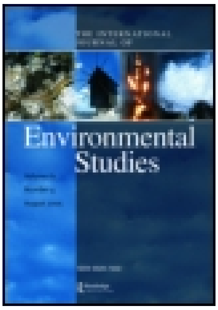

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Misrecognition: 4 Essays on C. A. Doxiadis

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Book review

Misrecognition: 4 Essays on C. A. Doxiadis, by Demosthenes Agrafiotis, Synapses, Athens, Greece, 2010, 125 pp., €15.00, pbk (ISBN 978-960-6723-12-4).

Constantinos Apostolos Doxiadis (1913–1975) graduated as an Architect-Engineer from the National Technical University of Athens in 1935 and obtained his doctorate at Charlottenburg University, Berlin, one year later. In 1937, he was appointed as Chief Town Planning Officer for the Greater Athens Area. During the war (1940–1945), he was Chief of the National Resistance Group, Hephaestus, and published the underground magazine 'Regional Planning, Town Planning, and Ekistics'. He was appointed as Undersecretary to the Ministry of Housing and Reconstruction (1945–1948) and Minister Coordinator (1948–1951) of the Greek Recovery Program. In 1951, he founded 'Doxiadis Associates', a private firm of consulting engineers that became established on five continents and in 40 countries. In 1959, Doxiadis founded the Athens Technological Organization, an organization for research and education. *Ekistics* is a term coined by C.A. Doxiadis from the Greek verb *οικὶζω*, meaning to settle down, and denotes an overall science of human settlements. Ekistics conceives of the human settlement as a living organism having its own laws. Through the study of the evolution of human settlements, it develops the capacity needed to solve its problems.

In his book *Misrecognition: 4 essays on C.A. Doxiadis*, Demosthenes Agrafiotis presents Doxiadis' work as an exceptional case in the Greek landscape of scientific and technological research and postgraduate studies from the period 1950–1975. During that period there were other research groups working with distinguished researchers, but none of their activities compared to those covered by Doxiadis' team.

The book consists of four essays written in the name of the approach 'S/T/S', Science/Technology/Society that together provide an indication of Doxiadis' peculiar route through the Greek cultural scene. The first essay explains why the work of Doxiadis constitutes a paradox in the Greek research landscape. The ambition of Doxiadis to create a new scientific field, and even an epistemological area, named 'Ekistics' does not correspond to the Greek context; it relates mainly to the international dynamics of scientific and technological knowledge and of course, to the dynamics of human settlements.

In fact from 1950 onwards, Greek society entered a phase of modernization characterized by a lack of correspondence between the functioning of an economically productive system and its sociocultural unity. In fact, it is still characterized by a conflict of directions. This 'tension' involves Research, Science and Technology. The demand for research in Doxiadis' day was very limited and it would be impossible to quantify the many gaps between researchers and those that might apply it. In this environment, the Doxiadis paradox has been characterized by a multitude of sub-paradoxes:

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- The most important works were realized outside of Greece.
- The high-level quality of organizational complexity required by the activities of research, education, and construction is even today considered difficult to achieve, even for technologically advanced societies.
- The desire to cultivate a scientific and interdisciplinary approach, together with the quest for a holistic approach, assured the preconditions for a constant assessment of the complexity.
- The interconnections between countries with strong traditions in the fields of research and education (e.g. the USA) permitted access to the most recent practices and knowledge of the time.
- The organization of various events (Symposia) with the participation of important personalities belonging to various areas of Science and the Humanities, led to the formation of cultural models with a worldwide range.
- The development of an extremely creative framework of theory-action and research-action tools and models.
- The emergence of international networks of clients, institutions and city planners who were educated at the Postgraduate School of the Athens Technological Organization (the only one existing at the time in Greece that was endowed with fully developed structures and procedures).
- The devotion to the creation of innovative theoretical tools, models, and techniques (cybernetics, digital databases, etc.) and the quest for the 'new', ensured a dynamic presence in the international forum of study and knowledge.

In a nutshell, Doxiadis was an excellent manipulator of the local and global, the present and future and the national and international dualities, within which he placed his Ekistics.

In the second essay, the author uses the Doxiadis paradox as a case (i) to elaborate on the possibility of a local initiative to create and sustain a scientific field and (ii) to express his thoughts about the research processes supporting the production of scientific knowledge. Such a discussion is useful in determining the conditions under which a group is capable of creating, developing, sustaining, promoting and 'imposing' a new scientific field, in a global world. There are many ways to address this issue, three of which are discussed in this essay. The first presents how Doxiadis himself perceived his contribution to scientific knowledge. The second presents how other scholars, scientists, political personalities and engineers have perceived Doxiadis' contribution. Excerpts from George McGhee (Former US Ambassador to Greece), Jean Gottmann (Professor of Geography) and Arnold Toynbee (Professor Emeritus of History, University of London, UK) are referred to as examples. The third way is an application of a scientific test based on Barnes's (1989) scheme of processes, in compliance with the point of view known as Science, Technology and Society. This is an interdisciplinary program that studies the circular causality between (i) social, political and cultural values and (ii) scientific research and technological innovation.

The author follows this third approach because he believes that what distinguishes science from other social practices is a set of institutional and procedural features. That is to say, the essence of science is achieved and assured through a specific arrangement of social mechanics and cultural norms. Having used Barnes' scheme as a template for telling the story of Ekistics, the author assumes that Ekistics as science satisfies many of the crucial criteria of this approach to science. Nevertheless, he thinks that Ekistics has to face some additional crucial challenges: (a) to forget its autonomy, (b) to re-examine its name in relation to the level of analysis and (c) to adopt new forms of governance in the areas of technology and research. In short, the final question is whether Doxiadis is the inventor of a scientific field or of an action tool.

The third essay discusses the Doxiadis paradox in a world of sociocultural uncertainties regarding knowledge and interdisciplinarity. In this context, the author formulates some questions as follows:

- What is the scientific status of Ekistics in the context of modern science?
- How does Ekistics shape its trajectory in a globalized economy?
- Is it possible for scientists and engineers to sustain Ekistics?
- To what degree does the personality of the inventor predetermine the evolution of his invention?
- Will Ekistics claim its title as a discipline or as a school of thought?
- If Doxiadis were alive today, what kind of innovative projects and visions would he propose to the citizens of our globalized and complex world?

Because Agrafiotis is not sure that he can answer these questions, he presents some elements in order to clarify the kind of questioning that involves the sociocultural challenges of scientific knowledge and technology in the risk societies. Agrafiotis exposes systematically various typologies of knowledge and elaborates on the question of interdisciplinarity, finishing his exposition with a reference to the inherent uncertainties. Of the uncertainties discussed, he focuses on the three most crucial from a sociocultural point of view: the first one refers to collective memory, the second comes from the expression 'knowledge society' and the third emerges from the distribution of the modes of knowledge. In this context, the author believes that if Doxiadis had the opportunity to begin his adventure again today, some of his ideas and analyses would be extremely pertinent, efficient and fertile. For instance, the idea of networks is now a universal concept, and his interdisciplinary inclination would prove to be a key concept, not only for pure scientific investigation, but also for decision-making in a complex world. Some of his schemes of analysis and inspiration would need to be modified, however.

In his fourth essay on the knowledge society, Agrafiotis poses some cultural and postcultural questions and then connects them with eventual implications for the Ekistics approach. After presenting a typology of cultures from a sociocultural point of view, the author asks various questions. For instance, to what degree do the structure and the infrastructure of a city promote a specific articulation of cultural patterns? To what extent do the plasticity of space and cultural plasticity constitute the nodes of a circular causal scheme, when multicultural, intercultural and transcultural societies emerge? If such an exploration is accepted as legitimate and fertile, the author believes that it would lead to eventual modification of the Ekistic philosophy and practice.

Reducing the redundancy of knowledge

The reviewer as an engineer experienced in building syntactic and context-free semantic models – and for four years in direct contact with Doxiadis (1971–1975) – follows Agrafiotis' challenge to decrease the uncertainties of Ekistic knowledge. However, such a project cannot be restricted to Ekistics, but needs to include every composite science, such as Ecology, Human Geography, *inter alia*, in the context of the modern knowledge society and the current spread of new technologies, which, according to UNESCO seem to be carving out fresh opportunities to widen the public knowledge forum [1].

The reviewer believes that the interdisciplinary organization of knowledge is characterized by an inefficient (feudal) system that perpetuates redundancy (the formal expression of uncertainty) of knowledge and is a handicap to the emergence of a universal knowledge society. To achieve an impressive reduction of redundancy two principles are necessary: physicalism and compositionality.

Doxiadis, being aware of the unifying power of systems thinking, and particularly of the biological and evolutionary reference models as used by many famous biologists–philosophers of his generation, especially Sir Julian Huxley (1887–1975), Theodosius Dobzhansky (1900–1975), Denis Gabor (1900–1979), René Dubos (1901–1982), George G. Simpson (1902–1984) and Conrad H. Waddington (1905–1975), used the biological model to describe the ekistic behaviour of human individuals (the five principles) and the evolutionary model to explain the morphogenesis of human settlements (the 11 forces, the hierarchy of human settlements, dynapolis and Ecumenopolis). Finally, he formulated a general theory, which considers human settlements as living organisms, subject to evolution. The first conception of Ekistics as a scientific field has been as a piece in a puzzle of overlapping knowledge fields, called interdisciplinarity, and that is a scheme used until now in various attempts to delineate humanities, as shown in panel (*a*) of the figure below [2]. The interdisciplinary approach to knowledge has, however, been criticized by Rosnay:

> Our education remains hopelessly analytical, centered on a few disciplines, like a puzzle whose pieces overlap rather than fit together. It is an education that prepares us neither for the global approach to complex problems nor for the interplay between them. [3]

Doxiadis had already taken a step towards a solution for the puzzle: ‘To achieve the needed knowledge and develop the science of human settlements we must move from an interdisciplinary to a condisciplinary science; making links between disciplines is not enough. If we have one subject we need one science’ [4]. In this sense, Doxiadis conceived a web of three dimensions that are depicted in panel (*b*) of the figure below and are defined as follows:

(1) A horizontal dimension of levels of knowledge, each one representing a *simple* science (e.g. biology, geology, astronomy, etc.).
(2) A vertical dimension that composes sets of simple sciences to *composite* sciences (e.g. ecology, ekistics, etc.).
(3) A third dimension that represents methods and values. [5]

What was missing from the Doxiadis model was a criterion for ordering the horizontal layers. The year that Doxiadis left us, Rosnay, among others, proposed to order the horizontal layers according to the complexity of the earth systems, which is the timeline of their evolution. ‘The two most influential ideas bequeathed to us by the nineteenth century: the idea of evolution in biology and the idea of entropy in thermodynamics, made it possible to integrate “vertically” the different levels of complexity in nature’ [3]. This implies an ordering of the levels of existence according to the stages of their evolution. The results of the famous experiment of Cosmic Background Explorer in 1992 confirmed the order shown in panel (*c*) of the figure below. The many layers that evolution has created up until now may be grouped into four, according to the class of information system that each one uses, as shown in the second column of panel (*c*): ‘Information systems are important because *they are the ultimate mechanisms of adaptation*’ [6].

Physical layer

Every entity on the planet keeps its structure, thanks to the physical information that is stored in the structure of matter in the three forms of potential energy known as the fundamental forces or *interactions*. Thanks to this information system, the hierarchy of matter is maintained from atoms to the whole planet.

Genetic layer

Four billion years ago, solar energy supported the appearance on earth of a dynamic form of organization of matter called life: a self-sustained chemical system capable of Darwinian evolution (NASA definition). Life is going on, thanks to the genetic information that is preserved in the cells of all living organisms in the form of *DNA scripts*, the reproduction of which sustains the hierarchy of all living matter from cells to organisms.

Neurological layer

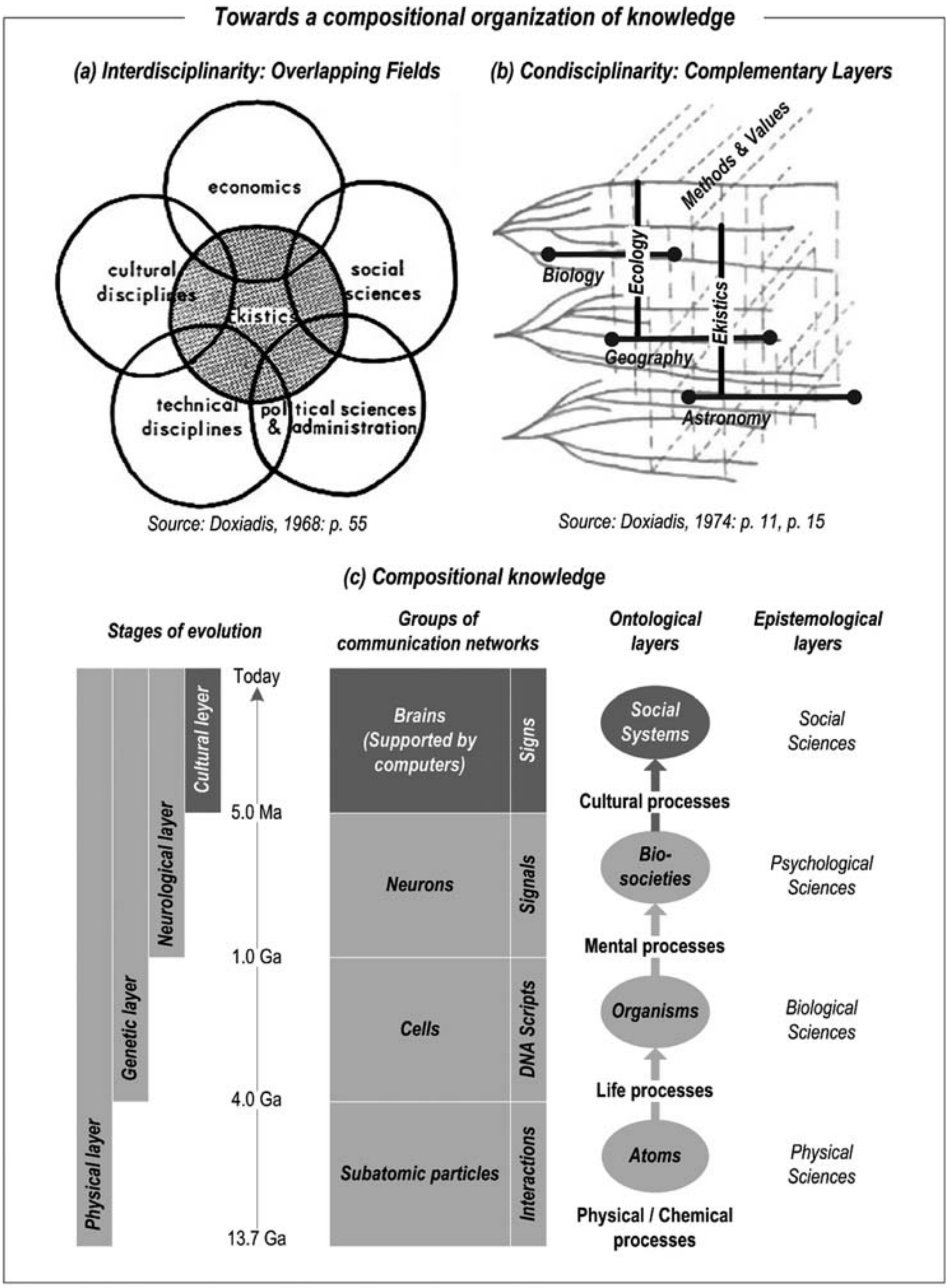
Key elements in the evolution of a genetic information system were adaptations in sensory organs and in the nervous system of many animals. Neurological information is stored in the nervous systems of animals in the form of neuronal circuits in the brains adapted to perform mental processes: logic, language, sociality, etc. and is transmitted through genetically determined electrochemical *signals*.

Cultural layer

Further adaptations in the sensory organs of hominids added the cultural information system that is capable of manipulating systems of *signs* (signals carrying social semantics). ‘Culture is information capable of affecting individuals’ behavior that they acquire from other members of their species through teaching, imitation, and other forms of social transmission’ [7]. Cultural information is especially valuable in social species. It enables the coordination of the activity of their members with the help of differentiated social systems, in the sense of Luhmann [8]. In this respect, Doxiadis’ methods and values and in general, any human scientific and technological knowledge, both physical and social (institutions), are part of the cultural layer.

The many levels of information and communication systems that have been grouped in the previous four layers sustain the ontological stratification (levels of existence) shown in the third column of panel (*c*), which implies the epistemological stratification depicted in the fourth column of panel (*c*). This stratification of knowledge is the necessity condition for an impressive elimination of redundancy and for the solution of innumerable conceptual or methodological debates. The first two groups of layers constitute the technology of nature, the study of which is called *Sciences*. The next two groups of layers constitute the technology or the culture of man, the study of which is called *Humanities*. ‘The greatest enterprise of the mind has always been and always will be the attempted linkage of the sciences and humanities’ [9]. Today, the heated debates of the past have been limited to the size of schism between the two.

As panel (*c*) depicts, every event in the world has a full physical description and every causal relation is ultimately representable at the physical level. This is *physicalism*. Its core idea is that all things that exist in this world are bits of matter and structures aggregated out of bits of matter, all behaving in accordance with physical laws, and any phenomenon of the world can be physically explained, if it can be explained at all [10]. This means that causation is a relation between events in the world, not between concepts or descriptions.



But, physicalism does not prevent us from describing and explaining the world at different conceptual levels if the organizations of these conceptual levels are *compositional*.

Compositionality is the property that a system of representation has when (i) it contains both primitive symbols and symbols that are syntactically and semantically complex and (ii) the latter inherit their syntactic or semantic properties from the former [11]. Although the force and justification of compositionality as a requirement for representation systems is still disputed today, it is fair to say that compositionality is widely recognized as a key issue across the cognitive sciences and remains a challenge for various models of cognition that are in apparent conflict with it [12].

Thus, physical, genetic, neurological and cultural laws are viewed as manifestations of physical laws, in that order of complexity. Hence, if an argument p at level l violates some law at level $l-1$, then p is definitely wrong; if not, p has a chance to be verified empirically. For instance, for a law system to function properly it should not contradict the prevailing cultural substrate of society. In consequence, the knowledge of a particular layer is summarized as the axioms used by the next layer. Such axioms drawn from the genetic and neurological layers are the five principles of the ekistic behaviour of human individuals. The 11 ekistic morphogenetic forces are second order computations based on physical, genetic and neurological axioms. Because the components of culture evolve at different rates across time and space, an extremely complex diversity is produced. Religious or other traditional values evolve at a much slower rate than economic, political, law, educational, art and other social systems. This fact, and the non-compositional structure of current knowledge in humanities, explains, in part, the chaotic perception we have of our societies and our settlements.

Thus, society is not a set of individuals, but a set of social systems facilitating the coordination of individuals [8]. This means that each social system becomes operational thanks to two material substrates: one in the brains of human individuals (consensus) and one in nature, informed as roads, buildings, antennas, works of art and so on (civilization). To keep their integrity at any level of abstraction, the process descriptions and the state descriptions of social networks must be based on explicitly defined criteria. This model of organizing knowledge strengthens our conviction that Simon's saying, that complexity is only a mask for simplicity, is valid [13]. Physics is an example: the compositional description of an atom permits the description of (almost all) physical and chemical processes. The same is almost true for Biology. Neurology is looking for such an organization. Humanities have not yet made the basic step. In any case, we should not forget that our descriptions are subjective: 'Intelligence organizes the world by organizing itself' [14].

Constantinos Doxiadis had the audacity to open new areas of thinking, to invent new methods of work and of course, to explore new forms of synthesis between the scientific disciplines. Demosthenes Agrafiotis insists on the innovative character of the Doxiadis efforts and he proposes, in order to adapt and to expand the Ekistics approach, to take into consideration the sociocultural turbulences of our global/glocal world. In this spirit, we might be equally audacious as the initiator of Ekistics.

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