

Elements to Understand the Epistemology of Medicine

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ABSTRACT: *With the purpose of identifying the structural elements that help to understand the epistemology of medicine, the study shows the analysis of the following aspects: conceptual delimitation of epistemology, the relationship between the history of epistemology and the most influential epistemological traditions in the field of medical sciences, the identification of the fields of application of epistemology, and the characteristics associated with epistemology as a philosophy, as a methodology and as a critique of knowledge are shown. It is concluded that the epistemology of medicine is understood as the critical study of the scientific principles that support clinical practice, the hypotheses that are formulated in biomedical, sociomedical, clinical and humanistic sciences, as well as the results obtained in the different scientific fields of the health sciences that converge in medicine, so that the epistemology of medicine makes it possible to determine the logical origin of medical knowledge, in addition to inquiring about the value of medical science and the objective content of the fundamentals that give meaning to scientific practice in the construction of medical knowledge.*

KEYWORDS: *Epistemology, medicine, philosophy, methodology, critique of knowledge.*

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I. INTRODUCTION

The current of thought headed by Raúl Rojas Soriano^[1-3], Federico Ortiz Quezada^[4] and Alfredo Tecla Jiménez^[5], affirms that medicine is a historical phenomenon that is transformed in accordance with social evolution, scientific progress and technical development.

Following the reflections of Tecla Jiménez^[4], medicine is not conceptualized as a science in itself, but rather as the set of knowledge, techniques and skills derived from different disciplines, including the humanities and social sciences, whose purpose is of study and work for the human being from the point of view of the health-disease process, a process that cannot be reduced to the biological or the social, since although its determinants are social, they include the biological as well as the spiritual. Thus, medicine materializes as a human social practice in which art, science and technique converge, to preserve or restore the state of health. In this sense, the following questions arise: what kind of knowledge is it in the medical sciences? What is the nature of this knowledge? What is its origin?

These issues are epistemological in nature and involve the concepts of knowledge, evidence, justification, probability, reasons to believe, and truth; so that, by exploring the answer to each of the questions from the field of art, science or technique typical of the medical sciences, they will provide different answers, favoring the scenario of medicine to show itself in all its complexity.

The reality in which the knowledge of the medical sciences is gestated is epistemologically transformed into a complex, infinite and changing reality, by linking the art-science-technical triad in the totality of the medical work. This implies that the totality configured by the art-science-technical triad shows the advancement of science in the field of medicine and health sciences through professional praxis that is revealed as a reality where two elements are exposed fundamental for its understanding: the development of the technique and the need to explain the reality in which the health-disease process unfolds.

The human being is determined by the hegemonic knowledge of society and the time in which it is immersed when building the reality of the world of life. However, when the human being approaches the reality in which health and disease unfolds from the social referents of the historical tradition in which it is located, it seeks to explain, that is, to justify from the field of scientific rationality, the interrelation between the health professional (as a knowing subject) and the disease (considered as an object to be known) from the traditional scheme of the knowing subject-object of knowledge relationship.

But the complexity of reality also requires explaining the context where the knowledge process takes place (in this case, the patient and their circumstances) as well as the image or concept that is generated from this interaction (diagnosis and prognosis). incorporating the participation of subjectivity in the subject-object relationship. The explanation of the context and the image of the subject-object relationship opens the way for the cognitive relationship to be shown as a triadic relationship: subject-object-subject.

The rational construction as the justified explanation of reality that arises from the subject-object-subject relationship, is not exclusive to Philosophy or the theory of knowledge in general and abstract, but is typical of the sciences in particular. A specific case is that of the disease that over time has integrated a historical evolution within a cultural framework from which each civilization had to assume its diseases, according to their beliefs, knowledge and forms of intellectual reflection that were sometimes radically opposed. to the canons of science^[6-8].

The subject-object-subject cognitive relationship from which medical sciences are explored dilutes the antagonism between natural sciences and social sciences and transforms it into different levels of appropriation of the reality of the health-disease process, moving from the quantitative to the qualitative, from explanation to understanding, operating different methodological strategies linked to the levels of biological organization and evolution of the health-disease process.

Explaining the perceived, known or constructed reality requires establishing a logical structure of knowledge in order to understand the limitations of scientific knowledge in the health sciences and encourages the following questions to be elaborated: how is a scientific theory constituted in the field of health Sciences? What is the role in scientific practice, of the ideological and social context in the health sciences? Epistemologists try to answer questions of this kind; its purpose is to study the genesis and structure of the sciences from a logical, historical and sociological point of view. An example of this is supporting explanations based on beliefs and testimonies based on concepts of causality, certainty, coherence, fallibility, illusion, inference, intellectual virtue, introspection, intuition, sense, memory, reasoning, relativity, reality and truth; which has led to the philosophical and scientific debate in relation to nature, sources, architecture, growth, knowledge in general and scientific knowledge in particular. In this context, the study was carried out with the purpose of identifying the structural elements that help to understand the epistemology of medicine.

II. CONCEPTUAL DELIMITATION OF EPISTEMOLOGY

Human beings have the natural attitude of knowing the world in which they are located. First of all, he will be concerned with apprehending the objects of nature that make up his immediate reality, but he will also be concerned with knowing the products of a social and spiritual nature; always with the intention of trying to understand, explain and anticipate natural, social, psychological and spiritual phenomena; so that he too will be faced with understanding the nature of knowledge and the limits of his knowledge. In this context, epistemology, as a branch of Philosophy together with metaphysics, logic and ethics, will contribute to the understanding of the human being immersed in the world of life, so it is necessary to define the thematic field of epistemology.

In the history of philosophical thought, the antecedent of epistemology is found in epistemology or theory of knowledge, in which the origin, essence and certainty of knowledge are analyzed; that is, epistemology deals with the analysis of knowledge problems to determine the necessary conditions to achieve true knowledge. Although different approaches to the problems of knowledge are exposed from Greek philosophy, it will not be until the modern age when the theory of knowledge appears as an autonomous discipline. John Locke^[9], G. W. Leibniz^[10], George Berkeley^[11] and David Hume^[12] systematically analyzed human knowledge around five fundamental problems: possibility of knowledge, origin of knowledge, essence of knowledge, forms of knowledge and criteria of truth^[13]. It will not be until 1781, when Immanuel Kant's *Critique of Pure Reason* is published, when the critical foundation of scientific knowledge of nature is exposed^[14].

In 1854, the Scottish philosopher James F. Ferrier introduces the term "*epistemology*" in his book: *Institutes of Methaphysics*, where he indicates that philosophy has two branches: ontology and epistemology; pointing out that epistemology is the doctrine or theory of knowledge^[15]. The word "*epistemology*" etymologically comes from two Greek words: *epistēmē* (knowledge) and *logos* (study), so that it is translated as study of knowledge and is traditionally defined as theory of knowledge, although it is also understood as theory of knowledge, theory of science, critical study of the main methods and results of the various sciences, which reflects, first of all, a confusion in the use of the term; secondly, the analysis of knowledge from different theoretical positions.

In philosophy the term epistemology has been used to refer to the philosophical discipline that deals with the certainty of knowledge. The material object of epistemology is knowledge and its sources; the formal object is the certainty of knowledge^[16]. However, since its appearance in 1854, its consolidation through the neopositivism of the Vienna Circle, until the crisis of the 50s of the 20th century, epistemology has developed in response to two philosophical traditions that correspond to the Anglo-Saxon epistemological approach and the French epistemological approach.

Anglo-Saxon epistemology is centered on the theory of knowledge and reflects the position related to what is it possible to know about the world? And, how is it possible to know it? In this tradition, the analysis of knowledge itself is carried out to determine what knowledge is, as well as its limits, scope, reliability and what

are the justifications for determining knowledge; so that it is developed with the intention of supporting a theory of knowledge in general, of a philosophical nature ^[17]. French epistemology locates the development of the discipline in the philosophy of science, focusing the philosophical analysis on the theory of science in general to expose the foundations of scientific knowledge, its development, aims and objectives; that is, it carries out a critical study of the principles, hypotheses and results of science to determine its value ^[17], with the intention of exposing the genesis and structure of science, resorting to the production of knowledge from logical, linguistic, historical, ideological, sociological.

Undoubtedly, both traditions understand epistemology as a philosophical discipline whose object of study is scientific knowledge. Their difference will be qualitative; because as Hajar and Calderón ^[18] point out epistemology is not reduced to the synthesis or conjectural anticipation of scientific laws, rather, it deals with the problems posed by science; therefore, it deals with the critical study of the principles, the hypotheses and the results obtained in the different scientific fields, so that it is directed to determine the logical and not psychological origin of scientific knowledge, in addition to inquiring about the value of the science and objective content of the foundations that give meaning to the different development of science.

III. HISTORY OF EPISTEMOLOGY AND ITS PHILOSOPHICAL TRADITIONS

Considering that epistemology refers to the problems of knowledge implies carrying out a historical reconstruction going back to Greek thought. However, since epistemology made its appearance on the philosophical scene in 1854, the most significant trends for epistemology from this date to the present will be stated.

James F. Ferrier (1808-1864), English idealist and promoter of the thought of Georg Berkeley, to introduce the term epistemology, begins the development of his thought exposed in *Institutes of Methaphysics*, with the axiom: “*Along with whatever any intelligence knows , it must, as the ground or condition of its knowledge, have some cognizance of itself*”^[15], and will conclude by stating: “*All absolute existences are contingent except one; in other words, there is One, but only one, Absolute Existence, which is strictly necessary; and that existence is a supreme and infinite and everlasting Mind in synthesis with all things*”^[15]. Ferrier will arrive at this proposition going through epistemology (theory of knowledge), *agniology* (theory of ignorance or theory of non-knowledge), and ontology (theory of being) with a clear vision of the conditions and limitations of the possibilities. of knowledge and ignorance.

The development of epistemology is gestated within the Vienna Circle, coming to consider that all topics, ideas and problems of knowledge were the object of epistemology since they made possible the foundation of the scientific conception of the world. With this, the crisis of modern epistemology also began, which manifested itself since 1950 as the crisis of scientific rationality through two central problems: the foundation and unity of science. In the 1960s, Piaget offered a solution to the problem of scientific rationality from a positivist position, enunciating an epistemology without philosophy^[19-21], while from an anti-positivist perspective, Habermas pointed out that he offered solutions to these questions through "reason interested"^[22]. But there will be three trends that will give meaning to the development of epistemology during the second half of the 20th century:

- Popper's critical rationalism, characterized by analyzing essentialism and falsificationism, the problem of induction, and epistemology without a knowing subject^[23,24].
- Schools of meta-science represented mainly by Thomas S. Kuhn, Imre Lakatos and Paul Feyerabend.
- Mario Bunge's Epistemology, which exposes the need to renew epistemological principles; analyzes the field, problems and usefulness of the new epistemology; enables reflection on the scientific method from which the application of methodological principles derives, explanation and action through scientific prediction and technological forecasting^[25].

In 1963, Edmund Gettier published two counterexamples to the classical definition of knowledge, also known as the traditional analysis of knowledge, leading epistemology to focus its analyzes on three problems over the last 50 years: defining the notion of knowledge, answering questions skeptic showing the possibility of knowledge, study the processes used in the production of beliefs and determine which ones lead to knowledge^[26,27]. In order to understand what is knowledge?, it is necessary to link it to the project of the theory of knowledge that exposes, through the analytical problem of knowledge, the conditions that are sufficient and necessary to determine that a subject possesses specific knowledge, that is, The epistemological analysis of the classical theory of knowledge is supported, which sustains that an affirmation is knowledge if and only if a belief is manifested in it that is justified and that is true; which favors that epistemology provides the conditions that determine when a belief is knowledge and when an affirmation is rational. Among the authors dedicated to formulating theories of epistemological justification, the following stand out: Robert Audi ^[28,29], William P. Alston ^[30], Laurence Bonjour ^[31].

Edmund Gettier ^[32] published in 1963 two counterexamples to the definition of knowledge as true and justified belief (propositional tripartite definition of knowledge) in such a way that it raised the discussion on the need for the justification of knowledge. Gettier's problem led the skeptical position to strengthen the claim that there are no conceptual tools to demonstrate the possibility of knowledge, raising questions about the internal coherence of the concept of knowledge as a justified and true belief. Different answers to the problem of the possibility of knowledge supported by skeptics and derived from Gettier's counterexamples have been elaborated, among which Robert Nozick ^[33], Norman Malcolm ^[34], Barry Stroud ^[35] stand out. Finally, the studies carried out between 1977 and 1986 by Alvin I. Goldman ^[36-38], as well as those by Larry Laudan ^[39-41] and Ronald N. Giere ^[42,43] shaped the emergence of normative epistemology with the intention of establishing normative criteria or standards that support standards. of epistemic evaluation to discern which are the belief production methods supported by cognitive processes that are recommended for obtaining knowledge. In this scenario, Fernando M. Gallego ^[44] defines five general features to define the traditions in the development of epistemology, identifying the Anglo-Saxon tradition, the French tradition and the German tradition (see table 1).

Table No. 1
Characteristics of epistemological traditions

Criterion	Criterion definition	Tradition		
		Anglo-saxon	French	German
Model	Perspective that they come to adopt when conceiving the scientific.	Focused on the cognitive issue, prevailing the theoretical.	Art, prevailing the poetic.	The technical prevails, emphasizing the practical, the praxis.
Function	How they tend to view the workings of science.	Possibility of the act of representation.	Creation.	Manipulation and intentionality.
Essence	Nature that they attribute to the scientific.	Language through logical propositions	Invention.	Application.
Middle	Domain or problematic element in which they tend to replace the scientific question.	Opinion, the domain of everything that can be said as presumably true.	The problem.	Intentionality and interest.
Hazard	The way in which they seem to philosophically determine the problem of science.	Fraud risk, that is, a tendency to pass for true a false opinion.	Promotion of stupidity, of banality, that is, selection aimed at derealizing opinion, ideology, representation, power.	Threat of destruction, denunciation of the lack of meaning, objectification and mechanization of life, complicated by the social system.

Source: reference number 44.

The Anglo-Saxon tradition thinks of science from the cognitive question, so the scientific question coincides with the problem and the foundation of the truth, so that the theoretical prevails over the practical or the poetic. The function of science is located in the possibility of the act of representation that determines the movement of recognition, which makes reference the hegemonic category in epistemological reflection. Then, the language stands out to direct the scientific problem to the determination of the set of conditions that allow legitimizing the consideration of an opinion as a true opinion ^[44]. The philosophical currents that can be ascribed to the Anglo-Saxon epistemological tradition are:

- Logical positivism: Circle of Vienna and Circle of Berlin.
- Critical rationalism: Karl R. Popper.
- Historicist philosophy: Imre Lakatos, Thomas Kuhn, Paul Feyerabend, Hanson, Laudan.
- American pragmatism: Pierce.
- Naturalized epistemology: Quine, Giere, Kitcher.
- Semantic formalism: Suppes, van Fraassen.
- Structuralist formalism: Sneed, Stegmüller, Moulines.

The French epistemological tradition supports philosophical reflection based on the model of art, which is why the poetic predominates over the theoretical and practical; the scientific question is exposed in terms of the new and innovation, so the function of science is creation that gives meaning to the nature of science in terms of invention, making the problem its central category for epistemic analysis, as a thought that leads to the question of the banality or importance of the concept in a scientific creation. According to Gallego, this tradition has developed in three ways: empiricist, critical and ontological ^[44]. The empiricist current is represented by Henri Poincaré and P. Duhem, J. Cavaillés and A. Lautman (disciples of L. Brunsvicg). The critical current in which stand out: E. Boutroux, L. Brunsvicg, Gastón Bachelard, G. Canguilhem, Michel Foucault, Louis Althusser and the members of the "Philosophy Course for Scientists" (M. Pécheux, M. Fichant, A. Badiou). The ontological current of the French epistemological tradition is developed by Henri Bergson, E. Le Roy and Gilbert Deleuze.

The German epistemological tradition adheres to a technical model of science, where the practical, praxis, prevails, so that the problem of scientificity is linked to the question of what is given and the foundation of what is given. The functional axis of science will be manipulation, from which the notion of intentionality will be recovered as a category to support the scientific essence from the idea of application. In this tradition, science will be presented as an activity that requires revealing the meaning of the task that is undertaken, for which it is necessary to analyze the participation of experience, the experience and the form of its process, to display the understanding of the world. , which favors that the problem of science is formulated in intentional terms, that is, of the interest (intention) that leads to think the threat of destruction and the denunciation of the lack of meaning, of the oblivion of being, of mechanization and objectification of life and complicity with the social system ^[44]. The philosophical currents included in the German epistemological tradition are:

- Neo-Kantianism of the Marburg School: Cassirer.
- Neo-Kantianism of the Baden School: Rickert
- Historicism: Dilthey.
- Phenomenology: Husserl.
- Hermeneutics: Heidegger, Gadamer.
- Critical theory: Horkheimer, Adorno, Marcuse, Habermas.

IV. FIELD OF EPISTEMOLOGY

The relationships that epistemology has come to establish with other branches of philosophy, as well as with the sociology of science and the history of science, have contributed to enriching the field in which epistemological reflection develops. In this sense, Mario Bunge, through his proposal to found a "new epistemology", defines epistemology as a branch of philosophy that studies scientific research and its product, scientific knowledge. Bunge has proposed a set of branches that account for the philosophical aspect of epistemology in attention to the problems that each of them poses to the analysis of the problems of scientific knowledge that are explored by epistemology. These branches are ^[25]:

- Logic of science.
- Semantics of science.
- Theory of scientific knowledge.
- Methodology of science.
- Ontology of science.
- Axiology of science.
- Ethics of science.
- Aesthetics of science.

In addition to the problems of scientific knowledge addressed by each of these branches, it points out different epistemological problems of the different scientific disciplines that are shaping regional epistemologies. However, from the crisis of epistemic rationality in the 1960s, epistemology was also configured as a reflection of science through which different currents of thought were consolidated according to the relationship of recognition that they give to science, in terms of epistemology or theory of knowledge; and they have been grouped, according to Piaget's scheme, into three groups: scientific, para-scientific and meta-scientific ^[45,46]. Scientific epistemologies, among which positivist epistemology, philosophy of science and genetic epistemology are identified; they start and remain within the framework of a reflection on the sciences themselves, without seeking an explanation of knowledge in general, they are situated in explaining scientific knowledge. It is represented by the thought of Comte, Mach, Russel, Poincaré and Piaget. Meta-scientific epistemologies encompass contemplative epistemologies, synthetic epistemologies, and meta-prescientific epistemologies. They start from the reflection of the sciences with the intention of enunciating a general theory of knowledge. It includes the currents represented by Plato, Aristotle, Descartes, Kant and Hegel. Para-scientific epistemologies include variants of the intuitionist position (Bergsonian intuitionism and phenomenological intuitionism). Relying on the criticism of science, they reach a knowledge other than scientific, in opposition to it. It is represented by the current of irrationalism, from Schelling to Heidegger, through Kierkegaard, Bergson and Husserl.

The historical development of epistemology shows the way in which epistemic positions have been reached that support the debates of contemporary epistemology with which the 21st century begins, marking the meaning in the construction of an epistemology of medical sciences. Thinking about the epistemology of medicine leads to the need to identify the field of epistemology. The debate to which the development of justification theories has been circumscribed, as well as that of normative epistemology and the naturalization of epistemology summarized by Ángeles Eraña ^[26], reveal the following areas of development in contemporary epistemology that involve the field of medical sciences:

- Relevance of empirical research for epistemology.

- Practical reason and nature of the epistemological recommendations in terms of hypothetical or categorical imperatives; that is, relations between epistemic norm and reason.
- Establish criteria for the evaluation of beliefs involving the commitment and epistemic responsibility regarding the truth and justification of the belief that is affirmed as knowledge.
- Construction of guides for the formation of beliefs.
- The rational being that expresses the relationship between being justified and following the rules of reasoning.

From these efforts to systematize the development of philosophical research and reflection in the field of epistemology, whether through problems of an epistemic nature or contributions from philosophical currents linked to the analysis of knowledge, it is verified that they prevail in the center of the discusses the fundamental concepts of epistemology: knowledge, justification and rationality. Knowledge, in its traditional meaning, is a justified and true belief. However, the notion of belief is a psychological concept that epistemically has four characteristics: justification, order, rationality and probability; truth is a semantic-metaphysical concept, so that the properly epistemological concept is that of justification. Thus, the justification will account for a constitutive feature of human knowledge: the epistemic responsibility that every subject acquires when affirming that he knows something^[26]. Epistemic responsibility implies, according to Eraña, understanding knowledge “not as a final product, but as a socially articulated process of confrontation and deliberation”^[26].

Justification, in general terms, is understood as the reason why a subject has a belief, in such a way that it explains why that belief is true or accounts for the way in which the subject knows what he knows; which implies that epistemological justification, like moral or prudential justification, is a type of justification that is related to truth. The epistemological interest in justification lies in its application to beliefs, since not any reason to believe will account for the epistemic justification of that belief; so that the interest is focused on clarifying the terms of the intellectually adequate means to avoid error and arrive at the truth of that belief^[47]. In this sense, justification is a normative property that is offered at different levels, since it is close to those that distinguish true belief from knowledge^[48].

Rationality refers to the Aristotelian rational being, however, the debate opened by the naturalization of reason through the advances of evolutionary biology have reopened questions of philosophical interest about the nature and scope of human rationality^[49]. Without going into this debate, rationality is understood as a "method that is predicated of our beliefs and opinions, on the one hand, and of our decisions and actions, on the other"^[50], which implies that there are beliefs and opinions that do not exist. are rational in such a way that the exercise of reason does not guarantee the success of the action^[51]. Therefore, Mosterin will point out that rationality, as a method, "leads to maximize the success of our beliefs and the success of our most important actions"^[50].

In this scenario, epistemology assumes that human reasoning will be a process through which the subject applies the previous knowledge that he possesses to a particular problem by deducing specific consequences from his general beliefs. This reasoning process also implies inferring the general from the specific, encouraging the subject to formulate ideas and hypotheses to later test them^[26,52]. Until the last quarter of the 20th century, the consensus in cognitive psychology was that the ability to reason depended on a tacit mental logic, consisting of formal rules of inference, similar to those of a logical calculation, favoring the development of established principles and norms for to evaluate human reasoning, also generating models^[53] and thought systems^[54] that account for the “standard image of rationality” in terms of what Stein conceptualized as a rational being: “to be rational is to reason in accordance with principles of reasoning that are based on rules of logic, probability theory and so forth. If the standard picture of reasoning [rationality] is right, principles of reasoning that are based on such rules are normative principles of reasoning, namely they are the principles we ought to reason in accordance with”^[55].

Considering the normative image of the rational being, as well as the dual process of thought and human rationality^[56,57], Eraña^[26] will classify reasoning as deductive, inductive, practical and theoretical; and he will point out that a theory of reasoning studies the normative principles that guide both the thought and the action of a rational person; in which the prescriptive statement is identified as a reasoning norm in which what is commonly considered to be reasoning correctly is manifested. This approach opens the debate on the dilemma of epistemic normativity (universality-non-normativity), offering a solution through the use of heuristic rules as normative principles of correct reasoning, which implies that "at least some of the norms that we use when reasoning and, in general, to evaluate epistemic (or cognitive) procedures are designed to solve a limited class of problems within the framework of a specific domain and, therefore, are norms that can only be applied in a certain context or situation”^[26]. In this sense, the field of epistemology is not reduced to describing and explaining the methods and theoretical foundations used in the construction of scientific knowledge. On the contrary, by searching, on the one hand, for the factors and processes that determine the increase in scientific knowledge and, on the other, the existence of explanatory principles while preserving a sociological or ideological structure. The field of epistemology is oriented towards the task of revealing the implicit

ideological-axiological component in scientific practice with the intention of clarifying the empowering or inhibiting function that the axiological-ideological exerts on scientific practice.

The horizon of understanding that opens up to medical epistemology to analyze medical knowledge, justification and medical rationality, in addition to the axiological and ideological components that are involved in each of them, encourages epistemological evaluation and surveillance to identify, analyze and search for solutions of the different ideological forms that appear as epistemological obstacles; so that epistemology in general, and medical epistemology in particular, is understood from three areas of human experience: as philosophy, as methodology, and as reflection.

V. EPISTEMOLOGY AS PHILOSOPHY

Philosophy, as "love of wisdom" is defined as "the science of all things by their ultimate causes, studied in the natural light of reason"; for what he has to say about Jaspers:

“What philosophy is and what its value is a matter of debate. Extraordinary revelations are expected from it or else it is indifferently pushed aside as a thought that has no object. He looks at it with respect, as the important task of unusual men, or else he despises it as the superfluous brooding of dreamers. It is held to be something that interests everyone and therefore must be basically simple and understandable, or else it is held to be so difficult that it is desperate to deal with it. What is presented under the name of philosophy actually provides justifying examples of such opposite appreciations”^[58].

Among the branches of Philosophy, is the theory of knowledge or epistemology. The terms epistemology and epistemology are often considered synonymous; in both cases the theory of knowledge is treated, an expression that is also used instead of any of the two previous ones. For some time, at least in Spanish, the word epistemology was used in preference to epistemology. Then, and in view of the fact that epistemology was used by philosophical tendencies of scholastic orientation, epistemology was used in the general sense of theory of knowledge, without specifying what type of knowledge it was about, that is, epistemology referred to theory of knowledge in general. This led to the word epistemology being used to refer to the theory of scientific knowledge, or to elucidate problems related to knowledge whose main examples were drawn from the sciences. However, due to the influence of Anglo-Saxon literature, the word epistemology has been used practically in almost all cases.

The historical evolution in the development of epistemology shows that in addition to its conception as a theory of knowledge, it has been understood as a philosophy of science or history of science^[59]. Understood as the history of science, epistemology is that part of science whose purpose is to carry out a journey through the history of the subject in order to analyze how scientific knowledge is constructed. Analysis that is oriented to try to clarify the way in which the subject has objectified knowledge, how the specialization of knowledge has been achieved, as well as the way in which the status of scientificity is assigned to knowledge; in addition to the recognition that this type of knowledge enjoys from the scientific community. Epistemology from this horizon, studies the genesis of science; scrutinizes how the human being has transformed or understood his environment through experimental methods in the need to explain the phenomena in their causes and in their essences^[60,61]. The development of epistemology from the philosophy of science is oriented towards the study and analysis of issues related to: the definition and classification of scientific concepts; the problem of the theoretical terms of science; the nature of scientific laws; the logical structure, evolution and change of scientific theories; empirical testing of hypotheses and theories; the logic of scientific inference; the scientific explanation; chance and necessity; scientific progress; the foundation of knowledge; the meaning and reference of the terms of science; the truth, simplicity or usefulness of scientific knowledge^[62,63].

Whether as a theory of knowledge, history of science or philosophy of science, health and disease, as objects of knowledge, are framed in different epistemological statuses, grouping them analytically through norms, values and meanings, which move from the reductionist biological up to political, social, cultural and ideological macro-phenomena; so that the reality of health and disease can be analyzed as a continuum in the transformation of facets and states. In order to understand the complexity of epistemology as a philosophy to determine the epistemological status of the objects of knowledge of the medical sciences, of certain realities or of certain ways of approaching the world, it would be thematized by various epistemological currents considering two perspectives: systematic questions of knowledge in medical sciences from a synchronous structure and, historical aspects that account for scientific changes in the reconstruction of medicine's own knowledge from a diachronic structure. Thus, epistemology as philosophy is limited to being a branch of philosophy that deals with all the elements that seek the acquisition of knowledge and investigates its foundations, limits, methods and validity^[64,65].

Finally, epistemology is conceptualized as the meaning of the constitution of scientific knowledge that is considered valid. In this sense, Piaget considers that epistemology "tries to determine how knowledge reaches the real, that is, what are the relationships between the subject and the object" ^[46]. In this search for knowledge of the real, Mario Bunge enunciates a set of premises that will characterize science from two fields: the ontological and the epistemological. With the intention of answering the question: *what is there?*, Mario Bunge enunciates the following ontological principles of science ^[25]:

1. There is a world outside the knowing and acting subject.
2. The world is made up of things (material objects).
3. Every property is a property of something: there are no properties or forms in themselves.
4. Things are associated forming systems.
5. Every system, except the universe, interacts with other systems in certain respects and is isolated from other systems in other respects.
6. Everything, every system, changes.
7. Nothing comes from nothing, and nothing is reduced to nothing.
8. Everything satisfies objective laws.
9. There are different types of law: causal and probabilistic, which link the properties of the same level, and others that link properties at different levels.
10. There are several levels of organization: physical, chemical, biological, social, technical, etc.

In addition, to explore the nature, origin and scope of knowledge from the perspective of realism, Bunge enunciates the following gnoseological principles of science ^[25]:

1. Reality is knowable even if only partially.
2. All knowledge of reality can be increased thanks to scientific research.
3. There are different sources or modalities of knowledge: sensitive experience, intuition, action and reason.
4. Scientific theories are representations (global or detailed, more or less true, and always symbolic) of objects that are supposed to be real.
5. The degree of truth of scientific theories is established (provisionally) only with the help of observations and experiments.

VI. EPISTEMOLOGY AS METHODOLOGY

The development of epistemological thought has also gone through other paths to epistemically analyze concepts related to scientific work such as empirical data, factual truth, hypothesis, scientific law, technical rule, theory, experiment, explanation, prediction, artifact and design; so that among the practical applications of epistemology are to guide scientific research and technical design, distinguish science from pseudoscience, technique from pseudotechnics, and help design policies to promote science and technology. In this context, studies aimed at trying to explain and understand the development of research processes have gone through three levels ^[66]:

- Theoretical-conceptual level: the philosophical and epistemological foundation of scientific work is located at this level, as well as the theoretical development of the scientific discipline.
- Methodological-technical level: it is an operational level, in which scientific activity is carried out and scientific research processes are practically developed.
- Pragmatic-experiential level: it is the level at which the research results are applied and validated so that it will be again, through practice, how experience is returned as a source of knowledge.

The interaction between these three levels denotes the complexity of epistemological practice in the field of medical sciences, especially bearing in mind the philosophical context in which medicine operates. The scientific, philosophical and epistemological context of the medical sciences is anchored in a framework of research traditions that seek to solve specific problems from theory, guiding scientific practice on the one hand, and scientific work on the other. But they also seek to provide answers to the deeper questions that are linked to the history of medicine and derive from the rational reconstruction of the scientific field of medicine.

The epistemological context of the medical sciences supposes differentiated domains in the theorization of scientific practice, which favors the grouping of problem nuclei and their solutions through epistemic approaches such as positivism, logical positivism, the critical school, interpretative conceptions, historicist vision, complex systems theory, semantic conceptions. Multiple approaches are permeating the scientific method applied by the different disciplines of the medical sciences that are dominated by two methodological conceptions in the construction of the context of justification on the discovery ^[67]: the hypothetico-deductive methodology and the emphasis to evaluate what the theories were capable of making and contributing to the knowledge of the reality of the health-disease process.

In the interaction of epistemology with methodology, Hans Reichenbach ^[68] in 1938 enunciates the difference between two fundamental tasks: the descriptive reconstruction of knowledge linked to the *context of*

discovery that is typical of medical sciences^[69]; rational reconstruction of knowledge, related to the *context of justification*, which is typical of epistemology. In the historical analysis of the epistemology-methodology relationship, four stages are identified: Aristotelian epistemology, the methodological revolution that gave rise to modern science, the consolidation of reflections on the method, and the diversification of epistemological interests^[70]. Each stage is circumscribed to a specific investigative tradition. Research traditions are defined as “a set of general assumptions about the appropriate entities and processes that should be used to investigate problems and build domain theories”^[41] scientific in particular; and are characterized by the following features:

- Certain number of specific theories that exemplify and partially constitute it. Domain composed of theories.
- Evidence of certain metaphysical and methodological commitments that as a whole individualize the research tradition and distinguish it from others. Systems of common group commitments that affect its identity or integrity.
- Unlike specific theories, it runs through a number of different, detailed (and often mutually contradictory) formulations, and has a long history, stretching over a period of time. Objectives of a methodological type, establishment of the ontology and ways of proceeding within the domain.
- Own functions: definition of problems, providing tools to solve empirical and conceptual problems, importance assigned to such problems within the framework of the domain.

The Aristotelian approach to epistemology was aimed at differentiating scientific knowledge from that which was not, in such a way that it established the distinction through the object of study and the method used for its study. Thus, the object differentiated one discipline from another. In relation to the method, he proposed the inductive-deductive method (or demonstrative, also known as the resolutive-compositional method in the Middle Ages) which was characterized by the fact that the scientist had to introduce explanatory principles based on the phenomena to be explained, in order to then deduce statements about the phenomena from premises that included those principles.

With the advent of modern science, in which the differentiation of everyday knowledge (truths of fact), philosophical knowledge (truths of reason), religious knowledge (truths of faith) and scientific knowledge itself, founded on truths, was established. of facts (the experience of the senses) and in truths of reason (the necessary demonstrations), the method acquires the relevance to establish the distinction between scientific knowledge from what is not, through the scientific method. This was characterized by verifying the hypotheses through the help of induction, the hypothetical-deductive method and the experimental procedure.

During the 19th century, the scientific method was consolidated and the social sciences made their appearance, so that the methodology began to be synonymous with epistemology. In this sense, the methodological reflection from the epistemological field propitious for the method to acquire the possibility of transforming the objects of study of the scientific disciplines, turning them into verifiable constructs, as Comte's positivism or Dilthey's effort to provide a method to the spiritual sciences. During the delimitation of scientific disciplines based on methodological consistency, he encouraged reflections on the method such as the one enunciated by Klimovsky: “the scientific method did not break when it was stretched to cover social problems. Nor is it broken if it is applied to other disciplines, particularly the humanities”^[71].

In the 20th century, epistemological interests regarding science began to diversify, in such a way that in addition to verifying that science could not be reduced to a method but rather was a human product of a historical and social nature^[72], the result of a psychological genesis^[19-21], a psychoanalyzable product^[73], and even an anarchic and methodless knowledge^[74]. This diversification, added to the methodological crisis of the social sciences, led to epistemology in its relationship with the scientific method acquiring two connotations: as a logical foundation of the scientific method and as research methodology, properly speaking. In this development, the positions of Mario Bunge, Gregorio Klimovsky and Juan Samaja currently stand out.

With what has been exposed up to here, and following the thought of Samaja^[75], epistemology as a method is focused on the understanding of research processes, so that the nature (essence) of its product, scientific knowledge, can be understood; the function of its procedures and the historical, social, cultural and ideological conditions in which it takes place; so that it will answer questions of the type: what does the scientist do when doing science? What kind of act is the act of scientifically explaining the phenomena of reality? Therefore, epistemology will have science as its object of study. as process. The epistemological reflection of science as a process fosters the discussion of the available knowledge about the research process and will go beyond the “epistemological surveillance” proposed by Bourdieu, Chamboredon and Passeron^[76,77]. Thus, epistemology as a method translates into an epistemological reflection that subordinates the use of techniques and concepts to the examination of the conditions and limits of their validity.

VII. EPISTEMOLOGY AS A CRITICAL REFLECTION OF KNOWLEDGE

Viniegra^[78] points out that epistemology is a philosophical discipline that deals with the study of the knowledge process that from a structural approach presents two perspectives: the diachronic and the synchronic. The diachronic aspects of the knowledge process consist of the modifications or transformations that knowledge undergoes in its evolution, while the synchronous aspects of the knowledge process refer to the relationships of the different types and levels of knowledge, at a given moment. When one ventures into the critique of knowledge, it is necessary to try to acquire a vision "from outside" of the knowledge process itself where the knowing subject is immersed. Only in this way does the possibility arise of understanding why the knowledge process has a certain structure that characterizes it today (*synchrony*) and how it came to be what it is (*diachrony*). From the above, it can be deduced that epistemology is a discipline in constant questioning and modification, an arena of ideological struggle where crucial issues for knowledge are settled^[78].

The inheritance of epistemology developed during modernity entered into crisis from the middle of the 20th century, when complex relationships were established with the theory of knowledge and the philosophy of science, which led to a growing naturalization consolidating the normative dimension of epistemology for with science^[79]. Crisis that led to the questioning of rationality as the natural basis of knowledge in general and that led to a set of questions to epistemology among which stand out: when is a belief justified?, what reasons are there to prefer certain methods research to others? By what criteria should scientific theories be compared? What are the goals of science? Does it make sense to speak of scientific progress? Is there any difference between scientific knowledge and other forms of knowledge?^[80]

In transiting through paths to respond to this type of questioning, epistemology has ceased to be an a priori and universalist normative reflection that sought to establish the essential conditions of rationality, to evolve towards a critical and plural reflection, whose normative function consists of in offering operational and pragmatic criteria to mediate advances in knowledge^[81]. As León Olivé points out:

“... epistemology must resort to the cognitive methods of science, take into account the substantial knowledge of science, and that epistemology must see itself as having a *a posteriori* status, in the same sense in which it does science... the starting point for epistemology is knowledge systems as they really exist. The epistemologist is not beyond the very conceptual frameworks of science, he is within them”^[82].

From this perspective, two events have marked epistemology during the 20th century: the emergence of naturalized epistemology enunciated by Willard V. Quine^[83] in 1968 and the understanding of the historical, social and collective production of knowledge exposed by Thomas S. Kuhn in 1962; two turning points in the history of epistemological thought that contributed to transforming epistemology into a discipline with a practical sense as a mediator between the general concepts of epistemology and the epistemological developments of particular sciences in its task of specifying the normative criteria that define the rationality of his knowledge.

Epistemology as a critique of knowledge focuses its interest on mechanisms of thought that explain how in the real processes of construction of scientific knowledge, the operational criteria that make progress or scientific advancement possible, giving meaning to normative epistemology; so that the construction and reconstruction of research traditions are attached to epistemic models and reasoning styles of each discipline.

The reasoning style, as possession of an enduring, impersonal social unit, product of the practical and reasoning processes that specifically shape knowledge; he develops his own self-stabilization techniques, and shapes his own path, until he becomes autonomous from the microsocial incidents that led to it. Their content may be common to several sciences, and although they may be developed or abandoned, they are “immune” to formal refutation processes^[84]; so that critical epistemology is focused on scientific praxis, on the scientist's work, generating analyzes that not only justify their research processes, but also set trends for the progress and development of both scientific disciplines and of science. epistemology itself.

In this sense, Piaget's genetic epistemology, the Lakatosian thought of scientific research programs, Piaget's constructivist epistemology, Hugo Zelman's epistemology of the present potential, or the development of positions such as those generated by Humberto Maturana and Francisco Varela in *The Tree of Knowledge*, and the epistemology of complex systems such as that enunciated by Ilya Prigogine and the epistemology derived from complex thought by Edgar Morin. There are multiple epistemological currents that reflect a reflective and critical position towards scientific knowledge, however, all of them have in common the rescue of man in his context, in his possible life world from which all languages arise, including the discourses of Medical Sciences.

VIII. CONCLUSION

The analysis of the thematic field of epistemology shows that medical epistemology should not be reduced to the study of medical knowledge, since it is diversified in fields that go from the knowledge that is obtained through the biomedical sciences, to the field of own knowledge. of the sociomedical sciences, as well as the medical humanities, moving through clinical knowledge. This multiplicity of knowledge that converges in the medical sciences and medicine requires continuing with the diachronic and synchronous analysis of the epistemological traditions that have characterized the development of medical sciences in its historical evolution, as well as the analysis of medical practice oriented towards understanding of the health-disease process.

Recognizing the influence of Mario Bunge's thought in the field of medical sciences, it is important to return to the fields of analysis that he proposes, so that it will be possible to develop elements related to the logic of medicine, the semantics of medicine, the theory of medical knowledge, the methodology of medicine, the ontology of medicine, the axiology of medicine, the ethics of medical science and the aesthetics of medicine; which will lead to reflection and critical analysis of: the evidence obtained from the patient's reality (through the clinical history and clinical examination); medical rationality and the elaboration of the differential diagnosis; causality in medicine; the cognitive relationship between doctor, patient and technology; in addition to recognizing the patient as another knowing subject.

In conclusion, the epistemology of medicine is understood as the critical study of the scientific principles that support clinical practice, the hypotheses that are formulated in biomedical, sociomedical, clinical and humanistic sciences, as well as the results obtained in the different scientific fields of the health sciences that converge in medicine, so that the epistemology of medicine makes it possible to determine the logical origin of medical knowledge, in addition to inquiring about the value of medical science and the objective content of the fundamentals that give meaning to scientific practice in the construction of medical knowledge

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