Sociology Study ISSN 2159-5526
July 2011, Volume 1, Number 2, 143-152

Poly-contextural Logic: New Resource for Transdisciplinary Research in Sociology

Miguel Ángel Briceño Gil[a]

Abstract

A couple of decades ago natural phenomena began to be approached from a comprehensive and transdisciplinary point of view, as it was understood that living beings and their environments are not linear but complex. There is no doubt that this perspective of visualizing complexity and working inter- and trans-disciplinarily has to be applied. The reflection on the theoretical observation (i.e., meta-observation) involved in the concept of poly-contexturality is the framework in which a theory of complex systems is possible, which in turn enables an observation that oscillates (a concept of chaos theory) between models structured in a hierarchical order (normally linked to a logical-deductive formalization) and models structured in hetero-hierarchy. And this would allow this reflection to be done in a formalized language that does not follow either the principles of the Aristotelian logic or the postulates of the Kantian transcendental reflection. It is precisely this liberation from the dictates of mono-contextural logic what paves the way to an observation of complexity, in which one or the other language is used to model the states of things, such as the epistemological problems of molecular biology or the social systems. And—what is gaining relevance—it also paves the way to a true transdisciplinary meta-observation, since each discipline chooses its own contexture and only the use of poly-contexturality makes it possible to formulate transdisciplinary relationships within the framework of such meta-logic.

Keywords

Poly-contextural logic, transdisciplinary, non-linear complex systems

In his reflections about the future of philosophy, Jung (2002) warned that in order for academic philosophy to maintain itself in these times, two goals need to be pursued consistently: (1) philosophy should address problems of practical concern—such as society's ethical, social, and even metaphysical needs—presenting them in a commonly accessible fashion; (2) philosophers should draw material from other academic disciplines—linguistics, neurophysiology, archaeology, biology, psychology, mathematics, astronomy and other specializations—for their own speculation, taking advantage of the integrative functions of philosophy to promote the cooperation between all disciplines.

There is much evidence that philosophy as a common human activity will endure because it appeals to a fundamental need: to reconsider knowledge and to go on inquiring when empirical research has reached its limits.

Achieving these goals clearly requires that philosophy opens up, recovering its role as a

[a]Central University of Venezuela, Caracas, Venezuela

Correspondent Author:
Miguel Ángel Briceño Gil, Humanities Faculty, Institute of Philosophy, Central University of Venezuela, Caracas, Venezuela
E-mail: mibricen@gmail.com

knowledge universalizing agent, while it also demands an attitude of respect towards the different scientific disciplines and of curiosity towards the discoveries resulting from their work. It means going back to situations in which the generation of crucial philosophical knowledge was bound to a direct reflection about the concomitant human activities examined from a historical point of view.

Bühlmann thought that there are reasons for the doubts to exist whether we can still philosophize. However, "philosophy" is not just the discipline with that name, but it should deal with the world existing whole, with all the knowledge:

> What will be the future of philosophy? Posing this question is the same as asking ourselves about the future of humanity! (Bühlmann 1998)

The one who philosophizes necessarily requires a free philosophy and an autonomous science that makes possible to ask oneself about the meaning of the history to which we are bound, that makes possible to ask oneself to which extent truth is possible for someone who depends on the relativity of constant changes. Such questions have been unavoidably addressed by philosophy since Hegel's times; they should in fact be part of any reflection. At that moment, the need of philosophy was to get free of the infinite invariability implied in the classical mechanics and its Kantian philosophical manifestation. This was Hegel's proposal, which allows the transition from the eighteenth to the nineteenth century, reflecting about the need of a philosophy for that future (Briceño Gil 1992).

From philosophy in general terms, it is expected that it serves as a guide to the political and institutional transformation processes, but philosophy as a specialty does not generate any particular expectations. The orienting role is left for those philosophers who follow their own course. The limited consolation can be found in philosophy as a discipline also hides its failure.

Philosophy as an academic discipline did not develop its own potentiality on a large scale, so as to get through to common people. By this potential Gimmler (1998) understood the classical philosophical virtues of critical analysis of the present object, the revision of the thinking resources and the concepts used, the practice of discernment, and the pragmatic-practical orientation of thinking, which is regrettably and very commonly pushed into the background.

The already tested combination of transdisciplinarity and an orientation towards the problems is considered by Gimmler to be the basic guideline that should be followed in this necessary transformation of philosophy. A pragmatic orientation of philosophy in these terms would certainly imply historical and systematic research at the very heart of philosophy.

It is noteworthy that philosophy, as a specialty, not only has become less important for society and the people, but it is also under threat of being ostracized within the sciences. In order to be able to play a significant role in the discussions on issues such as the body and its frameworks, the dynamics of the globalized democracies' legitimacy, interculturality and the problems related to what is owned and what belongs to others, philosophy needs transdisciplinarity, which—rightly understood—does not imply less specialized competency, but it necessarily presupposes excellence within the specialty.

THE IRRUPTION OF COMPLEXITY AND THE NEED OF A TRANSCLASSICAL EPISTEMOLOGY

New knowledge has been developed during the last decade in a great variety of scientific disciplines about complex phenomena. Basically in the field of physics, biology, brain studies, sociology, psychology and managerial sciences (Goorhuis 1996), phenomena were discovered, all of which referred to phenomena that only become evident when complexity increases

significantly. There were attempts to develop theories to describe such phenomena, giving rise to, e.g., the chaos theory, the theory of self-referential systems, the catastrophe theory, the self-organization theory, the fractal theory, the systems theory, and the autopoietic systems theory[1]. The autopoietic theory was originally developed by biologists Maturana and Varela (1992) and later applied to social processes by Luhmann. Constructivism and the chaos theory show new ways to act within a constantly dynamic environment. This wide recent scientific production shows that there is now a thematic convergence among the different scientific disciplines and that the new knowledge about complex phenomena must be taken into account by philosophy in the future.

The observation of the plurality of observations involved in the scientific activity in a growing number of scientific disciplines, or the observation of controversies arising between those practicing ethical reflection about the impact of science on human life should be done without falling into the trap—as scientific thought commonly does—of forgetting that any observation implies a blind spot, i.e., "not seeing that one does not see what one does not see" (von Foerster [1979] 1996).

Overcoming the avoidable blindness when observing our situation is the challenge to be taken up by philosophy in the 21st century. The project will certainly face resistance and seductiveness coming either from the Cartesian rationalism that confined thinking to the subject, from the reductionism resulting from the model of scientific knowledge applied in fields such as economics and sociology, or from the instrumental rationality (with its theoretical prejudice that the only valid explanation is the causal one), among others. The idea is to overcome dogmatic positions, which is not an easy task, as it implies changing the subject-centered thinking for the one centered on communication.

Yet the idea is not to have an observer with similar characteristics. The solution would not be that Habermass observes the way Neo-Kantians observe in the way Kant observes Newtonian physicists, but it demands meta-observation of theoretical-scientific observations (which is already second-grade observation, as they in turn observe the methods and actions of the praxis).

A new transclassical epistemology, as a structuration of such meta-observation, would have three basic postulates:

(1) Substitution of a transclassical poly-contextural logic for the dichotomic logic;

(2) Substitution of a communicational approach for a subject-centered one;

(3) Substitution of complexity admission for the calculatory-functionalist paradigm.

In the first place, this meta-observation would require establishing the use of a higher abstraction level—a level of "logic"—as an epistemological postulate. Key proposals (though not the only ones) to make possible this observation level could be the approaches of G. Spencer Brown and of Gotthard Günther, who redefined the level of abstract observation as one "produced" through the observer's action. This would save us from the ontologization of the formal and the abstract as a new reissue of Platonic ideas.

In the second place, the re-entrance of the observer demands an appropriate guidance to avoid the obstacles that have to do with adopting simple relativist stances, so as to develop new logics of thought organization. The hurdle here is represented by the logicist stance narrowing the observation focus and thus intensifying the "blind spot" effect, very far from the wisdom-based position. Working on the logic level would allow overcoming the dominant logic paradigm—the Aristotelian one, with its dichotomy formulated through the principle of the excluded third, which is still present even in the most advanced symbolic logics. Formal logic does not have an answer for this situation. Therefore, one of the crucial aspects of a complexity-oriented epistemology

Table 1. Method of Propositional Calculus

p	~p (NONp)
(true) 1	(false) 2
(false) 2	(true) 1

project is one of a transclassical logic.

FROM THE DICHOTOMIC LOGIC TO THE POLY-CONTEXTURAL LOGIC

The hypothesis of a single logic (understanding reality through hierarchies: one reality, one truth, one God, one nature, one society, etc.) could not have other foundation than the hypothesis of poly-contexturality: different contexts of questions with different meta-logics, and not having to assume either a reality, nor a truth or a logic. In the poly-contextural logic of Gotthard Günther (1900-1984)[2], the original dichotomy of "Tertium Non Datur" is substituted by poly-contexturality. The author is not trying to deny the internal validity of the basic postulates of the classical logic (Identity, Noncontradiction, Tertium Exclusum), which have created a very useful conceptual framework as shown by the progress made by the different scientific theories and models.

Günther worked on reinterpreting the idea of dialectics transferred from Proclo to Hegel, based on which he conceived a transclassical logic. He attempted to develop a logic that would formalize the reflection processes regulating the observer's operations, not only setting rules for valid or invalid relations (e.g., of inference) between the contents of those operations. The idea of poly-contextural logic, which originated from Günther's studies of the work of Hegel, Schelling and Cybernetics, is an extension of classical logic to cover simultaneously active ontological locations. It is based on the development of a philosophical theory and a mathematics of dialectic and self-referential systems—a cybernetic theory of subjectivity and an interplay of cognition and volition.

Poly-contextural logic is a many-systems logic, a dissemination of logic, in which the classical logical systems (called "contextures") are enabled to interplay with each other, resulting in a complexity which is structurally different from the sum of its components. However, it does not fall into the category of fuzzy logic and offers new formal concepts such as multinegational and transjunctional operations.

Coexistence, as heterarchy, of infinite logic locations can only be described by a non-classical relationship in a poly-contextural logical system. It is a "proemial" relationship, i.e., one that "prefaces" the difference between "relator" and "relatum", providing a foundation of logic and mathematics at deeper level as an abstract potential from which the classic relations and operations emerge, ruling the mechanisms of distribution and mediation of formal systems.

Günther (1997) first stated that until that moment it was well established that the human mind could only think in Aristotelian categories, but he discovered that mechanical brains, however, will work differently and will eventually be able to "think" in non-Aristotelian forms of reasoning, which had already applied to quantum mechanics and whose most important field would probably be social sciences and cybernetics. He also analyzed Euclidean geometry, which rests on arbitrary axioms, and realized that if these axioms are replaced by a different set of assumptions, the result might be a different geometry, such as Fractal geometry. Based on this, he—as many logicians—asked himself

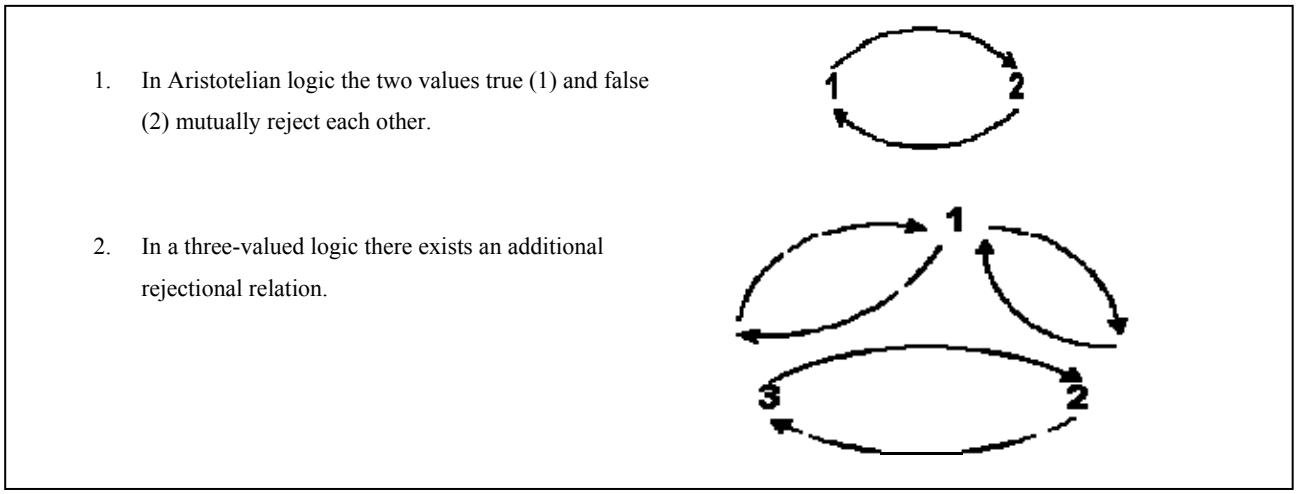

Figure 1. Three-Valued Logic

whether the same might not apply to a system of logic as well.

Limitations of Aristotelian Logic

Classic aristotelian logic in Günther's work. If logic is a rational technique it can be technically handled. This is done by the method of propositional calculus, which is a technique of combining logical statements according to their truth values. The letters *p* and *q* are used in order to symbolize any two statements. The tilde (~) is used to represent the negation, and a dot (●) has the meaning AND. Therefore, ~*p* is read as *NONp*, and *p*●*q* as *pANDq* (see Table 1).

Any statement in this dichotomic technique of thinking must have one of the two values: it is either true (1) or false (2) and these two values are mutually exclusive. No third value exists. Besides, all Aristotelian logic is characterized by a very strict limitation: It cannot make any valid statements except about past events. A proposition about the future has only probability value. The dichotomic occurrence pattern does not apply. Therefore, there is the need of at least a three-valued logic, and any statement about the future should be phrased according to the laws of a non-Aristotelian system of logic thought.

Three-valued logic. In a three-valued logic (see Figure 1), there exists an additional rejectional relation. Apart from the mutual negation (rejection) of 1 and 2 there now exists an analogue relation between 2 and the new value, 3. That means that there is a logical choice for the argument. It can either return from 2 to 1, or it can also proceed from 2 to 3. In fact, this latter course is exactly what will happen. An entirely new rejectional relation is produced: 3 not only rejects 1 and 2 individually; it rejects, moreover, the whole alternative which is represented by the mutual opposition of 1 and 2.

To put it differently: 3 not only rejects the contrasting features of 1 and 2, it also negates that which the first two values have in common. It negates not only the individual instances, but it rejects their common denominator. And since the relation between 1 and 2 is, in the end, about events, when the 3 value negates the common denominator we should arrive at the idea of "no event" as last solution.

Yet regardless of its variety and existence, in the universe the Whole is part of the category Being as a non-differentiated and symmetric whole. The Being is only different from the Nothing and no logical operation can start to continue in the Nothing. But both are related through their mutual ontological position defined by the logical principle Tertium Non Datur (excluded third) in its most absolute generalization: an ontological contexture.

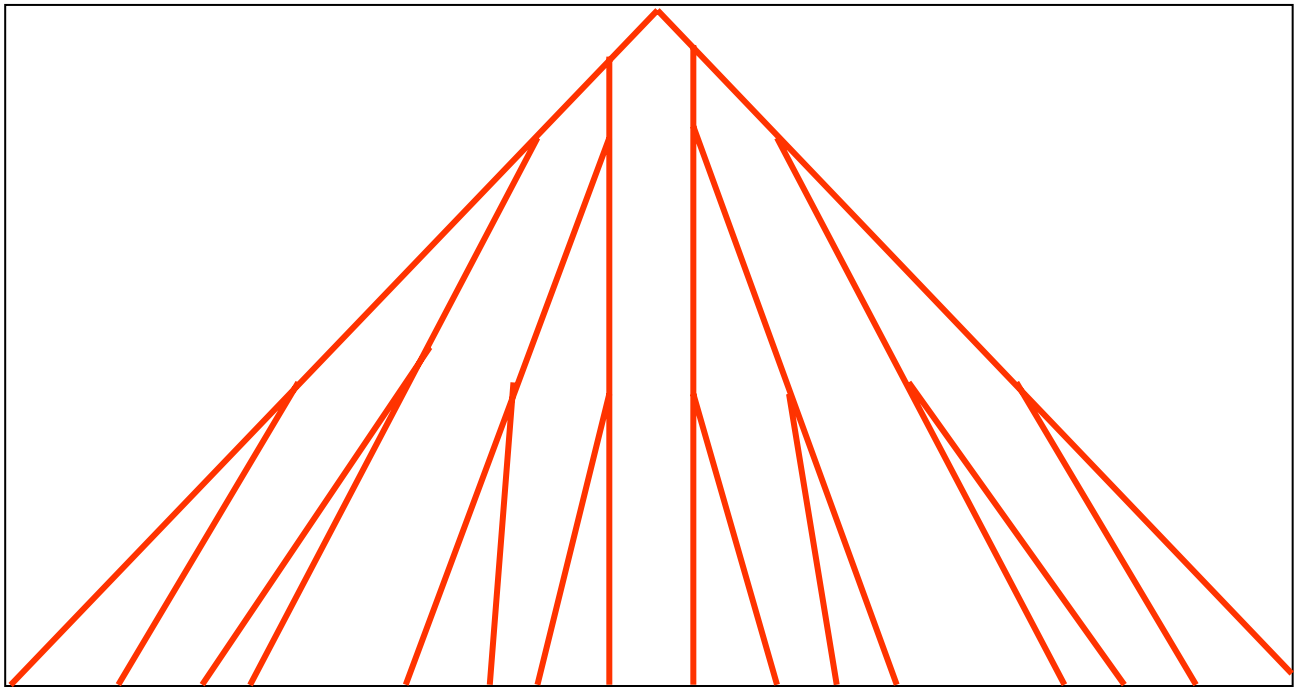

Figure 2. The Platonic Pyramid of Diairesis

But the Nothing is not "Empty". It has served as an ontological location for everything that does not seem to be rationally conceived and also for the observer of the world or thinking subject who does not occupy any space in the Being. And it would be absurd that the knowledge subject is part of the contexture that is being known.

The Contexture Concept in Günther's Work

Categorial context. In any proposition, we assign to the object of the predication not only a predicate, but also a context within which the predicate is relevant, or not relevant. The Tertium Non Datur (TND) has two functions (Günther 1972):

(1) It is used to decree that a given datum of experience must have the property *a* or *non-a* (exclusively) and refers to a stateable context. This is the only way in which logic can be applicable to the empirical world. It is the EXISTENCE (stateable positive context);

(2) It may operate in such way that it encompasses all positive contexts and puts them into relation to something that is not a positive context at all. It is Negative, it is The Nothing. In this case no context can be given for the operation of the TND, as it designates a Universal Contexture. It refers to the ESSENCE (Being-in-general). In the classic tradition, it denotes a Metaphysical Entity and may be understood as an alternative between material content and that which does the containing, or, as proposed by Günther, an alternative between two universal contextures. While it is true that the increase of generality in the positive concepts diminishes the separating power of the TND, it increases at the same time its power to distinguish between context and contexture.

Platonic pyramid. Since the Being displays so many contexts and disparities, the metaphysical postulate was created that every context is capable of finding its place within a universal system such as that of the Platonic Pyramid of Diairesis (see Figure 2).

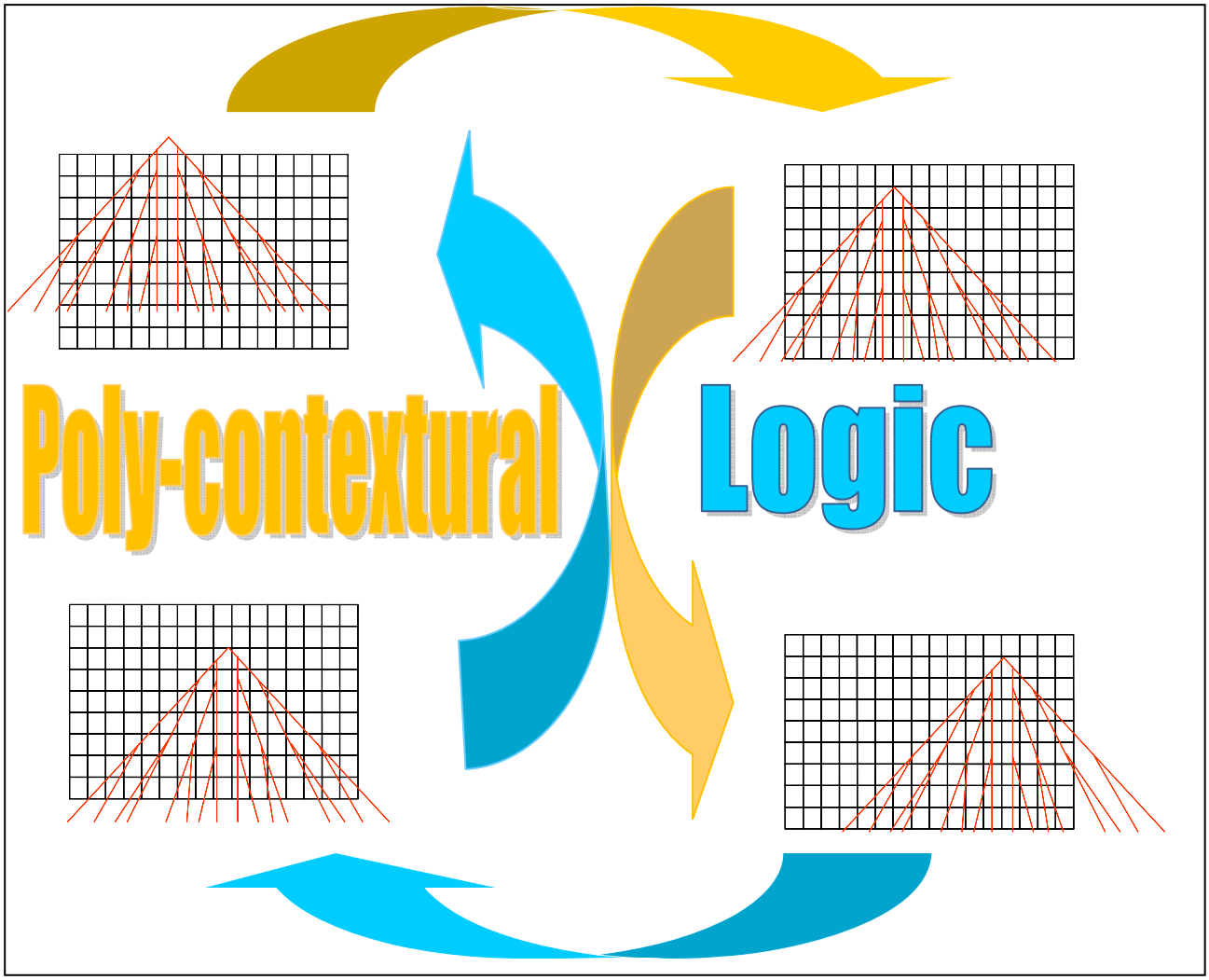

Figure 3. Heterarchical Coexistence

However, when we ascend from a differentia specifica to the genus proximum we never reach a preliminary apex or a coincidentia oppositorum[3]. And when we descend from the genus proximum to the differentiae specificae, we never reach the bottom (there is none), because it represents individualities that will always lead to further dichotomies. So the Platonic Pyramid of Diairesis does not have the coincidentia oppositorum on its apex, because when we move from the genus proximum to the differentia specifica we do not cover everything and, thus, we do not oppose nothingness. Therefore, there is no metaphysical hypostasis as an absolute general which encompasses everything, but neither mono-contexturality. This is the way Günther (1979) found to overcome the limitation to knowledge production in the classical science.

The first thinkers who broke consistently with the Aristotelian assumption of the mono-contexturality were Kant, Fichte, Hegel and Schelling, but it was especially Hegel who pointed out that Reality must have a poly-contextural structure.

The world has infinitely many logical places (or locations); each location is representable by a two-valued system of logic when viewed in isolation. However, a coexistence—a heterarchy—of such

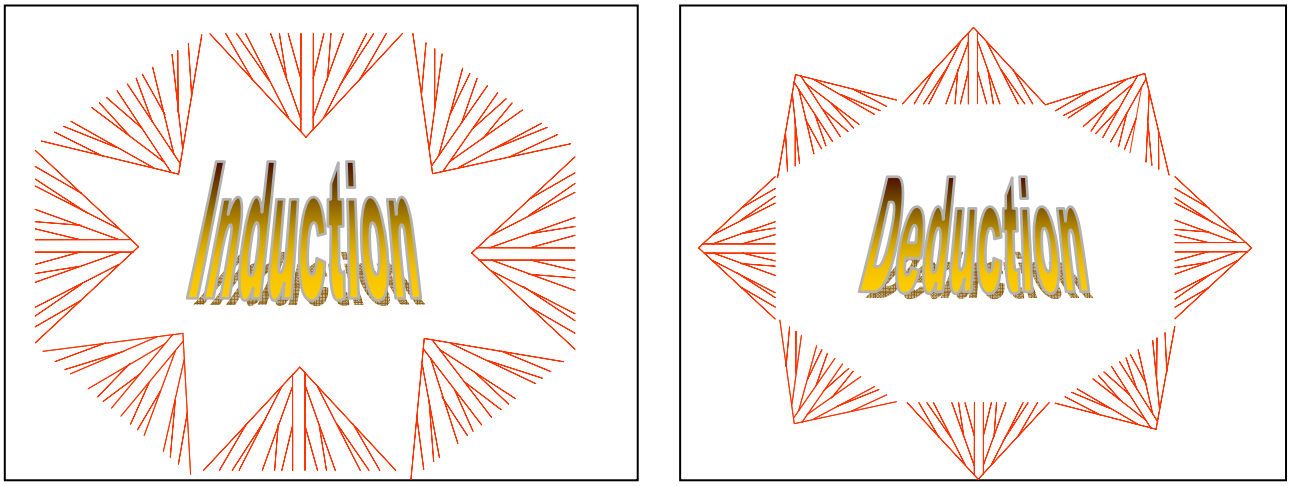

Figure 4. Poly-contextural Induction and Deduction

locations can only be described by a non-classical relationship in a poly-contextural logical system (see Figure 3). This is the so-called "proemial relationship"[4].

Potentialities of the Poly-contextural Logical System

This poly-contextural logical system allows to formally model cognitive and volitive processes with no contradictions. In a mono-contextural logic, the expression A= - A (A equal Non-A) implies that A can not be a proposition, because in that logic a proposition is either true or false. It has to be one of the two (Law of Identity); it cannot take both values at the same time (principle of Non-Contradiction); and it cannot take another value, i.e., Tertium Non Datur.

But this is precisely the problem faced when trying to formally describe complex systems and process such as that of life. If you try to model such processes within a mono-contextural framework, then either you have to "reduce" the system (and leave out initially valid aspects), or you have to accept casual loops (Second Order Cybernetics).

It is important to note that any measurement (be they of physical or chemical nature) automatically defines a contexture (even though the subject is not aware of this). This is due to the fact that the differences measured are only those that are framed in the same context and based on the same logic, as a basis to quantification. The observer performs their observation-measurement and by not observing themselves in that observation, they do not even become aware of the assumptions of their operation. In natural sciences, or in the economic theory based upon this same paradigm, nor even mono-contexturality and poly-contexturality are differentiated.

Poly-contextural logic sets the framework for different angles from which to observe and to be observed, from which to deduce and to induce without simplifying and reducing the process of knowledge production to the minimum expression. Now induction can be a process for the identification of multiple specificities originated in multiple logical places. At the same time, deduction becomes a process originating from different generalities produced in varied logical places (see Figure 4).

The reflection on the theoretical observation (i.e., meta-observation) involved in the concept of poly-contexturality is the framework in which a theory of complex systems is possible, which in turn enables an

observation that oscillates (concept from the chaos theory) between models structured in a hierarchical order (normally linked to a logical-deductive formalization) and models structured in hetero-hierarchy. And this would allow this reflection to be done in a formalized language that does not follow either the principles of the Aristotelian logic or the postulates of the Kantian transcendental reflection.

It is precisely this liberation from the dictates of mono-contextural logic what paves the way to an observation of complexity, in which one or the other language is used to model the states of things, such as the epistemological problems of molecular biology or the social systems. And—what is gaining relevance—it also paves the way to a true transdisciplinary meta-observation, since each discipline chooses its own contexture and only the use of poly-contexturality makes it possible to formulate transdisciplinary relationships within the framework of such meta-logic.

Notes

1. Krieger D.J.: Einführung in die allgemeine Systemtheorie. München: W. Fink, 1996, Malik F.: Systemisches Management, Evolution, Selbstorganisation. Bern: Haupt Verlag, 1993, Marko H.: Systemtheorie. Berlin (etc.): Springer, cop. 1995, Rapoport A.: Allgemeine Systemtheorie. Darmstadt: Darmstaedter Blaetter, 1988, Willke H.: Systemtheorie. München: Wilhelm Fink Verlag, 1993, Dahme, C.: Selbstorganisation und Handlungstheorie. In: Niedersen U. (Hrsg.): Selbstorganisation. Berlin: Duncker & Humblot, 1990, Jeanmaire P.: Selbstorganisation: Paradigma des nächsten Jahrhunderts? Technische Rundschau, Heft 50, 1991.
2. Gotthard Günther was born on June 15, 1900 in Arnsdorf (Germany). His Ph.D. was the first version of his book "Fundamentals of a New Theory of Thought in Hegel's Logic". On the International Congress on Philosophy (Brussels 1953), Günther presented the first version of his concept of a non-Aristotelian transclassical logic. From 1961 to 1972, he worked at the University of Illinois developing his fundamental ideas about poly-contexturality. After his retirement, he continued working on a theory of negative formal languages, which he presented in 1979 on the Hegel-Congress in Belgrade. He died in the age of 84 in 1984.
3. Nicolás de Cusa assumes that there is only one contexture (God).
4. "Proemial" means "to preface" and the relationship "prefaces" the difference between relator and relatum of any relationship as such.

References

Bühlmann, Daniel Mario. 1998. "Can We Still Philosophize? A Philosophical Reflection on a Possible Future of Philosophy." Symposium 1998 University of Marburg. Philosophy and the New Millennium. Retrieved (http://staff-www.uni-marburg.de/~gimmler/PhilosophieJahrtausendwende.html).

Briceño Gil, Miguel Ángel. 1992. "Hegel and Contemporary Thought." Graduate Papers Number 1, Faculty of Humanities and Education, Central University of Venezuela.

——. 2005. "Epistemology and Medical Complex." *Review Text and Context* 14(3), July-September. Federal University of Santa Catarina, Florianópolis, Brazil.

Cruysberghs, P. 1976. "Moral of the People's Organization." *Tijdschr Philosopher* 38:236-263.

Gimmler, Antje. 1998. "Philosophy at the Turn of the Millennium." Colloquium Philosophy and the New Millennium. University of Marburg. Retrieved (http://staff-www.uni-marburg.de/~gimmler/PhilosophieJahrtausendwende.html).

Goorhuis, Henk. 1996. "University Continuing Education in the 'New Capitalism'." Contribution to the Symposium on University Further Education on August 29-30, 1996. University of Zurich. Retrieved (http://paedpsych.jk.uni-linz.ac.at:4711/LEHRTEXTE/Goorhuis96.html).

Günter, Gotthard. 1959. "NO-Aristotelian Logic and Aristotelian. September 2, 1997." Retrieved (http://www.vordenker.de/gunther_web/aristotelian.htm).

——. "Contexture and Negation." Manuscript from August 21, 1972, at the State Library in Berlin. Signature: Nachl. 196,

266th Mp.

——. 1979. “Life as Poly-Contexturality.” Contributions to the foundation of an effective operational dialectic. Band 2 Meiner Verlag, Hamburg, 1979, pp. 283-306.

Jung, Joachim. 2002. “The Future of Philosophy. Ludwig Boltzmann Institute for Modern Austrian Intellectual History in Vienna.” Retrieved (http://www.bu.edu/wcp/Papers/Cont/ContJung.htm).

Lenk, Hans. 2001. “Current Challenges of Philosophizing. Michael Funken.” Retrieved (http://www.information-philosophie.de/philosophie/lenkweltumfrage.html).

Maturana, H. and F. Varela. 1992. *The Tree of Knowledge: The Biological Roots of Human Understanding*. Revised edition. Boston: Shambhala.

Spencer Brown, George. 1972. *Laws of Form*. New York: Julian.

Von Foerster, H. 1996. “Cybernetics of Cybernetics.” Pp. 89-93 in *Seeds of Cybernetics: Selected Works of Heinz von Foerster*, 2nd ed., edited by M. Pakman. Barcelona: Gedisa.

Bio

Miguel Ángel Briceño Gil, Ph.D., Professor Titular at the Institute of Philosophy, Central University of Venezuela; Director of the Institute of Philosophy and Coordinator of Postgraduate Studies in Philosophy; Member of the Directory of Foundation UCV; research fields: social epistemology, role of the university in regional development, and management of complex systems in sustainability.