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The Odyssey of Science: The Case of Karl Popper and Adolfo Figueroa

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Abstract

What does the Immanuel Kant's paradox mean for science? Why is the difference between analytic and synthetic sentences-propositions a central puzzle in science, epistemology, analytical philosophy, and philosophy of science? These inquiries entail a profound research on the foundation of philosophy and science. Despite all this necessary endeavor, this brief article focuses on the case Popper-Figueroa with the purpose to highlight the basic philosophical challenges regarding the construction of the bedrock—the substantiality of ontology— or the substratum in the scientific process.

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1. Introduction

Karl Popper (1992) was an Austrian philosopher recognized for his important publication *The logic of scientific research*, in which he offers his contribution to the philosophy of science, especially with the theory of falsification, refutation, and demarcation, very controversial matrix for the logic of modern empiricism, logical empiricism, science, and philosophy in general. Furthermore, Popper (2020) is also recognized by another publication *The open society and its enemies*. Is his theory of liberalism based on the logic of falsification and demarcation? How consistent was Popper with his own political theory?

In his turn, Adolfo Figueroa was a Peruvian economist. His research begins with the problem of economic inequality in Peru. Webb and Figueroa (1975) published *Income distribution in Peru* which had important effects on the modern economic investigation on this Andean country. This book arises in the middle of the horizon of the discussion of the history of Peru and the conflicts of the 1970s—the oligarchy, the land problem, the peasant, the guerrillas, the first great migrations, and the colonial heritage. In this context, agrarian reform arose, a plan executed by the military government in the 1970s in order to solve one of the central problems: the distribution of land. And what was the effect of this reform? For Figueroa, the results show minimal impacts, for example it only benefited 15% of the population and, even more, this population was not the poorest in the countryside. He also carried out an economic study in eight communities in the southern highlands of Peru, and developed his theory of the peasant economy. From here on, income distribution became the gravity force of Figueroa's research.

Considering these two different intellectual paths, how can we understand the Popper and Figueroa connection? How should we explain this research process of Figueroa? How do we make sense of his theory of the peasant economy and the unification of capitalist theory? Would the epic Homer's *Odyssey* be a metaphor to explain this scenario? What was the maturation route? What were the philosophical factors behind this trajectory? This process is not studied yet at its fullest. And it would be important to analyze this case because it would shed light on the functioning of scientific research, not only in its methodological component, but also in its cognitive evolution regarding the role of the question and the problem. How do we connect the studies of income distribution and Popper's theory of falsification? From a philosophical point of view, I will draw just a few lines to, somehow, come closer to understanding the research process, the voyage, and the Homeric *odyssey* of Figueroa's frameworks.

What was the significance of Popper on the development of Figueroa's economic theory? This question is central to understanding Figueroa's productive period in the field of research on the capitalist economy, especially in his latest works. Various analysts approach Popper's influence on Figueroa somewhat hastily. Figueroa's scientific method—including debates between Carnap (1996) and Popper—is believed to be linear or perhaps a matter of form only, which ignores the significant problems that Popper engendered in the construction of Figueroa's frameworks, especially those on Growth, employment, inequality, and environment. Unity of knowledge in economics; Economics of the Anthropocene age; and The quality of society. Essays on the unified theory of capitalism. Others maintain that Figueroa would deceive us, would make us believe

that something is central when it is in fact only a "cover up" or "sugar coating." For example, they maintain that Figueroa employs Popper as a tool to criticize classical, neoclassical, and Keynesian theories. If this hypothesis is true, then we would be entering a complex scenario where Figueroa's theory would have several schemes and stratagems within it, and even more we would be facing a political program covered by a scientific mask. If this were the case, the best method of analysis would be to use Wittgenstein's (2017) theory of language games to discover Figueroa's pseudo-Popperian position. This situation would bring complicated consequences for this scientist.

I, personally, do not share these positions. The task, consequently, is to analyze the implicit architecture, the philosophical factors, of the quantitative argument that appears in Figueroa's publications. This is a project for the future, but here I will present the first sketch of the history of this architecture of his publications, especially the most recent ones. Herein lies the contribution of this economist: not in his solutions but in the questions and problems he has posited not only for economics but also for science and philosophy. These first lines of the history of architecture address the significant conflicts and theoretical questions that Popper provoked in Figueroa's thought and productions. It was neither an easy process nor a harmonious intellectual friendship. Consequently, and after a long process of reflection, the author of the sigma society developed his own economic theory employing six methods: quantitative methods, physics, biology, economics, sociology, history, and epistemology and philosophy of science. How was a theory developing through synthesizing these methods? To Figueroa, the central task entailed creating a new economic theory: The unified theory of capitalism.

After researching and publishing on the peasant economy, agrarian reform, income distribution, and the liberal economic reforms of the 1990s, Figueroa faced a turning point in his work. What need did Figueroa have to carry out this position? What did he observe in the social reality? From the peasantry to Quine (1980)? We could say that this paralleled what took place between the philosopher Kant (2020) and the value of a priori propositions when facing David Hume's work on empiricism and its limits— as well as between Quine and his Two dogmas of empiricism.

Figueroa faced a dilemma: the concept of rigor and science. Despite using quantitative methodology, how do we know that the theoretical process is rigorous and scientific? How can we answer this question? Here entered a line of knowledge that was unfamiliar to him: epistemology and philosophy of science. Two of its main contributions included Haack's (1978) philosophy of logic and Russell (2004) works regarding the principles of philosophy and mathematics. These initial readings led Figueroa to the Kripke's (1980) theory of logic and the concept of "necessity", to the Cartesian problem of the cogito and the mathesis universalis, and to the whole derivative problems of axioms, principles, sentences, foundations, and the system of propositions. As a result, Figueroa reinterpreted the fundamentals of science in general and the science of economics in particular. And he then analyzed —with different perspective— the works of the renowned mathematician and economist Georgescu Roegen, professor in his Ph.D. program and one of the most important authors in his economic thought, especially in the use of the concepts of bioeconomics and the laws of physics.

Figueroa dedicated several years to studying the philosophy of science. As a consequence, he discovers fundamental problems of knowledge in general and of science and economics in particular. He finds great debates among the most important theoretical physicists on reality, beings, space-time, existence, metaphysics, objectivity, relativism, rationalism, realism, theory, evidence, David Hume, Immanuel Kant, W. Quine, Rudolph Carnap, and Karl Popper. This new horizon was nothing other than the complex problems of epistemology that resulted from research in cosmological physics and quantum physics. Personally, I maintain that the big questions of today—the most pressing challenges in epistemology and philosophy of science—do not originate in philosophy but in physical science, especially in quantum physics. For example, Figueroa reflected on these debates and scientific investigations in the works of [Einstein \(1967\)](#), especially in his system of propositions that belong to his work on the theory of gravitation; [Weinberg \(2015\)](#) in his unlearning thesis; [Boltzmann \(1974\)](#) with his question "why do we observe irreversibility?"; [Schrödinger \(1992\)](#) and the equation of "anomalous behavior"; [Heisenberg \(2007\)](#) in his concept of "modelling and experience"; [Zeilinger and Reiter \(2010\)](#) in "mathematics and the universe itself"; [Prigogine \(1997\)](#) with the thesis "reality is many possibilities"; and [Feynman \(2011\)](#) with his concepts of "equivalent theories", and "logical proof". Figueroa was surprised and intrigued by these discussions that impact science so directly and that are articulated, for example, by [Putnam \(2012\)](#), W. Quine, Rudolph Carnap, and Karl Popper.

These theoretical physicists needed to analyze these problems because of their scientific investigations. Figueroa then rediscovered the enormous problem of true and false propositions and the concept of validity and truth. And thus, he arrives at Kant's differentiated propositions, then the Vienna school with Carnap and the logical empiricism. Finally, Popper. After several months of study, Figueroa uses the Popperian concept of "refutability" in his work. What does this concept mean?

Figueroa spent considerable time studying Popper and his challenging development of demarcation theory. What did Figueroa see in this philosophy? To what extent was it useful for his research on income distribution and the nature of sigma society? Why did he not consider Quine's theory of dogma important, for example? Why did he not consider Wittgenstein's theory of representation and the Tractatus framework? Why Popper and his theory of science as "refutability"? What was the problem of classical, neoclassical, Keynesian, and Marxist theories in economics research? The truth is that Popper transported Figueroa to a deep and complex universe. He introduced him to the world of science—but to a science that Figueroa did not know, despite having studied formal methods, mathematics, calculus, metrics, statistics and econometrics in his Ph.D. years in economics in the United States. Anecdotally, Figueroa would always ask in meetings with foreign colleagues: "Why did I have to read Popper? I was so happy before knowing his theory. My concept of science was so loose. My ignorance was so enormous. I was a joyous man." Popper's had enormous effects, both positive and negative, which have not yet been fully evaluated in Figueroa's work. The difficulty in doing so rests on the starting point: Karl Popper's philosophy of science.

What does science mean to Popper? Answering this question was the great project of this philosopher and professor at the London School of Economics. Highlighting main points only.

Popper states that "science is refutability." This statement marks the beginning of the advancement of science. "Refutability" means a method that does not seek confirmation of a theory but rather its error, its death. Popper's method is like a system of missiles, and the mechanism of science guides the crime. To develop this concept, Popper studied the following theories: Einstein's theory on "gravitation", Freud's theory in psychoanalysis, Marx's theory and history and Adler's theory in individual psychology. What is the difference between them? For Popper, this sample is of great importance. What makes the difference is "the risk involved in the prediction." This is "refutability." He then derives an important point. There exists the "empirical method, non empirical method, and pseudo empirical method." Evidence itself is not a sufficient requirement to deem a system of propositions as scientific. What matters is to assess the method of confirmation or falsification and the type of propositions of the future scientific theory. Popper thus concluded that "demarcation" means to differentiate between a system of scientific propositions and another system of pseudoscientific propositions. Furthermore, unlike Wittgenstein in his *Tractatus*, Popper gave significance to the myth, to Freud's theory, but maintained that these authors (Marx, Freud, Adler) have not produced scientific theory because their system of propositions does not follow the principle of "refutability" and because they are not structured under the logic of "risk"; on the contrary, they are systems that reinterpret the concordance between theory and evidence. This methodology is typical of myths— and myths are important in society, but they are not scientific.

Figuroa incorporated this enormous concept of falsification or refutation and demarcation into his works. It was not only useful to his methodology, but also allowed him to discover the problem of science and economic science in another way. Nevertheless, Figuroa noted that "refutability" is not commonly used in scientific research or in the scientific community, and that Kuhn's (1962) scientific revolutions theory would perhaps guide researchers—for example, concepts of consensus, structure, and paradigm anomalies. Figuroa observed that the candidate to become the "scientific" theory is generally defended, supported, and reinterpreted even when it is false, even when it is rejected by the evidence. This economist proposed an important question: Why do science and scientists behave like this? Is Popper's demarcation theory a marginal topic? And he asked another question: does the use of Popper imply social prerequisites? This question is closely linked to his theory of income distribution, sigma society and the issue of social, economic, and historical preconditions. These questions marked the complicated routes in its development and theoretical evolution. These doubts do not have an easy answer because Popper also did not consider them.

"Refutability" led him to other observations. When he taught the epistemology and philosophy of science course at the undergraduate and graduate levels, he realized that science was lacking in the minds of economics students. The graduates—very interested in smart economics and artificial intelligence—lacked the fundamental scientific knowledge, the discussion of quantum physics, and the philosophy of science in general. Figuroa thus developed a key question: what is the concept of science used by the scientific community, the educational system, and society in general? For example, what knowledge does the working class have regarding the social world? This experience led him to Foucault (1980) works, especially those on the themes

of power, knowledge, and discourse. What is the difference with Marx's theory of ideology and alienation?

Popper-Foucault took Figueroa to deep universe. How are paradigms formed? How are discourses disseminated? Why are fallacies so widespread? Why is there so little Popperian science among a large part of the population? As we can observe, these questions lead us to question Popper himself. Is Popper a normative philosopher? These doubts led Figueroa to a discussion with Karl Marx, Eric Hobsbawm, and the postcolonial theorists such as [Said \(1994\)](#), and [Bhabha \(2004\)](#). But these analyses relate to his own concepts of "path dependency," the role of elites, and sigma societies.

For Figueroa, Popper was the tool for the construction of an economic theory, especially a new framework: The unified theory of capitalism. However, Popper also gave rise to fundamental problems. As a consequence, Figueroa —trained in economics— left us important philosophical questions that framed the foundation of his system of equations, measurements, and mathematical statements in his scientific analysis.

First: Would The society of quality have any importance for Popperian science to be possible?

Second: For Figueroa, what is the difference between [Rawls \(1999\)](#) theory of justice and Popper's justice?

Third: Is Popper's demarcation theory empirical or normative? What is Figueroa's conclusion?

Fourth: How can we understand the concept of "evolution" in Figueroa's unified theory of capitalism?

Fifth: How can we understand the relationship between Popper and Marx in Figueroa's economic theory, if both philosophers have different assumptions?

Sixth: What is the underlying problem of representative democracy in sigma, omega, and epsilon type societies? Can Popper explain one of Figueroa's theses: "power relations, a result of the initial inequality in the individual endowments of economic and social assets"?

Charles Darwin was one of the few thinkers who stirred the most central structures of knowledge. Until today, the concept of evolution continues to present conflicts, debates, questions, challenges, and trends. His holistic vision as a naturalist was enormous and his impact colossal. As far as the history of architecture from his theory can be understood, Figueroa was also a holistic scientist. And he may be one of the last with this profile. Today the incentive is found in specialization. This raises several questions about the future of the concept of science and analyticity —in Quine's terms.

Popper opened a complicated cosmos in Figueroa's theory, a world that went beyond Popper himself. Despite everything, it encouraged Figueroa to go deeper and once again question himself on scientific research, equity, wealth distribution, working class, power, history, elites, sigma societies, justice, development, growth and finally climate change and the fate of man.

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