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A PHILOSOPHICAL APPROACH BASED ON MATH MODELS FOR A "QUALITATIVE" PERCEPTION OF SPACESCAPE

UMA ABORDAGEM FILOSÓFICA BASEADA EM MODELOS MATEMÁTICOS PARA UMA PERCEPÇÃO "QUALITATIVA" DO HORIZONTE ESPACIAL

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Resumo. O presente artigo concentra-se em algumas questões e ideias teóricas relativas à percepção da paisagem, ou seja, do horizonte espacial e sua espessura "qualitativa". Nos últimos anos está a construir-se uma nova abordagem na arqueologia teórica: analisar um sítio arqueológico é mais do que investigar a área escavada. É óbvio que os arqueólogos, por exemplo, precisam de micro- e macro- contexto, mas como eles o definem? Há uma confusão terminológica no uso de termos como espaço, ambiente e paisagem. Poderia colimar a percepção do espaço contemporâneo e pré-histórico através de uma "reconstrução" confiável do passado? Quão úteis são todas essas especulações na arqueologia prática? O autor tenta explorar a essência mais profunda do espaço propondo uma leitura simplificada de acordo com algumas palavras-chave básicas da Análise da Sintaxe Espacial (SSA).
Palavras-chave: Ambiente, Paisagem, Lugar, Território, Paisagem Espacial, Análise De Sintaxe Espacial.

Abstract. The present paper focus on some basic theoretical questions and ideas concerning the perception of spacescape and its "qualitative" thickness. The last years a new approach in theoretical archaeology is building up: analysing an archaeological site is more than investigation of the excavating area. Is obvious that archaeologists, for example, need micro- and macro- context, but how they define it? There is a terminological confusion using terms such space, environment and landscape. Could collimate contemporary and prehistoric space perception although a reliable "reconstruction" of the past? How useful is all of such speculations on practice archaeology? The author attempts to explore the deeper-essence of space proposing a simplify reading according some basic Space Syntax Analysis (SSA) keywords.
Keywords: Environment, Landscape, Place, Territory, Spacescape, Space Syntax Analysis.

Ground

Pierre Lévy one of the most eminent thinkers of our time spent most of his intellectual work to define the culture implications of technology. To describe the process, he invents a new word: cyberspace. What this mean? A nomadic wireless technological condition of contemporary societies.

The peculiarity of such nomadic condition is the absolute disappearance of space. At least under its classic definition: every human being lives his own experience and such experience is located and conditioned inside a time-space frame. Experience feed culture which could be taken as a fundamental function of time-space. That's why

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is possible to correlate and to compare on the same issue different cultural *facies* in time.

Indeed now-days space conception is not geographic space, is not national states or institution space one rather a space of mind potentialities which modify the way to made society. (...) A qualitative and dynamic space where humanity invent its own world [Lévy 1994].

By the way, how we arrived at this point? The perception of time and space wasn't the same along human acculturation process. During 18th and 19th century humanity assist in some radical technological and ideological changes on the nature of space-time especially after the publication of the theory of relativity by Einstein [1916]. Before him philosophers and physicians approach on the nature of space was thrived in a very interesting human condition perspective and viewpoint [Ortega y Gasset 1916 ; Mach 1906]. The thought of the last two turn us useful in my investigation on prehistoric mentality and perception of spacescape.

Thesis

The position of the present paper is clear: humans in the past dwelling spacescape in a perspective way. What means and how could possible this?

Tim Ingold formulate the same idea as "dwelling perspective" which mean not a sterile opposition between the naturalistic view of the landscape as a neutral, external backdrop to human activities, and the cultural view that every landscape is a particular cognitive or symbolic ordering of space [Ingold 1993]. To make more clear such position we entrusting to landscape philosophers which formulate cultural and natural implementation in the concept of "re-inhabitation" [Thoreau 1854; Snyder 1990, 1995; Naess 1995]. Besides Henry Poicaré [1898] and Ernest Mach [1906] much later express Riemannian bi-dimensional perception of surface as the "skin of space". According the eminent physician space ideas are deep-rooted inside the physiological human structure and consequently there are a plurality of spacescapes that could be identified as visible, tactile and motor. Few years later such ideas was supported by Jacob von Uexkül (1908) studies on animals spacescape (including humans). He asked:

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Which is the answer to external world (Umwelt) call? Answer: every species (human and not human) replay in a personal mode throughout the organization of his internal spacescape (Imwelt).

I believe that our approach to prehistoric perception of spacescape much run inside such guidelines and introduce some lexicon annotations in order to structure an homogeneous and wide accepted corpus of meaningful concepts is a must.

Philosophical Overview & Spacescape Terminology

As I constrain in one my last works [Dimitriadis 2006] unlettered social groups spacescape is folder under the concept of "space creation or production". The basic question which we are called to answer now is: "how could a snake model the environment"? [Figure 1]. The answer coming out if isomorphic ground on spacescape all the possible perceived space dimensions.

Considering that humans are the only animals that could perceive and elaborate ahead of time, in such tragic way, their *momento mori* throw themselves in an continous stress condition that could be defined as *das Unheimliche*. This is the one the deepest characteristic of Spacescape if we identify it isomorphic with Nature. Nature manifests itself to human observators throughout revelation and amazement. Both keywords which are strictly linked with the concept of *Der Sandmann* according Lacan seminars [1968] and *l'hospitalité* in Derrida theory [1997].

Keep in mind such philosophical implications we could classify step by step anthropological "space" entities as spacescape, environment, landscape, territory and place (*topos*) which remind consequently to their corresponded qualities of wilderness/*wildness*, technology/culture, identity and temporality/taskscape (knowledgeability) [cf. Tables 1 and 2].

Scapespace: is observators cosmoview. Probably the greek term "Χώρος" fit well with the concept.

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Câmpus Anápolis de Ciências Exatas e Tecnológicas Henrique Santillo
Universidade Estadual de Goiás
Daqui se vê do alto!
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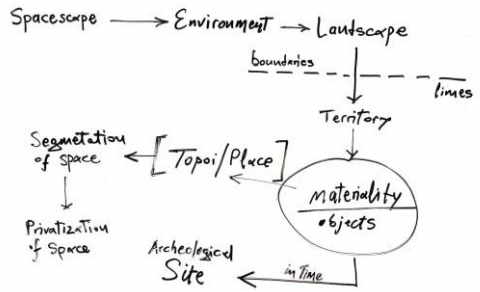

Table 1. Anthropological Space Deconstruction.

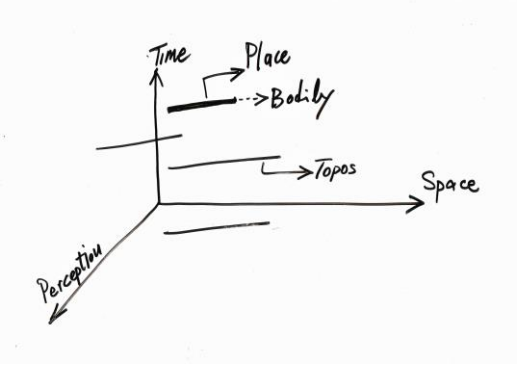

Table 2. Tri-dimensional representation of Space Entities.

Elaboration: Dimitriadis

Environment: is the area where modifications (in terms of functionality) and historical events and processes take place. According Deep Ecology Theory (Naess, 1982[3]) humans built up their approach to environment as:

1."Ecology of surface". Reminds in a "paternalistic" approach to the environment (whatever natural or artificial) where environment perceived as source for humans. 2."Ecology of deepness". An identification of humans with their habit take place (culture landscape).

Landscape: is an area of potentialities which implies the concept of bound, limit and *form*. Landscape perception coming out by human body react. Human societies are basically differenciated by culture and consequently landscape is as well culturally perceived [cf. Skolimowski 1981]. Frobenius referred about the existence of a borderline between *Spielttrieb* (inside vision= actors) and *Spielbruck* (outside vision= visitors) in the perception of the landscape-territory-place. Landscape is living individually. So, humans perceive the space-territory, which include more landscapes, in a personal way. Indeed, landscape is the main spatial terrain experience of the man.

Territory: is an area where a web of macro- and micro- relations take place. Indeed, neolithic revolution produce a strong social stratification based on territory management and occupation (cultivation and urban ideology). In such way a dynamic approach link the emerging of individualism with the terrain occupation and production. Human bodies are in game.

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Place (Topos): is a noo-area. Is the consciousness of a *topos*. Recalling the fragmentary elements of the place, we are able to read the landscape, because landscape is always under construction. Thanks to the Place man and materials acquiring value and entity. Discover the Place, the fundamental *quanta* which reactivate the spacescape, means rethinking the spacescape according to all the possible relations and interrelations which existed inside it [Fremont, 1981]. It was the Place where basic human cognitive faculties for the life were grow up and this strictly connection recalling a memorization knowledge process, called "conceptuality ".

In a short of preliminary conclusion we can assert that human reciprocal actions and interactions produce, transform and structure continuously spacescape. Living space is relativistic and its curve according materiality which becoming organized and structured by humans.

Basic Elements of Living Spacescape

Human lives is palsh around some basic activities such as reach the work place, built up small social units for procreation and guarantee sub-sustain. All these activities require time and are explicit in space. Often are only available at particular locations for limited durations and for specific purposes.

During their life humans are inevitable under a stress of their social interrelationships which constrain them to a strong mobility. Archaeologists continuously register such dynamic state during their excavations and develop space models for settlements patterns, artefacts distributions maps powered by geographic information systems (GIS) and global positioning systems (GPS).

If humans must trade time for space through movement or communication to participate in their life activities [Pred 1977] is absolute important know the "quality" of such activities which could be expressed in terms of temporal duration: "grain", and spatial capability or duration: "extent". In 1987 Clark compiled a list of characteristic scales based on "extent" in order to investigate interactions between ecosystems and societies determined characteristic spatial scales. The terms "grain" and "extent" have been used quite often in descriptions of scale [Weins 1989; Turner et al. 1989a; Allen

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and Hoekstra 1991; King 1998] and in archaeologically terms could be traduced in "thickness of materiality" or "bodily". The process how humans select and choose a place for specific purposes is proportional to spacescape qualities. The point know is the comprehension of how such qualities are organized and inter-correlated around some space-attractors [Thom 1980].

In 2006 I visit one more time Mycenae, where is near my native village place, concentrate my attention not to the ancient city structure and tombs dislocation rather to the environment and the landscape [Figure 2]. What I was looking for? During my steply approach to the acropolis area I asked myself why they choose this place. Which is the emerging "quality" of the rocky emergence where the acropolis was built and the surround landscape? I remember that Tyrinth acropolis was built up in a similar outcrop [Figure 3a,b]. Besides, my curiosity to read the natural outlines and profiles was further stimulate after Bradley [2000] quotation: "[...] the stone outcrops that characterise the peak sanctuaries might have been thought of as artificial constructions: the work of ancestors or the gods".

In our case, both Mycenean and Tyrinth acropolis were built up by Cyclopes, mythical entities with supernatural powers. Indeed, the dry stone walls still now-days are called cyclopean murals.

So, I looked the horizon and the plough-land all around. I looked to discover the emotion of that place. I knew from my rock art studies experience that some natural outcrops becoming significant because works as "attractors" in time for humans. Indeed, is already accepted the idea that prehistoric mentality runs along non Aristotelian logic patterns [cf. Mithen 1998; Clottes & Lewis-Williams 1998; Pearson 2002; Dimitriadis 2004, 2005h] and natural features stimulate a culture appropriation of it [Tilley 1991b; Bradley 2000; Dimitriadis 2007]: The power of the symbols in places is dependent upon the depth of the human emotions experienced in the fields of care [Tuan 1978].

Quoted by Pausanias, *Periegesis*: a particular oak tree was selected by observing the behaviour of the birds. Then it was shaped into an idol and sacrificed along with slaughtered animals.

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I realize that some elementary cognitive categories as light/dark, dry/wet, near/distance, hidden/appearance *etc* took part in my emoticon perception of the archaeological site and the construction of the Mycenean cittadel "beaty". In the *Apologie du Logos* René Thom [1991] explain that every existence is simply the expression of a conflict between elements in decay and a abstract principle of permanent which guarantee the stability of the "logoi". In other worlds he describe reality as a permanent catastrophe condition between saliency (define forms) and pregnancy/meaningfulness (define quality of forms= "spirit of a place").

Saliency: every form that emerge from a continue backstage and has a transitory identity.

Pregnancy: every form is full of biological values with a permanent character.

In the case of the acropolis of Mycenae the conflict or "bodily" was played by the categories of near/far, hidden/appearance (access/no access).

I explain: 1. Outside viewpoint (from the Argolic plain looking to the acropolis): no possibility to find it at the first glance because is organically absorbed by the natural environment. Acropolis visibility/accessibility is gradually gained. The colour of the stones that made by is from the same material present in the area: grey limestone and conglomerate outcrops. So the ancient inhabitants built on a naturally hill strong protected by ravines on its N and S sides and accessible only from the West. Hill's altitude is about 100 mt s.l. and naturally protected from NE by Sarra Mt. (650 mt. s.l.) and from NW by Paleogalaro Mt. (350 mt. s.l.).

2. Inside vision (from Acropolis top to Argolid plain): a large corridor of visibility open in front of us and could be possible dominate the Argolid plain and gulf by a bird-eye glance. This condition could be traduced as anticipation in case of danger because gain time to the inhabitants of the cittadel in order to organize their difence. In the same time between them the various mycenean acropoli present in the plain are intervisible linked [cf. Prendergrast 2005].

The point knows is: if emotions persistence in time, it's possible to discover their "bodily"? This mean investigate how spacescape is organized and how place "qualities" as saliency and pregnancy implement each other. Which is their gradient of inderdipendency?

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Spacescape Organization and Interdipendence

In America of the North around '50s, was made reference to the great plains cultivated with corn, in terms of "Corn Belt" just because all the region was rendered homogenous thanks and continues cultivation of the maize. That returns profit to our speech is the reference to the character of spacescape “homogeneity” meant like “identification” element of the spacescape.

To understand better we must apply the questiony: Which is the function of such area and how is organize the spacescape?

The answer comes out from the study of the human groups distribution that attends the area, its interaction with the surrounding environment and the quantity and quality of connections developed in compliance with the resources in disposition. In few words from the “thickness of materiality” distribution of the phenomena inside spacescape.

The paradigm of space organization was developed in the United States during ‘50s-’60s behind of the geographers suggestions in exploring and to deepen in terms of organization of the space the binomial "nature-society". Initially, the attention of the scholars was concentrated around the concept of spacescape, that is of the visible and observable data after a detailed tassonomic surveying of the pilot area.

It then turns out, that some areas in terms of " living space ", act as attraction centers and coined the term "nodal region" [Preston 1971]. What hit mainly, also throughout the tassonomic tables then written up, was the possibility to recognize the development of "semantic hierarchies" inside of the organizated space in terms of micro- and macro-. The more meaningful data emerges from the micro/macro-interdependence condition, for which it had been assumed that changes of one of the nearly gradient provoked simultaneously also the alteration of the conditions of the other [cf. Ullman 1954].

Once characterized, throughout the elaboration of the statistical data, the "nodal regions" is passed to the exploration in connectionism terms "the attractors" localities. That means "to weigh" the interconnection distances describing the span of communication tolerance. By now it is very clearly that the "spacescape" is considered

as a "system of relations" that to its inner conserve "structures". Considering the systemic nature of the spacescape and seen the possibility to classify it to fines-layers we can extend the spacescape concept heading at the concept of “relational space”.

Web & Diffusion Gravitation Models

Considering then the "attractors" present on the territory and their interactions field between "nodal regions" are enrolled to determine the "potentiality" of the area, expressing as “gradient of concentration”. So, the influence of a given data ***i*** on a second one ***j*** could be expressed with the formula:

(1) $I = Pi / Dij^{a}$ [Morrill 1974]

[P*i* is the “potentiality” of the data *i*; D*ij* is the distance between the two data; ^{a} indicate an exponent capable to adapt to every context the formula].

Now the global potentiality of the given data j in the area is given formthe summa of the potentialities of the data present in the area:

(2) $Ii = k$

[k is a formula constant].

The concept of "field" or "nodal region", introduced previously, allows us to shape better the type of relation in function of the "flow of ..." persons, assets, concepts. Briefly, I point out to the movement it is made along sure channels (process of spread) that they facilitate the flow, to which gives the name of "nets" [Haggett 1977]. Often nets analysis is implement by settlement distribution patterns e the density and dimension of population in that “nodal region”. Under a theoretical profile, localization and development of nets, are useful pointers in order to comprise the total territorial structuring -in other words the functionality of spacescape- that for the case of archaeological sites is led back to an essential problem:

“Given a specific number of “attractors” and consequently a specific “nodal regions” which and how link them”?

A possible solution can come outside from a spread spaces model of the innovations, integrated opportunely with the protocol of Hägerstrand [1973] previews

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that the probability of spread is in dependency to the distance of break up of the nuclei (in our case of varied numerical consistency tribal groups) on the territory. Consequently, for definition the issue of spread of the innovation is function of the communication and the number of contacts between the groups. It can then, to calculate the resistance to the absorption of the innovation (cultural or material) applying the following formula:

(3) $p = P/1+e^{\acute{a} - ò}$ [Berry]

[*p:* is the percentage of population which adapt innovation; P: maximum percentage of adopters; e: natural logarithms base; ´a: value of *p* in time; °: a constant which determine how *p* increase in time].

Spatial Syntax Analysis

It is born in '70s like module of search in the Department of Architecture of London University College. The term appears in an article signed from Bill Hillier, Adrian Leaman, Paul Stansall and Michael Bedford, in the review of architecture and urbanization Environment and Planning. Ten later years, in 1984, the text of Hillier & Hanson "The Social Logic of Space" given in press, where exactly it gets a deeper knowledge and the new concept is explained to analyze the spacescape:

Holding account that the complexity of the human panoramas is the much most complex one, is not enough to know the way in which "locality centers" embed hierarchically but rather to comprise the "complexity" of the space syntax [Hillier et al. 1984].

The Space Syntax Analysis makes just this: explores how humans organizes in morphological terms the space. That means that the space, meant like associate-economic movement, shapes one second its generative logic. Learning this risen of common language to the several spaces morphologies then we are able also to interrogate them and to gain the margins of the respective differentiation.

The term "Syntax" involves two motivations. Before it is relative to the description of increasing of space in managerial terms. The second one regards "patterns" of acknowledgment of one given society and culture (of topological character). In fact, this last one intimately is correlated in procedural terms with

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"patterns" of connection bases on the permeability relations, intersection or superimposition of the different elements present in the area.

Therefore, the heart of space syntax as descriptive theory is based on the comparison of the data of geometric recognition of the configuration and the topological analysis of the relations between objects. Better still it explores the logical syntax of the movement of the "actors" and the increase of the site one in connection with the nearby spacescape. To the space syntax analysis, it does not interest as the connection happens or the ability to connect rather as it is developed and how like interface locally.

Moreover, an ulterior index of the functionality of a site gain from the toponymic or from the fictile evidences that allows to construct us the "frontiers" of the places. Consequently, we are in a position from time in time to circumscribe the ceremonial ground from other purposes one [Fedele 2000]. The reproduction of "labelled" areas falls back also in the development of the social relations meant as "space of the aborigines", space of the visitors"; "space of transit" in the description of the different modality of access in the site one, fact that increases its better understanding in terms of useable, because expressed from "patterns" [Peponis, et. al. 2001][1].

Discussion as Conclusion.

Present job is a theoretical approach to the comprehension of an archaeological site due to fieldwork experience made by the author on spacescape. In the first part I

[1] In order to face the concept "frontier" or "liminality" is interesting read the work of Gould & White [1974] on “mental maps” where is re-elaborate the concept of "public image", coined from Lynch [1960], and define the particular images that the individuals elaborate on the same portion of territory. As corollary we obtain the definition of the outline "operational perception" like the perception tied to the own activity, with strong characters and opposite to that one of "inferential perception" which indicate the convictions deriving from our culture that often coincides with that one of the same societies. Consequently, also the concept of "imageable”, defined by Lynch like the ability of an urban object to remain impressed in the memory. For which the public space it is the highly summarized vision of the individual images and turns out circumscribed from "physical shapes" like: 1) distances or lines along which one of us moves (a subject and a concept/idea); 2) margins that delimit or prevent such flow; 3) space with their own identity; 4) knots, that is places of concentration; 5) pregnancy references (cf. monuments). Obviously, the conception of the space that is gained answers perfectly to the models of “factorial ecology”, proposed in years `70s by Murdie [1969]. It considers the physical space as neutral element on which other structures are overlapped.

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expose the nomenclature of spacescape. In the second part I demonstrate how reality is deep and structured around broken symmetry concept (catastrophic) which produce discrepancies. Such luck of "homogeneity" could be "identify" as saliency and meaningfulness spacescape configurations. In the last part I apply in concise manner a theoretical model on spacescape organization called space syntax analysis.

In conclusion we can assert that archaeological spacescape is more reach and the site comprehension is not only limit to a perfect excavating approach: rather consider archaeological excavation place as *unicum* with the surrounding area. Spacescape is package in two folders from a semiotic viewpoint: an Euclidean one used as "nodal region" full of meaningfulness "attractors" and an axiomatic one where pregnancy forces point in continues conflict: emotion of natural morphology.

References

ALLEN, T. F. H.; HOEKSTRA, T. W. (1991). Role of Heterogeneity in Scaling of Ecological Systems under Analysis. In: KOLASA, J.; PICKETT, S.T.A. (Eds.) *Ecological Heterogeneity*, New York: Springer.

BRADLEY, R. (2000). *An Archaeology of Natural Places*. London & New York: Routledge.

CLOTTES, J.; LEWIS-WILLIAM, D. (1998). *The Shamans of Prehistory: Trace and Magic in the Painted Caves*. New York: Harry N. Abrams.

DERRIDA, J. (1997). *De L'hospitalité*. Paris: Calmann-Lévy.

DIMITRIADIS, G. (2004). Philosophy of Image: The Relationship between Variant and Constant in Rock Art. In: BERTILSSON, U.; McDERMOTT, L. (Eds.) *The Valcamonica Symposium 2001-02*, Rapport från Riksantikvarieämbetet 2004:6, 28-32.

DIMITRIADIS, G. 2005. Rock art, Binary Logic and Archaeoastronomy. In: Belmonte, J. A. (Ed.), *Lights and Shadows in Cultural Astronomy*, SEAC 2005 Conference, Isili, Sardinia.

DIMITRIADIS, G. Architecture of Light. In: PÁSZTOR, E. (ed.). Archaeoastronomy in Archaeology and Ethnography. Oxford: BAR S1647: 25-28, 2007.

EINSTEIN, A. (1916). *Die Grundlagen der allegemein Relativitätstheorie*.

FEDELE, F. (2000). Luogo, terra, territorio: spunti dalle Alpi dell'Età del Rame. In:

Revista Mirante, Anápolis (GO), v. 17, n. 2, p. 77-90, jun. 2024 (edição extra). ISSN 1981-4089

BONESIO, L. (Ed.). *Orizzonti di Geofilosofia*. Casalecchio: Arianna Editore.

FREMONT, A. (1981). *La région, espace vécu*, Paris: Presses Universitaires de France.

GOULD, P.; WHITE, R. (1974). *Mental maps*, New York.

HAGGETT, P. (1977). *Networks Models in Geography*, Norwich: Geo Abstracts Ltd, University of East Anglia.

HÄGERSTRAND, T. (1973). The Domain of Human Geography. In: CHORLEY R.J. (Ed.) *Directions in Geography*. Londra: Methuen.

HILLIER, B.; HANSON, J. (1984). *The Social Logic of Space*. Cambridge: Cambridge University Press.

INGOLD, T. (1993). The temporality of the landscape. *World Archaeology, Conceptions of Time and Ancient Society*. Vol. 52:2, 152-174. Routledge.

ORTEGA Y GASSET, J. (1916). Verdad y perspectiva. *El Espectador*, Madrid.

KING, A. W. 1998). Hierarchy Theory: A Guide to System Structure for Wildlife Biologists. In: BISSONETTE, J. A. (Ed.). *Wildlife and Landscape Ecology, Effects of Pattern and Scale*. New York: Springer.

LACAN, J. (1968). *The Seminar Book, Book I. Freud's Papers on Technique (1953-53)*. New York: Jacques-Alain Miller Editor.

LÉVY, P. (1994). *L'intelligence collective. Pour une anthropologie du cyberspace*. Paris: Éditions La Découverte.

LYNCH, K. (1960). *The Image of the City*, Cambridge: MIT Press.

MACH, E. (1906). *Space and Geometry inLight of Physiological, Psychological and Psychical Inquiry*. Chicago.

MITHEN, S. (1998). *The Prehistory of the Mind*. London: Phoenix.

MORILL, R.L. (1974). *The Spatial Organisation of Society*, Belmont: Duxbury Press.

MURDIE, R.A. (1969). *Factorial ecology of metropolitan Toronto 1951-61. An essay on the social geography of the city*. Dept. of Geography, Research Paper n.116. Chicago: University of Chicago.

NAESS, A. (1982). *Wilderness and the American Mind*. New Haven: Yale University Press.

NAESS, A. (1995). The Third World, Wilderness, and Deep Ecology. In: SESSIONS, G. (Ed.) *Deep Ecology for the 21st Century*. Boston: Shambhala.

PEPONIS, J.; WINEMAN, J.; BANFA, S. (Eds.) (2001). *Proceedings of the 3rd International Symposium on Space Syntax*., Georgia: Georgia Institute of Technology, Atlanta.

PEARSON, J.L. (2002). *Shamanism and the Ancient Mind. A Cognitive approach to Archaeology*. New York: Altamira Press.

POINCARÉ, H. (1898). On the Foundations of Geometry. In: *The Monist*, 9:42.

PRED, A. (1977) The choreography of existence: Comments on Hagerstrand's time-geography and its usefulness, *Economic Geography*, 53, 207-221.

PRESTON, R.E. (1971). The Structure of Central Place Systems, *Economic Geography*.

SKOLIMOWSKI, H. (1981). *Eco-philosophy. Designing New Tactics for Living*.

SNYDER, G. (1990). *The Practice of the Wild*. San Francisco: North Point Press. (1995). *A Place in Space: Ethics, Aesthetics, and Watersheds*. Washington DC: Counterpoint.

TILLEY, C. (1991). Constructing a ritual landscape. In: JENNBERT, K.; LARSSON, L.; PETRÉ, R.; WYSZOMISKA-WERBART, B. (Eds.) *Regions and Reflections. In Honour of Märta Strömberg*. Lund: Almquist & Wiksell.

THOM, R. (1980). *Modèles mathématiques de la morphogénèse*. Paris: Christian Bourgois. (1991). *Apologie du Logos*. Paris: Hachette.

THOREAU, H.D. (1854). *Walden or Life in the Woods*. Boston: Ticknor and Fields.

TUN, Yi-Fu. (1978). Space, time, place: a humanistic frame. In: CARLSTEIN, T.; PARKERS, D.; THRIFT, N. (Eds.), *Timing space and spacing time*. *Volume 1: Making sense of time*, 7-16. London: E. Arnold.

TURNER, M. G.; O'NEILL, R. V.; GARDNER, R. H.; MILNE, B. T. (1989). Effects of Changing Spatial Scale on the Analysis of Landscape Pattern. *Landscape Ecology* 3, 153–62.

ULLMAN, E.L. (1954). Geography as Spatial Interaction, *Annals of the Association of American Geographers*.

von UEXKÜL, J. (1908). *Umwelt und Innenwelt der Tiere*. Berlin.

WEINS, J. A. (1989). Spatial Scaling in Ecology. *Functional Ecology* 3, 385–97.