional science clung).⁷ It is worth remembering that this theory affirms that the world is ontologically constituted by facts, that is, the world is a great structure, like a wall formed by bricks placed one on top of the other to give shape to what is known, so that science has nothing left but to dismantle those bricks to know and manipulate them, and to finally reorder them according to the new concepts obtained during the process of deconstruction.

But this idea has not been entirely accepted in the field of positivism itself. The processes of deconstruction of knowledge to reach the stage of reconstruction of the results obtained, have been the ones that have given the greatest weight to the idea of a positive science: the knowledge that embodies this epistemological position, advocated by positivism, obeys rather to the purposes of an instrumental reason that contains a concept of dominating rationality, which leads to the purpose of exploiting resources through the manipulation of knowledge to obtain the maximum quantity of nature's "fruits".

Following this path of indiscriminate exploitation we are on the brink of the abyss and the destruction of the human species, which necessarily makes us think of new forms of coexistence and scientific rationality. That is, we need to articulate them with the objectives of preserving life, protecting the human person and nature, guaranteeing the valuable life project that each person chooses to live, without harm or humiliation, liberated from misery and fear, effectively enjoying their fundamental human rights in the framework of a democracy conceived, in turn, as the fundamental right that makes it possible to enjoy their fundamental human rights and guarantees the happiness and human flourishing of the associates of the political community for the sake of the common good, in the context of a Timocracy and a New World Order, also seen as a fundamental human right, according to Caldera Ynfante⁸ and Cubides et al.⁹

⁷ Martínez Miguélez, *El conocimiento científico*, 32.

⁸ Jesús E. Caldera Ynfante, "La democracia como derecho fundamental: Ideas sobre un modelo de Democracia Integral", *Opción: Revista de Ciencias Humanas y Sociales*, no. 87 (2018), 592. Jesús E. Caldera Ynfante, "Intervención Humanitaria Electoral: El Consejo de Seguridad de la ONU y la superación del conflicto político en Venezuela", *Opción: Revista de Ciencias Humanas y Sociales*, no. 92 (2020): 498. Jesús E. Caldera Ynfante, "Biocracia y derecho fundamental al nuevo orden mundial en la postpandemia COVID-19", *Revista Utopía y Praxis Latinoamericana* 25, no. 4 (2020): 36.

⁹ Jaime Cubides Cárdenas, Jesús E. Caldera Ynfante and Érika Ramírez Benites. "La implementación del Acuerdo de Paz y la seguridad en Colombia en el posconflicto", *Revista Utopía y Praxis Latinoamericana* 23, no. 2 (2018): 181.

This is the heart of the crisis of scientific paradigms: nature taken to a superlative level of indiscriminate use or destruction, with the disappearance of the species from the face of the earth as a consequence. Faced with this fatalistic vision of science, we are obliged to provoke the overthrow of science and traditional epistemology, or “normal science” in Kuhn's terminology.¹⁰ In this sense, it is possible to propose a new epistemology concerned with the care of life, the defense of the human person and its dignity, and of nature, which will lead the scientific community to make the necessary changes (in this regard, see the videos of the Future 2022 Congress, at www.congresofuturo.cl).

The Contradictions of Traditional Science: The Assumptions of the Epistemological Critique

One of the most important points revealed by the critique of the old paradigms is the structure of knowledge conceived and centered on the structural separation of the human cerebral nature. Traditional knowledge, or rather, traditional science, bases its epistemological edifice on the separation of the object and the subject of knowledge, as if these were two separate realities, only connected by virtue of the act of knowing. However, to strengthen this conception, the science of modernity fixes its structures on the separation of knowledge according to specialized disciplines, often unconnected with the rest of the physical framework and the reality of nature. Precisely, the process of knowing reality was established, in the Renaissance, by René Descartes, as expressed in previous lines, as the division of reality as many times as necessary, in order to be able to access the determinant distinctions in the process of knowing. This process leads us, argues the French philosopher, to a clear and distinct knowledge: clear from the point of view of the understanding, and distinct from the point of view of the other structures of reality. In this way, a reality determined by parts that integrate a whole was conceived, leading science to a path in which the knowledge of the parts was indispensable to obtain, supposedly, the knowledge of the whole.¹¹

Furthermore, by this epistemological route of division and stratification of reality, Descartes' argument served as a catapult for the configuration of science structured in disciplines, often unconnected to the totality of reality: a disciplinary science is

¹⁰ Thomas S. Kuhn, *La estructura de las revoluciones científicas* (México, D.F.: Fondo de Cultura Económica, 2005), 175.

¹¹ Descartes, *Discurso del método*, 1964, 100

thus conceived, that is, a fractal or fractured science, based on specific regions of reality and producing a specialized knowledge of it (physics, chemistry, biology, etc.). This is also due to the erroneous idea or misconception of a non-dynamic and non-changing reality, since, being stratified, this science assumes that its structures do not obey changes or modifications provoked by agents of nature itself. This led twentieth century philosophy to deepen the criticism of the static, that is, deterministic, idea of reality, on the shoulders of an idea of fixity or immobility, and rather to conceive it as a macrosystem constituted by subsystems. Thus, as expressed by Morin, the structure of reality is conceived as a set of parts that constitute the whole, whose sum is greater than the parts. This is typical of a complex idea rather than a simplifying and reductionist conception of reality. This complexity of reality is conceived also as a dynamis, that is, as a complexity in constant change, always in movement, integral of the terrestrial system, and, consequently, of the universal system.

Thus, from this idea of complexity, the image of the world begins to change, since it is perceived as a skein that weaves and unweaves according to the look given to it (“the observer changes the object of observation”, as expressed by Werner Heisenberg, in Martínez¹²), thus banishing the idea of certainty from the human being's cognitive framework, since by virtue of the structural changes that have occurred in the subjective conceptions about reality, knowledge begins to present itself in terms of uncertainty about the truths of science. If the world is dynamic and changing, in the eyes of Werner Heisenberg, it is not possible to know the truth about the position of the particles and phenomena that occupy our attention. This idea is called by this physicist and philosopher the Uncertainty Principle, according to which, there is not and there cannot be a deterministic or prefixed knowledge, as traditional science pretends when it conceives the world as facts; rather, knowledge is presented as uncertain and uncertain to human understanding.¹³

This argument, brought from the quantum physics of the 20th century, evidences the fact that scientific knowledge is in search of new epistemological foundations¹⁴.

¹² Martínez Miguélez, *El conocimiento científico*, 48

¹³ Martínez Miguélez, *El conocimiento científico*, 2016, 62. José Vicente Villalobos-Antúnez, Víctor Márceles and Teresa Ayala, “Epistemología y Ciencia: La Hermenéutica Filosófica como crítica al Método Científico”, *REDHECS. Revista Electrónica de Humanidades, Educación y Comunicación Social* 9 (2016): 109. Cfr. José Vicente Villalobos-Antúnez, “Karl. R. Popper, Heráclito y la invención del logos. Un contexto para la filosofía de las ciencias sociales”, *Opción. Revista de Ciencias Sociales y Humanas*, no. 84 (2017): 5. José Vicente Villalobos-Antúnez et al., “Karl Popper y Heráclito. Antecedentes y problemas actuales de la Filosofía de la Ciencia”, *Opción. Revista de Ciencias Humanas y Sociales*, no. 92 (2020): 987.

¹⁴ Fuentes, *La evolución de las teorías científicas*, 25. Martínez Miguélez, *El conocimiento científico*, 60.

But it is necessary to say that sometimes these new foundations have few acceptance in the research carried out in many official and unofficial research centers, because they are issues not accepted (or unknown) by the researchers themselves, since what is at stake is the validity and survival of a science that, considering the strong relation between power and knowledge¹⁵, has dominated the scientific and political scenario for more than five hundred years, counted since the famous *Discourse of the Method*. How then can we approach a science that knows itself to be delegitimized in the face of the new ways of confronting reality, sponsored by the new science, that is, how can we conceive the science promoted by the strata of the control of power as opposed to the science that emerges in the light of the new cognitive realities?

Derived from the above, other questions arise: What is the new nature of reality that this new science unravels? How is it possible to know something that we know changes at the speed with which we human beings observe and think? Before answering these questions, it is important to state the following: what is clear to us is that conceptions about science are merely human, since we have known, since Einstein himself, that the truths of science depend on the theories with which we look at reality. When theories change, the glasses with which we observe the outside world change, and therefore, the perspective on reality changes (theory is, as we know since Greek antiquity, the point of view from which we observe things or the world, as Manuel Gonzalo Casas points out)¹⁶. In this sense, let us see in detail what has been proposed.

The Complexity Perspective

Some of the parameters of approach towards the new idea of reality are set by the perspective of complexity in the idea of change, but also in the idea of integration, a field where much research and theoretical contributions have been carried out.¹⁷ Change, in the sense of the dynamics immanent to the world, whose flowing nature has been affirmed, since Heraclitus, more than its fixity and staticity (its non-changing character); and integration, in the sense of the need to approach the changing reality from diverse points of view, in unison and from different angles of vision, considering the totality of the immanent order in nature, describing that

¹⁵ José Rodríguez Martínez, “Ciencia y Derecho: ¿cómo formas de la dominación social?”, *Novum Jus* 15 (Especial), 18. See also, Jürgen Habermas, *Conocimiento e interés* (Madrid: Editorial Taurus, 1982), 168-192.

¹⁶ Manuel Gonzalo Casas, *Introducción a la filosofía* (Madrid: Editorial Gredos, 1970), 11.

¹⁷ Victoria Puente de la Vega et al., “Reflexiones acerca de la investigación universitaria desde la perspectiva de la Teoría de la Complejidad”, *Dilemas contemporáneos: educación, política y valores* 8, no. 3 (2021).

complexity comes from complexus, which means that which is jointly folded. Thus, the complex is that which is folded: the Universe is all folded because it is a complexity, as Morin¹⁸, González Moena¹⁹, and Villalobos and Palencia²⁰ point out.

These two characteristics assume that the concept of reality is composed of a multiplicity of elements integrated into a totality, whose comprehension is only possible through the integration of the constituent parts into a unity: it is the idea of unity in multiplicity and of the multiple in the one, says Edgar Morin, when he defines the complex. Precisely, from the new proposals of the contemporary social sciences, it has been argued that reality is a skein whose structure of totality can only be understood rather than explained, because what man can know is only a part of that reality, a small fraction of nature. The difference with traditional science is that for the latter it is possible to know the totality, since the world is constituted by facts; it is only necessary to appropriate the propositional language to be able to describe the world; while for the sciences of complexity, this is not possible, that is, knowledge about the totality is logically inaccessible, to the extent that it must be unfolded, for which the human being has neither the methods nor the cognitive apparatus that allows him to observe that unfolded, or to be unfolded, totality.²¹

By virtue of these considerations, and others that we will not comment on for reasons of space and time, some of the elements that constitute the perspective of the new science, but also the perspective of the new episteme, have been postulated. The sciences that emerge in the face of these disquisitions are called complexity sciences, whose framework is discussed, for example, by Miguel Martínez in his text called *The Emerging Paradigm*, but also by Morin²² and Capra²³. This paradigm contains the elements of the critique of the traditional science, but also the elements of the characterization of the emerging science, beyond the pragmatic turn. Let us look at these elements in order to structure the ideas that we must wield in the face of the contemporary sciences of man, not without first stating that these critical elements emerge precisely because

¹⁸ Edgar Morin, *Introducción al pensamiento complejo* (Barcelona: Gedisa, 2005), 23.

¹⁹ Sergio González Moena, "América Latina y complejidad", in *Pensamiento Complejo. En torno a la obra de Edgar Morin*, comp. Sergio González Moena (Santa Fe de Bogotá: Cooperativa Editorial Magisterio, 2006), 34

²⁰ José Vicente Villalobos-Antúnez and Iraima Georgina Palencia, "Epistemología de la complejidad. Perspectiva desde las organizaciones universitarias" in *Memorias arbitradas del 2do. Congreso Virtual Internacional de Ciencias Gerenciales* (Maracaibo: Universidad Rafael Bellosso Chacín, 2014), 344.

²¹ Fuentes. *La evolución de las teorías científicas*, 2021, p. 31

²² Morin, *Introducción al pensamiento complejo*, 35.

²³ Fritjof Capra, *El punto crucial. Ciencia, sociedad y cultura naciente* (Buenos Aires: Editorial Troquel, 1992), 132.

of the need to establish appropriate methods for understanding human nature (its complexity) and the events produced by interrelation, i.e. intersubjectivity, and the communicative nature of the human being.

The Subject-Object Relationship of Knowledge

This is one of the most important questions, at least from our perspective, in the face of the dilemma presented by traditional science: Is knowledge really structured in the object-subject relationship? Why is knowing mediated by this relationship if reality is independent of the knowing subject? Is reality certainly independent of the observing subject? These questions are precisely the crux of the matter since the positivist paradigm proposes the existence of a distance or separation between the object and the subject of knowledge to obtain a reliable knowledge as a product of the scientific method (this is the so-called scientific objectivism). But in the field of contemporary social sciences, the issue plunges into new depths because now we are dealing with the evaluation of the relationship between the subject and, not the object of knowledge, but the same reality where the cognizing subject is immersed.

Edgar Morin rightly defines the human being as a bio-socio-psycho-anthropological being, thus highlighting the complex character of human nature itself, where these defining characteristics are not found as divisive elements or structured in watertight compartments, but as integral parts of the anthropological unity that is the human being (as an open system, as Prigogine would say): the biological is a differentiating element but at the same time a unifying element of the human being. The same happens with the social, the psychological and the anthropological; all of them are constituted at the same time as integral parts of a greater complex unity: the complexity of nature. This can then be observed from the object-subject conception as a unity in multiplicity: to see the simplicity of reality, but to visualize it within the framework of the complex structure of the world.

The problem consists, consequently, in the establishment of the parameters of understanding around human nature, but in function of this unity between the simple elements of reality with its characteristics of multiplicity, projected towards the conception of the unity of the system that is man in the environment of nature. Consequently, the relationship between the one and the multiple is defined by the complex nature of reality. Observing the world from this perspective is what is new for the paradigm of complexity. The object of knowledge is no longer the object of knowledge; it is integrated in the framework of scientific observation; its

contextualization will then be the characteristic of the complex science: the fact that the object of observation is at the point of observation; that is, the space of observation is occupied by the observation itself. How is this? Simply, the idea of the search for knowledge of reality is staged by a subject that observes the object from itself and as itself.

The object is known as part of the subject and the subject knows the object because it is at its point of observation. Paraphrasing Werner Heisenberg, the physicist and philosopher of science, we could say that the world has vanished before our eyes, that the world has slipped away through the perspectives we have acquired of reality. Or, as Morin puts it, the object of knowledge has dissolved into the subject of knowledge. In this sense, paraphrasing Ortega y Gasset, the “epistemology of circumstance”, as has been noted, has a hold, in which the observing subject is himself and his circumstance, in which subject and reality articulate a contingent, evolving, unstable, changing, constantly transforming relationship, mediated by the unfinished translatability of his conceptualizations, as explained below.

The above is supported by the idea of a complex reality. This reality can only be studied from the perspective of the subject who knows he is immersed in it and dealing with it. Complexity implies conceiving reality as folds that are self-constituted to the extent that it is unfolded; each fold of reality, including human reality, is considered as a structuring element of the partiality that it itself forms in complexity. So, the idea of complexity considers the possibility of establishing knowledge on the banner of harmony that is destroyed at the same time that it is understood and reconstructed. Therefore, the relationship between object and subject of knowledge is defined as contradictory as well as complementary and necessary. Morin's ideas, in the face of this problem, lead to a new idea of science: one that considers the possibility of contradictions, which are precisely those that allow its further development.

In conclusion, the perspective of the new paradigm that emerges in the light of these considerations places us in unknown terrain. But that has always been the task of philosophy: to scrutinize reality and expose the problems that emerge from the vision of the philosopher. There is no philosophy without reality, nor reality without philosophy; but neither complexity without the simple, nor the simple without the complex. Hence, there is no object that is not in the subject, nor subject that is not in the object: this is the new perspective brought to the surface by the sciences of complexity.

The Relation Language-Reality

This is one of the contradictions present in the idea of science for the positivist paradigm. But in our interpretation, it is one of the elements to be discussed as constituent of the new episteme, since, according to this positivist paradigm, language fulfills a function of representation of reality, that is, the human being represents the world according to what he understands of it, according to what his conceptions tell him it is. In the positivist paradigm the human brain is like a photographic camera that collects impressions as they are presented to it. Reality is constituted by facts and language fulfills the function of clarifying it to the extent that the facts are visualized as parts not integrated to the whole. Each element of the structure of nature is described by means of the propositional language used by the subject.

For the sciences of complexity, language does not fulfill this enlightening function, much less that of representation; ideas about reality are not the reflection that we have of them through language, but rather the translations of reality to our understanding according to our own concepts. Every theory is built with concepts and not with the images that we have of reality, expresses Mario Bunge²⁴, to which Miguel Martínez²⁵ adds: provided that those concepts refer only to aspects of reality; the latter simply due, according to our interpretation, to the untranslatability of the totality of reality. For Morin, precisely, science pursues the translation of the simple elements of complexity into human understanding. Hence, according to Miguel Martínez, language-reality is the other side of the coin formed by the object-subject relationship. Both epistemic binomials configure two of the most important elements of the sciences of complexity, as an expression of the emerging paradigm. However, let us look at other characteristics of complexity as a paradigm, in order to understand more deeply the perspectives of the new science and the new episteme that shape it.

The Parts-Whole Relationship

Martínez considers this duality also as an antinomy of the positive science. However, our interpretation is that it is one of the elements of complexity due to the epistemological load that assumes, compared to traditional science, due to the perspective that the scientist has about the constitution of reality. We have

²⁴ Mario Bunge, *Epistemología* (México D.F.: Siglo XXI Editores, 1980), 19.

²⁵ Martínez Miguélez, *El conocimiento científico*, 2016, 68.

already advanced some considerations about this, but it is important to express that this relation is the medullar element of the new science or of the new episteme, since traditional science considers the mentioned relation as non-existent, due to the method of separation and reduction of the complex to the simple, precisely because of that ambition to reduce everything to non-connected structures, and to conceive the world as formed by non-existent bricks. Complexity conceives the world as a system that consumes energy and, for this reason, transforms itself (the Second Law of Thermodynamics).

The world is a system in which each part is an integral constituent of the totality. It is not possible to know the whole, says Edgar Morin, but each part is an integral part of the totality, depends on it, influences it, and interacts with it through the relationship of unification of the physical tensions that compose the world: the human being, in the constitution of his world of life, reflects these tensions between the whole in relation to the parts and the parts in relation to the whole. Human life is interceded by the internal relations of the systems that constitute the totality of reality, managing to modify the life perspectives of each member of society. For this reason, says Edgar Morin, the complexity of nature encompasses the complexity of the human being, although it could be said that each system is constituted by its own specificities: the human being is a specific system with respect to society, which is another specific system but which contains the previous one; and thus, society as a system integrates the totality of the human species as a superior system, contained in the sphere of planetary interactions, the latter in turn belonging to another system of greater magnitude which is the solar system and so on to infinity.

From the above, we conclude that, for the sciences of complexity, that is, for the emerging paradigm, the whole is made up by parts and the parts always refer to the totality of the reality. Hence, the vision we have from the contemporary social sciences will depend on our perspective of the human reality within the framework of the total reality to which it belongs. We agree with Morin when he affirms that science must be capable of observing man in his complexity, which is why the partial perspective is important, because the configuration of specificities depends on it; but the perspective of integrating the object of knowledge from its understanding of totality is also important, without being obliged to know that totality. The parts-whole relation emerges then as a new structure of the world, because the previous one only considered their existence without connecting them, without relating them. It was a reductionist perspective.

The Relationship Between Philosophy and Science

From the viewpoint of the new epistemological paradigm, it is evident that a new relationship between the categories of philosophy and science arises, particularly due to the new conception of reality as a totality translatable to human understanding, rather than represented in the mind of man. For the traditional perspective, science is only conceived through the episteme, that is, there can be no science if there is no epistemological position for it. However, for the complex sciences, the ideas of science and philosophy merge, they are in a new relationship, because as for the pre-Socratic Greeks, to the human understanding nature has the characteristic of a flowing totality, by virtue of which, only through translations by means of language it is possible for the understanding to access the world of complexity, that is, the knowledge of the total reality.

For this reason, a new idea about the relationship between philosophy and science arises, because for the sciences of complexity, science and philosophy return to the old position of unification in which they were since the pre-Socratic philosophers: science and philosophy were one embraced by the concept of episteme, that is, by the idea of obtaining universal knowledge about the world, but with the clear awareness of the specificities of each of the constituent parts of the totality. The sciences of complexity summarize in their postulates this unification of knowledge because the purpose is to obtain a vision of the complex from the understanding of the folds that make up reality (the whole of reality, including human society, as one of the greatest complexities), but also knowing that it is not possible to know all of them because the reality thus conformed is constituted by an infinite chain of folds, and judging by our scientific history, it can be affirmed that the human being, with his methods, will never be able to unfold the totality, because during the process more and more folds emerge.

We are only sure of the order that lies behind this complexity, but from which chaos re-emerges for a new resurgence of order, and so on, in an infinite succession of chaos-order-chaos. David Bohm²⁶ rightly expresses that behind the existing totality there is an implied order, a folded order that cannot be unfolded. Hence the unity between philosophy as love of knowledge, love of wisdom, and science, as the foundations of that knowledge, that is, science as episteme (let us remember that episteme emerges, in the history of science, as philosophy).

²⁶ David Bohm, *La totalidad y el orden implicado* (Barcelona: Editorial Kairós, 1987), p. 19

Contemporary Human and Social Sciences, the New Episteme, and the Complexity Sciences as a New Science

The previous ideas introduce us to the final theme of these philosophical reflections, already stated in the subtitle and specified in the following questions: Are the contemporary human and social sciences complex sciences? If so, what are the evidences of this complexity? Why are the sciences of complexity interpreted as emerging sciences? We will give a special treatment to these questions, since our interest is none other than to introduce ourselves in the concert of the discussions that are taking place at the level of the new episteme in different national and international forums, headed by the French philosopher Edgar Morin, whose theoretical approaches we have already discussed. However, it is good to note that the central ideas of the emerging paradigm are taken from Morin's idea of complexity, precisely because from his texts, especially the one called *Introduction to Complex Thinking*²⁷, we can gather the main constructs regarding this new image of science.

The Relationship Between Order and Disorder

From a complexity perspective, the world is not order, but a constant tension between order and disorder, cosmos and chaos. According to Morin, before the 20th century, the universe was conceived as a tendency towards order, a characteristic that emerged from its antagonistic concept: chaos, disorder. For the ancients, the world comes from chaos, and this belief persevered until the 20th century, when the new belief that the world moves in a paradox began: on the one hand, there is a tendency exemplified by the second law of thermodynamics, according to which open systems tend to transform themselves through the consumption of energy, and, on the other hand, there is a tendency towards the order and organization of the system (we call open systems those organizations of nature that develop through transformations by virtue of the energy that they take from the same system or from other systems, as for example, man, society, the planet). Order and disorder are in constant tension, and from this tension emerges the organization, the complexification, and the development of the system; all of which implies the stability of the system until the moment of a new transformation.

This characteristic of order and disorder is present in society and in human beings in general. Man develops in an environment that is in constant change, in constant

²⁷ Morin, *Introducción al pensamiento complejo*.

becoming, so it is not possible to catalog human existence as a particular and small system, seen individually; rather, it must be catalogued as a social system within which humanity is transformed individually, but also within which it is shaped and transformed socially. The contemporary human sciences, as complex sciences, take into account this condition of the human being, of being one and multiple, of being individual and system, as part of a superior system which is society, which in turn is part of the planetary nature: we can no longer conceive human life apart from a planetary context, due to the great achievements of science that have planetarized human life. Contemporary social sciences take into account this new human and social circumstance, so that the practice of science and the method that characterizes it must revolve around the complexity of life in society.

Self-Organization

As a system, is the human being a self-organizing entity? How can contemporary sciences consider this question of complexity? Let us look at this characteristic from a complex point of view. The idea of self-organization refers to structures that self-produce by virtue of their interactions with the rest of the systems, so that the organizations of each system then obey the relationships between these and the rest of the systems, establishing an interdependence of such magnitude that each of the organizations belonging to the system self-reproduces in order to keep the system “alive”.

Of course, self-organization depends on the exchanges that the individuals of each system are capable of establishing in virtue of their needs. Societies are self-organized because the individuals that integrate them try to live in an orderly way, in spite of the efforts of self-destruction. Systems as integrators of individuals that are smaller systems strive to establish mutual relationships towards greater complexity. In the case of the human being, the complexity of which he is part allows him degrees of autonomy as an individual but also demands from him the self-protection of the social system that houses him. It is a request for energy that the individual is willing to give and the society is willing to receive, in an infinite process of self-organization. Consequently, this sign of complexity translates human nature as part of a macro-system that self-organizes from disorder but is driven towards order. These are complex societies, and the sciences that study them are the complex social sciences.

We see, then, that the sciences of complexity postulate a new paradigm, which emerges not only from the physics of the 20th century, but also from the foundations laid by the new conceptions of human nature. The hermeneutic paradigm lays the stones that the complexity paradigm takes to organize the new path of science. This science appears as a new unification of reality, but this time conceived as an implied totality and not as a decontextualized and unconnected totality; that is why the social sciences approach this epistemological perspective to the extent that they interpret human life as part of the totality of reality, as part of nature: the new perspectives, succinctly exposed as sciences of complexity, allow us to think of the emerging paradigm mentioned by Miguel Martínez, who takes from Morin the idea of complexity. Hence the relevance of the sciences of complexity for the study of human reality.

In the context described above, we ask ourselves the following question: How should the study of this reality be conducted? What are the parameters for the consideration of the human being as an object of knowledge in this position? The answer is found in the new epistemological perspective called by Edgar Morin interdisciplinarity, which consists in the multiple vision of the same object of study by different disciplines that address the diverse specificities of complexity. Therefore, the idea of a new science refers to the formation of a new scientific spirit, capable of seeing the simple in the multiple and diverse, but at the same time aware of the impossibility of knowing the totality. Positive science was characterized by being made up of unconnected disciplines by virtue of ignoring the complexity of reality. The new science must be recognized as an interdisciplinary science capable of seeing nature and the human being as a system in the diversity of systems that self-organize and self-involve, that is, capable of perceiving them in and from their complexity²⁸.

Final Reflections

Throughout this research it was revealed that one of the issues that have had the greatest impact on the current state of the art in the field of knowledge is complex thinking. This way of approaching reality has produced philosophical statements of great relevance about the epistemology of complexity. This work has served to determine, with certain perplexity, that the current critique of the problem

²⁸ Eduardo Andrés Perafán Del Campo, "Editorial: Un espacio para la interdisciplinarietà", *Novum Jus* 15, no. 2 (2021): 2.

of knowledge starts precisely from the conception of reality and the situation of the observing subject with himself and his circumstance in relation to reality, nature and human life, marked by the “unstable stability”, the lack of staticity, the transforming uncertainty and the changing, open and evolving interaction between order-disorder-order of what, in Orteguian terms²⁹, we dare to call the “epistemology of circumstance” in contexts of complexity. In this way we obtain a possibility, or better, some possibilities for knowing the world and unveiling an horizon of opportunities which necessarily burst into new forms of coexistence and scientific rationality in function of the preservation of life, the protection of the human person and nature, that result in the guarantee of the valuable life project that each person chooses to live, without harm or humiliation, free from misery and fear, effectively enjoying their fundamental human rights in the framework of a democracy that guarantees a good life, freedom and happiness to every person in pursuit of their human flourishing and their tangible contribution to the common good.

The science of complexity brings a new form to view reality, also complex. In this way, these ideas support further analyses and guide the research towards crossroads with new horizons, unpredictable, of course, but horizons in any case. Many roads will have to be traveled, in addition to those already traveled throughout recent history, mostly in the late eighties with the sharpest looks at this complexity, but which were born at the beginning of the twentieth century, when the world vanished with Schrödinger's gaze on the object of quantum physics, an objectual dynamic that has been difficult to assimilate even today, a century later.

The sciences of complexity, in plural, show us a diverse path about knowing, beyond the formal statements rooted in the modern empirical science. This new perspective, we can conclude, by changing the whole paradigmatic scaffolding in which it is sustained and which was reviewed in this study, allows us to augur new paths for the unfolding of knowledge, as we are experiencing it today with the novel proposals about knowing, which even call for a better deference to the objectual nature of the world that science deals with³⁰.

²⁹ José Ortega y Gasset, *Meditaciones del Quijote*, ed. J. Marías (Madrid: Cátedra, 2010), 35.

³⁰ See Fundación Congreso Futuro, “Aprender a convivir”, <https://www.congresofuturo.cl>.

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