

## **Annexes**

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## Annex 1

### On the Search of the Research Core of Architecture

Josep Muntaniola Thornberg, Architect

#### Asking Questions

Neither Vitruvius nor Leon Battista Alberti had problems with the research core of architecture. Both *De Re Aedificatoria* and the *Ten Books on Architecture*, are treatises that open huge doors and possibilities to architects and others to do research on architecture and "of" architecture. Why then is it now so difficult to define such a "core" of architectural research? Why are architects so reluctant to do research and to participate on research? And finally, why are research frameworks skeptical towards architecture as a research independent realm? Why have doctors, lawyers and others no problems of this sort?

The answers are the same for all these questions, and architects should meditate on them if they want to survive. The first answer comes paradoxically from the same scientific huge development of sciences. The more they develop, the better architects know the danger of a "scientific" architecture, authentic monster of human development, because the complexity of architecture as "science" challenges all these developments one by one. Just think about the "phylogenetic" model of architecture recently developed, and you immediately notice the ridiculous of the situation, when you want to deduce architecture directly from a scientific paradigm.

The second answer comes from the "artistic" autonomy of architecture, against which Adolf Loos wrote one of his best essays. Architecture is an art that is very special, since, according to E. Kant, the use and the function are the aesthetic contents of it. Architecture paradoxically is an art of "necessity", or a non-art, because we all know that art cannot be necessary in scientific terms. However, this artistic dimension of architecture is in the origin of a deep misunderstanding about the core of architectural research in relation to the design creative process. In fact, the innovative power of our brain is the same in art, in science, in politics, etc. It is not "less" or "more" innovative research in one of our intersubjective dimensions than in other. Nevertheless, innovation in art is based upon the contrary direction of sciences, it goes deep in our sensations, images, emotions and feelings, (Levinas said it is the shadow of knowledge) and cannot be identified with scientific innovation without an "inversion" or "reflection". We cannot go from art to science without research. Art is a special kind of research but is not scientific research. Architectural design as art is not a scientific process. However, architecture is "non-art", so architecture can be "scientific". But the misunderstanding has very deep roots in the way art is analysed by philosophy as "subjective", or in the way art in architecture depends upon the "genius" of the architects. Both mistakes come often from a wrong reading of the philosophy by E. Kant. In fact, the aesthetic dimension of architecture can be analysed through poetics, rhetorics or semiotics and it is neither mysterious nor "genial", it is simply human, aesthetically human, that is, a way of pretending to be (or not to be), a way of fiction.

The third answer comes from politics and ethics, and architects should take this point seriously. Research must be public. When one basic scientific discovering is published by a serious review, everybody can use this new scientific finding, in exchange the scientist earn fame and perhaps a better post to do research, but that is all. Architects do not like this. We like mystery, to be the first to do one design, to be the first to build that building, etc. Then research is against our professions and our benefits, and we, systematically, use the ideas and the design of others without the names of the persons that have produced, in fact, these ideas and designs. The ethic rules are totally "twisted" in relation to the scientific rules. For instance, the magazines on architecture are prestigious because the "owners" of the magazines select the content and have prestige in the profession. If the magazines send blindly to other architects to check the quality of the contributions, this would have a bad lecture, something like: "they do not have knowledge about what they want so they need to ask outside".

To conclude, a mixture of scientific skepticism, aesthetic egolatri and ethical selfevaluation, have paralysed a very rich core of research on architecture. We, architects, are full of excuses, but this situation is a shame.

#### Looking for Answers

The core of architectural research is in the same place we lived it years ago: At the crossroads of art, science and ethics, on the one hand, and where design, building and dwelling meet, as Vitruvius, Heidegger and a long list of people located it. There is no way to go directly to this core of architecture. This is true in any research topic of medicine, law, biogenetics, etc. It is necessary to accept different research perspectives and often, to interchange these different views with personal freedom and a maximum knowledge.

But each perspective or research approach cannot be neither "private", nor a simple copy of a situation on environment, etc. In both cases there is no way to relate the "private" researches, or the "repetitive" ones, in a positive way. For instance, to explain what I am doing in my office can be good if there is a "research" on it, but if it is only marketing, it is not enough.

To use design as a rich tool for research is not impossible. However: What about the social and physical impact of a design

(and not the design in itself) before and after construction? Design in itself can also be a good research, if, and only if, the "private" is made "public", like Klee or Kandinsky proved. Life is research (and design is life), of course, but we know that a lot of research efforts have been necessary, for centuries, in order to discover a bit why life is as it is. In relation to architecture we are far from the understanding of what it is, why it behaves as it behaves, and what use it has for men. So to say that my design is research is a pretentious position: Who knows what my design is? How do I know that my design is what I think it is? For what can my design be used, or why is my design what it is? Simply questions that one person that wants to use his or her own design as research project should answer.

The three dimensions of architecture: design (mind), construction (land, city, and territory) and use (society, history, culture) are huge research fields, and the core of architectural research is just the way design, building and social use are related to each other. We, architects, need a specific research field called: architecture, as doctors have medicine, and neurologists the brain and the nervous system. No urbanism, or building or environment, simply: architecture. If we select the right perspectives or approaches inside this box "architecture", research will start to develop, by architects and by others. Now architects are working for geographers, engineers and so on. We, need, I insist, a box named architecture. We should not be afraid of this. Public knowledge about what architecture is can alarm bad architects or speculators, but it should not scare good Architects.

As Aristotle and Mikhail Bakhtin insisted upon, ethics, at the bottom, is an architectonic problem, so, we should decide if we prefer ethics and research, or we prefer to remain without both forever. Nevertheless, think before, if with this second choice we are losing architecture altogether too. Think before, just in case.

### **The Research Core Is Where the Architect Should Be**

In order to have a real architectural research core, we should begin with a clear distinction between research on construction, dwelling and design that is not related to architecture, and research on these domains that is related to it. We cannot compete with engineers, geographers, social scientists and psychologists or historians of art in a field they are much more prepared for.

However, we should develop research on architecture when construction, dwelling and design are "architecturally" linked. Of course, in this second case, architects need a clarification about his or her own responsibility. For instance: Is the architect responsible for the design of a building in a concrete place? My answer is yes. He or she is not only responsible of the design of the building (or city), but of the design of the building (or city), in the particular social (historical) and physical (geographical) setting where the design is built. There is no way to deviate this responsibility to the social opinion, or to the politician or owner. Just compare with medicine in order to have the opposite situation. This has nothing to do with the right to decide where and how to build by people; architects can always refuse to design a building when they believe the urban or political decision has been wrong. This is the only way to maintain credibility based on public research.

Of course, we, architects, should work with interdisciplinary and transdisciplinary teams of research, but this is not an excuse for avoiding the core of architectural research. For instance, we should investigate not only the fractal structure of geometric form in our computer design projects, but the physic and social dimensions of these "fractal forms" in real buildings, landscapes and cities. An architectural form is not simply a geometric complex drawing, but a real physical and social place, where the interaction between building, dwelling and design is the main architectural dimension to analyse. Mathematicians know "fractals", as abstract entities, much better than we do, but they know nothing about the transformation of this fractal form into parks, buildings or cities.

There are much more examples to develop, but I think that my argument is clear enough. Sometimes I have the strange sensation of being closer to old theories than to the new recent ones, nevertheless our historical situation is today different, we can learn from those old theories, but we should adapt them to present times. And we need to go fast. Research is going faster and faster, and we are losing the trail, faster and faster too.

### **The Basic Role of Education**

Education is the only way to engage architects in a new public attitude towards research on architecture. I agree, totally, at this point with the excellent book edited by Martha Pollak: *The Education of the Architect*, the MIT Press, 1997, where the subtle interplay between profession and education is presented as a process of control by the former to the latter. The total failure of Lewis Mumford in front of Ph. Johnson and Hitchcock is an excellent point in the book, as well as the analysis of the ideas by F. L. Wright about new technology and architecture.

In conclusion, schools have not been an alternative research way of practice and theory of architecture, because the paradigm of what is an architect has been dictated from outside the university. Public freedom of research on architecture has not been a reality in our schools during the last sixty years, with some exemptions of course.

J. Ll. Sert sent to me in 1967 the following letter in Catalan, that I have translated into English. He, who was Dean of the Graduate School of Design in Harvard, explained to me the core of an ideal School of architecture that, Alas! It never was...

*Cambridge, 6 June 1967  
Mr Josep Muntanola*

Dear colleague:

Thank you for your letter of 20 May. I have had too much work in the last weeks to write. I am sorry for the delay. I will send separately catalogues and other information about the Graduated School of Design and a copy of a conference, even though it is not recent material.

A school of architecture and urbanism, both are by nature inseparable, is a center of experimentation and investigation that has to change anticipating the social, economic, ideological and technological changes of our time.

The courses, programs and experiments are concentrated in three main groups.

a) Knowledge of man and the natural elements, (physical and psychological reactions) - from anthropology to urban sociology.

b) Knowledge of the visual world - conception, perception of spaces, volumes, elements of communication and links, (interrelations) - Functional spaces and their emotional content. Three-dimensional elements and movements that replace words. Establishment of visual vocabularies.

c) Knowledge of the methods of execution - architectural technology and urban technology, interpretation of materials and their behavior, structures, systems of climatological control, systems of services and channelizations, interrelation of systems, economy, financing, and legislation that make possible and executionable the concepts, ideas and projects whose main basis is the creation of a world of spaces, volumes, forms and communications that respond to the human rights we all fight to establish.

The young generations are aware that the architect-urbanist of our times is not another specialist, he is a generalist-coordinator whose main mission is the establishment of a new visual order that agree with the aspirations of the majority of people. Spiritual and material aspirations to which they have the right as individuals and as members of a community of free men.

The reorganization and the new urban-regional structure (a result of the new aspirations, the new technology and integration of systems), of which architecture is an integral part, is the answer to our profession and our contribution to the society of which we are members.

I think I will be in Barcelona at the beginning of July, for a week. If you want us to meet, tell our friend Prats.

Sincerely yours

Josep Lluís Sert

As Mark Jarzombek indicates in the book I quoted above:

*"The rise of Martin Heidegger's popularity among art and architectural theorists certainly is an example of how a philosopher's writings came to legitimate perceptualist-based aesthetic consumerism. Truth was achieved not by going to a library, not by laborious reading of books from antiquity to the present, not by skeptically questioning one's education, and not even by musing on one's intellectual inadequacies. No! Truth can be achieved by looking at a painting by Van Gogh."*

And Royston Landau writes:

*"I have tried to suggest here that the domain of ethics can and has played a major part in architecture, both in relation to individual action and in the cultural agendas of correctness that it has helped to create. I have also attempted to sketch in some historical architectural evidence suggesting that the Modernist agenda started as an ethical person construct that found its way into architecture, but in later phases began to fade as architectural thought became immersed in form and technology. But also, the more recently named, but still not defined post-modernist model has illustrated that the ethical can operate at two conflicting levels at the same time – it can invoke the free person and in so doing promote free expression, but in the act of celebrating that free expression that same individual can create, or in the case of architecture can produce, an autonomous gesture of cultural antagonism.*

*Although architecture has been passing through a recent period in which there exists a dominant architectural amorality, I suggest that in the current climate there are very positive signs of the beginnings of a new ethic concerned with natural, human, and ecological rightness, which for the first time appears to be bringing together, in a comprehensive way, architecture, ethics, and the person."*

Perhaps I am not so optimistic as Landau is, but I agree with him in the general diagnosis of a paradigmatic architect working with a modern "self-expressionistic" amoral "culture", that demolishes, not only traces on our environment, but destroys our scientific, aesthetic and ethic architectural research core too.

### **Epilogue: The Poetic Hope**

I do believe that poetics is inside the core of our architectural way to do research. However, to explain it will make this communication too long. So I reproduce some verses by Petrarca almost seven centuries old, but alive as ever. I think they contain the research core of architecture:

Francesco Petrarca (Codice Vaticano 3195)  
In morte di Madonna Laura

*Valle che de ' lamenti miei se ' piena*  
Valle che de' lamenti miei se' piena,  
fiume che spesso del mio pianger cresci,  
fere selvestre, vaghi augelli e pesci  
che l'una e l'altra verde riva affrena,  
aria de' miei sospir calda e serena,  
dolce sentier che s\_ amaro riesci,  
colle che mi piacesti, or mi rincresci,  
ov'anchor per usanza Amor mi mena,  
ben riconosco in voi l'usate forme,  
non, lasso!, in me, che da s\_ lieta vita  
son fatto albergo d'infinita doglia.  
Quinci vedea 'l mio bene; e per queste orme  
torno a vedere ond'al ciel nuda è gita,  
lasciando in terra la sua bella spoglia.

### References

Muntañola, J. La Topogenèse Anthropos. Paris. 1997. (Spanish version: Topogenesis. Edicions UPC. Barcelona. 2000).  
Muntañola, J. Arquitectura 2000. (Architecture 2000). Edicions UPC. Barcelona. 2004.  
(Texts in Spanish and in English).

### On the Web

[www.arquitectonics.com](http://www.arquitectonics.com)  
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## Annex 2

### Architecture as a Thinking Matter: Mind, Land and Society in a Global World

Josep Muntañola Thornberg. Architect

#### 0. Introduction. The Pathology of the Interactions Between Mind, Land and Society

It has been long stated that the organization of the land reflects the cultural, mental and social organization of the men who built that organization, and that the pathological ways of living and thinking are reflected upon space forms and uses.

The word "formae", in itself, in its original meaning, signifies the lots of land instituted by the Roman Empire everywhere in Europe, and in the Middle East and the north of Africa, as a key global link between mind, land and society, regardless of the specific local cultural and climatic trends of the place. A plumbic copy of each "formae" was kept in the General Archives of the "Cenuriato" in Rome, as a General Register of Property.

The wide theoretical and urban planning tradition from the Greek and Roman origins until the works by P. Geddes, L. Mumford, follows this vision of space as a healthy or a pathological social agent (1). The urban growth in the last hundred years has named all this tradition a "moralistic" "old fashion" way of thinking because technology and science are today strong enough to solve any "pathology", and we build without cultural limitations, in spite of some isolated and minority voices of "critical resistance" (2).

Late developments, a mixture of ecological and anti-global trends uncovers perhaps deep hidden changes, in the mind, land and society interrelationships. Some sort of "new way" to look at the social and technological fast transformation of our environment. First step was the degradation of natural bio-diversity and health, but second step is the political struggle for energy and global change versus local socio-diversity. Of course, architecture cannot remain "in-different" to this simultaneous "new way", between mind, land and society (3).

Can this "new way" be the "old way" designed by Plato in Timaeus when he writes about a strange "third way of thinking"? (4).

#### 1. Architecture as Thinking Matter

At a crossing way among different philosophical late developments as: Paul Ricoeur, Jacques Derrida, Emmanuel Levinas, (5), and keeping in "mind", previous developments by Mikhail Bakhtin, Jean Piaget, J. B. Grize, John Searle, etc. (6), we are now better acquitted for an analysis of architecture as a "thinking matter", that is, as a material form invested by scientific "intelligibility", aesthetic "intrigue" and political "inter-textuality", three human qualities that we "transfer" to the land we build (7).

As I have discussed at length in other publications (8), the best concept in order to grasp how this is possible is the concept of "trace" (from Latin tractus, to draw or to design) analysed overall by Ricoeur, Derrida and Levinas. To think "by tracing" is not the same as to think by "talking", however our brain is able to "think" both ways (and through music too). So it is important to keep in mind this "thinking-diversity". As a matter of fact, this "thinking-diversity" defines differences between cultures, and only a globality of one unique universal "culture" would be able to produce brains with the same "thinking diversity". All this dialogical complexity was already clearly discussed by the astonishing Russian anthropologist, linguistic and literary critic Mikhail Bakhtin (9).

Each "way of thinking" has its role in the global communication, and semiotics of space has just the role of defining the specific qualities of architecture as a human way of thinking and communicating. Some specific qualities of architecture as a thinking matter or "trace" are:

- a) The "trace" is the only sign, according to Paul Ricoeur where the sign and the "empirical cause" of the sign convive. There is an overlapping described by Ricoeur as follows:

*"So the trace combines a relation of significance, best discerned in the idea of vestige, and a relation of causality, included in the "thing-likeness" of the mark..."*

- b) The "trace" interconnects building and dwelling. The Catalan architect Enric Miralles described this quality pointing to the specific power of the design, because it helps you "to enter and to go away from the real physical and social place where your design will be built." And you enter and go away throughout the design itself. It is another way of conceive the complex quality of design as "trace" defined by Ricoeur.
- c) The "trace" is a document and the document is law. This social quality of design as "land", clearly expressed by the "formae" of the urban planning in the old Roman Empire, is embedded in the notion of "trace" too. Ricoeur compares this quality to the "calendar", or law of order of time.
- d) The concept of "mask", so important in the philosophy of E. Levinas, is linked to the notion of trace too. Paul Ricoeur makes the following connection:

*"I have borrowed the very expression: the significance of the trace, not from Heidegger, but from Lévinas..."*

- e) Finally the concept of "chrono-tope", defined by Bakhtin, synthesizes all precedent qualities in one: the "chrono-toped" intelligibility, or wisdom, in any work of art. The "chrono-tope" can exist because men have a dialogical power of think-

ing. One article by W. Clocksin points to the same argument when it differentiates between constructivism and constructionism. Only the latter is dialogical (10).

A design is a link between physical space and time and social interaction, or between the "peripateia" (poetic inversion between space and time) and the "recognition" (poetic uncovering of the real identity of the same person). This is possible in architecture because "building" and "dwelling" are linked to each other throughout this same link between these two poetic structures. The building form is the mask allowing social "recognition" thanks to dwelling, and the building function takes, simultaneously, the space and time "peripateia" by allowing the inversion of several functions in the same place, configured by dwelling forces too (11).

As M. Bakhtin indicates, there are no meanings without representation (words, sketches, sounds...) and the chrono-topes are the doors the meanings need to pass through. It is important at this point to reproduce the whole text by Bakhtin: (pages 257-258) (9).

*"In conclusion we should touch upon one more important problem, that of the boundaries of chronotopic analysis. Science, art and literature also involve semantic elements that are not subject to temporal and spatial determinations. Of such a sort, for instance, are all mathematical concepts: we make use of them for measuring spatial and temporal phenomena but they themselves have no intrinsic spatial and temporal determinations; they are the object of our abstract cognition. They are an abstract and conceptual figuration indispensable for the formalization and strict scientific study of many concrete phenomena. But meanings exist not only in abstract cognition, they exist in artistic thought as well. These artistic meanings are likewise not subject to temporal and spatial determinations. We somehow manage however to endow all phenomena with meaning, that is, we incorporate them not only into the sphere of spatial and temporal existence but also into a semantic sphere. This process of assigning meaning also involves some assigning of value. But questions concerning the form that existence assumes in this sphere, and the nature and form of the evaluations that give sense to existence, are purely philosophical (although not, of course, metaphysical) and we will not engage them here. For us the following is important: whatever these meanings turn out to be, in order to enter our experience (which is social experience) they must take on the form of a sign that is audible and visible for us (a hieroglyph, a mathematical formula, a verbal or linguistic expression, a sketch, etc.). Without such temporal spatial expression, even abstract thought is impossible. Consequently, every entry into the sphere of meanings is accomplished only through the gates of the chronotope."*

## 2. Towards a Semiotic Simulation of Architecture as Thinking Matter

A semiotic system of architecture is somewhat located between the "psy-physical" genetic systems and the "socio-genetic" historical development of mankind. It is, then, close to verbal language, and, simultaneously, far from it. The "Silent Language" of Eduard Hall was a good example of what happens in space, and the "Space is the Machine" by Bill Hillier is a suggestive approach too. Late developments in artificial intelligence, spatial cognitive systems and semiotic theories are promising, and they respect very old theories as the Greek ancient ideas about "Khora" by Plato, about the dream-like nature of space: "when all senses are absent..." "or through a strange kind of spurious reason (or way of thinking)." (4).

However, it is the poetic and rhetoric structure of space as configurative systems between building and dwelling, that invests the "trace" as key element in the spatial processes of semiotics, of a non-verbal communicative dialogue.

In fact, in order to pretend to be poetically or rhetorically effective, architecture should be "intelligible", and, as in any way of thinking, this intelligibility demands a "reversibility" between subjects and actions upon objects or subjects. In our case, this "reversibility" is the work of design (or "tracing"). It is design that can convert dwelling into building and building into dwelling, by making space a symbolic game of building, where plans are the symbolic representation of this same game.

New philosophical developments can help architecture to be "semiotically" intelligible. It is impossible, as I have suggested, to develop one "system of communication" that is universal and able to represent "reality" globally and totally. Aristotle advises about this silly possibility through which reality and communication will disappear altogether. Each "channel" operates the whole by specific means: verbal, music, architecture, etc. In diagram I can be found another attempt of classification of those "channels". A very silly task indeed, but human curiosity has no limits... In this classification it is the concept of "chrono-tope", that takes the command. It is also impossible to identify one channel with the other: music with architecture, verbal with sculpture, etc. We can compare. In fact, we do all the time. But we cannot identify. So what is specific with architecture as a thinking-and communicative-"channel"?

This is why the concepts of "trace" and "mask" are important. Only architecture can build objects with "trace" and "mask" qualities, by linking space and time qualities of matter (streets) with "mask" qualities of subjects (windows as eyes).

In diagram I, I have developed a frame of "chrono-tope" levels of understanding, in order to conceive the analogies and the oppositions between arts, and between arts and sciences. The epistemological background of this diagram is related to the work by Jean Piaget in the seminal book: Play, Dreams and Imitation (12) and, of course, to the work by M. Bakhtin.

According to the work by Italian philosopher Rita Messeri, the link between logos and topos needs philosophical classifica-

tions. The dialogical intelligibility of architecture, between the poetic intrigue and the rhetorical inter-textuality of places, points to a better understanding of the architecture itself. In fact, she proposes a new interpretation of the Babel Tower Myth. It was not a divine "punishment" for the size of the tower, but a "punishment" because men should "cover all the planet of earth", not to remain in one place. To remain in one place produces in-communication between languages. In this way poetic conception and translation (from one language to another) are the same basic work of "metaphoric" translation or "change of place". To change a place and to change from place to place is the same basic change of intersubjective communication between languages and places (13).

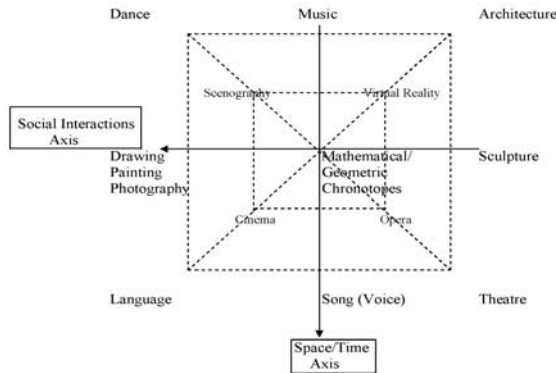


Diagram I: Chronotopic Structure of Intersubjective and Intertextual Communication

So, according to the "chrono-topic" structure of human meaning by Bakhtin, and to the "semiotic" nature of human space in permanent process of poetic "translation" between places, and between places and languages, architecture is a machine of thinking. A sociophysical "archi-geometry" that "thinks", with a chrono-topic structure.

This chronotopic structure has two main ways to exist: the "peripateia", or the space and time representation of events, and the "recognition", or the social interaction materialized in objects as "masks" or as socio-physical "transparencies" (14). The combination of these two ways of representation builds up all architectural chronotopes.

### 3. Towards the Semiotic (Dialogical) Intelligibility of Architecture: How Matter Thinks in a Global World

The overlapping of the "trace" and the "mask" is, then, the "empty place" ready to be filled in. John Heyduck has been perhaps the architect who best understood this difficult, or "dark", thought (15). Let us analyse a case through the design by the late Catalan architect Enric Miralles of an archeological site in Thessaloniki, in Greece. (Never built).

As in Gaudi this design by Miralles is a trace because it is a mask, and it is a mask because it is a trace. The phenomenological quality of space, as Pierre Kaufmann pointed out a lot of years ago, was already a first indicator of this power of architecture as socio-physical dialogical tool, able to give social meaning to a physical form, and physical form to a social meaning. Architecture is a "brain", then, but a very different "brain" of our mind (the architecture of the brain), or our social urban laws (architecture of a social group) (16). This design by Miralles is a socio-physical object to be built and used. The intelligibility between building and dwelling is what semiotics of architecture should uncover in a single universal way. There is no basic contradiction between global and local, on the contrary, both are needed for development, as this design by Miralles indicates. The contradiction is between what I have named "specific modernity", made of single universal events, and "monological modernity", a standard, homogeneous global way of living, where there is no place for the difference (17).

This work by Miralles (see figures) is a good "practical" example of the universal intercultural and intertextual roots of a single specific and unique project of an object: an island for and archeological center in Thessalonika, in Greece. Biblical narrations, icons from the XII century and from Picasso's works of art, are combined with the urban history of Greece thanks to geographic and historical "traces" or "masks" culturally significant. The result is a clever poetic and rhetorical artifact with spaces totally embedded by these meanings. However, if this can be directly appreciated by "connoisseurs" of the architecture of today, this is not self-evident, on the contrary, as Vitruvius indicates it needs explanations, needs "significations" in order to be understood. In Diagram II, the articulation between language and time on the one hand, and architecture and space, on the other hand, is stated thanks to the "crossing" of "writing" and "designing". It is a very close position to the one defined by E. Husserl in the Origin of Geometry (18), with the subtle "transcendental" definition of geometry as the "horizon of living" (or "place", in my terminology). The structure of this "horizon" is made of progressive "chained" (following the translation by J. Derrida) (18) real and virtual qualities of geometry, by an enigmatic procession of "reduction" of the difference between the "end" and the "origin",

some kind of "Rückfrage" (Husserl), that is a "question" towards the beginning coming from the future. We are not far from Plato when he defined the "Khôra" in *Timaeus* (4).

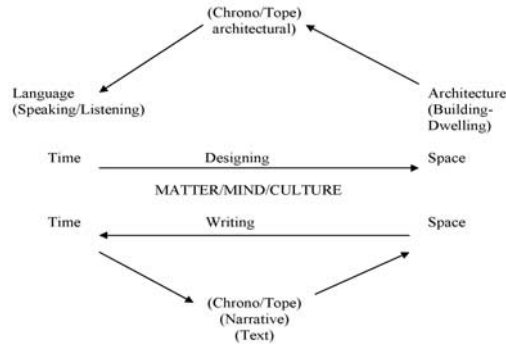


Diagram II: How Matter Thinks, and Places are Written as Texts, or Texts are Designed as Places

We arrive, then, to the point, where "chrono-topic" "chains" are the answer to the E. Husserl question about the "quality" of this "chained" existence of geometry. Architecture as "archi-writing" is what architects do with design, as in the example by Enric Miralles.

The chrono-topic built "chains" of architecture and the chrono-topic written "chains" are two faces of the same coin, as Paul Ricoeur repeats again and again in his last book (5). Our thought cannot be "represented" with one unique kind of signs. We think with our unique brain but we write with several "hands": language, architecture, music, etc. Each of these "hands", however, should represent the global and local power of our mind and our culture. Men convert matter in space and time, but they are not able to represent neither the global, nor the local, only the "chronotopic" texts, building, symphonies. Is it not enough? In any case, it is what we have.

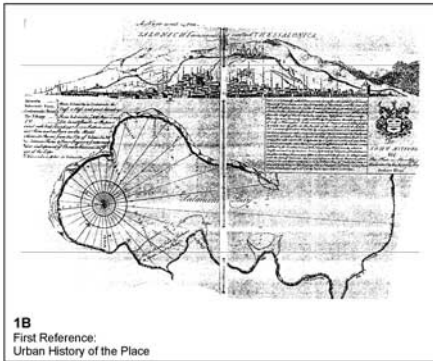
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#### Notes

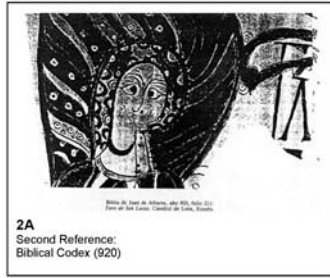
- (1) In a letter Lewis Mumford sent to me he stated: (6-7-1981) "*What I have written fifty years ago, has recently found a new audience in the new generation (...) this gives me great satisfaction (...)*"
- (2) See text by Paul Ricoeur in *Arquitectura y Hermeneutica*. Original in French, and Spanish translation, in *Arquitectonics* n. 4. Edicions UPC. Barcelona. 2002.
- (3) This is the main topic of the III International Congress: The Architecture of In-Difference. Barcelona June-July 2004. Universitat Politècnica de Catalunya.
- (4) See Muntañola, J.: "Hermeneutics, Semiotics and Architecture: *Timaeus* Revisited" in *Semiotics Around the World*. Mouton & Gruyter. New York. 1997. (There are expanded versions in Spanish, Russian and Polish).
- (5) Mostly, Ricoeur, P. *Memoire, Histoire et Oubli*. Seuil. Paris. 2001.
- (6) Piaget, J. *Etudes Sociologiques*. Droz, Geneva. 1967.
- (7) Op. cit. note 2.
- (8) Muntañola, J. *La Topogènese*. Anthropos. Paris. Spanish translation *La Topogènesis*. Edicions UPC. Barcelona.
- (9) Bakhtin, M. *Art and Answerability*. University of Texas Press. 1990.
- (10) Clocksin, W. "A Narrative Architecture for Functioning Minds: A Social Constructionist Approach".
- (11) Muntañola, J. op. cit. note 8.
- (12) Piaget, J. *La Formation du Symbole chez l'Enfant*. Delachaux a Niestle. Neûchatel. 1959.
- (13) Messori, Rita. *La Parola Itinerante*. Mucchi Editore. Modena. 2001.
- (14) Hays, K. M. "Hejduk's Chronotope", Princeton Architectural Press. 1996.
- (15) Muntañola, J. *Arquitectura, modernidad y conocimiento*. Edicions UPC. Barcelona. 2002.
- (16) Muntañola, J. *Arquitectura 2000: Proyectos, territorios y culturas; Architecture 2000: Projects, Territories and Cultures*. Edicions UPC. The *Arquitectonics* serie number 10. 2004.
- (17) See op. cit note 8, last part.
- (18) Husserl, E. (Volume VI *Husserliana*) *L'Origine de la Géométrie* (translation, and introduction in French, longer than the text by Husserl, by J. Derrida) P.U.F. Paris 1962. (original manuscript in German by E. Husserl in 1936).



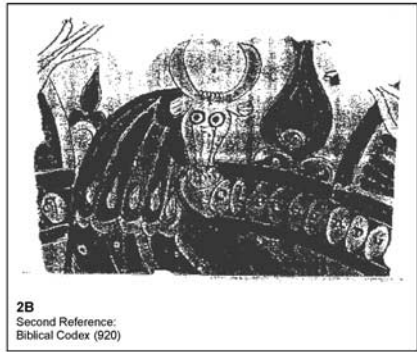
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Urban History of the Place



**1B**  
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Urban History of the Place



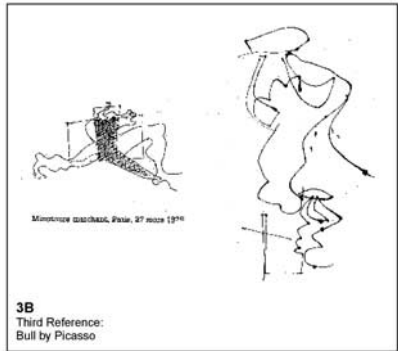
**2A**  
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**2B**  
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Biblical Codex (920)



**3A**  
Third Reference:  
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**3B**  
Third Reference:  
Bull by Picasso



## Annex 3

### Architecture, Education and Social Dialogy

Josep Muntañola Thornberg. Architect

#### 1. Introduction: Mind, Land and Society

The relations between architecture and education are numerous and complex. What is normally studied is that of the architecture of the educational institutions. Without wanting to offend anyone, this relation is not the most important one of this subject.

In fact, in many books and articles (1) I have shown that the relations between mental development, social development and territorial development are fundamental both for architecture and for human culture. Architecture is, actually, the articulation through a design between history (social development) and geography (territorial development). I will try to select the fundamental aspects of this complex interaction as a base of the analysis of an education that is sensitive to architecture. The French philosopher Paul Ricœur has been the first to formulate the philosophical base of a spatial hermeneutics that is useful for the educator (2).

#### 2.1 The Chrono-Topo of Bakhtin and the Education in Architecture

The "chrono-topo" conceived by Mikhail Bakhtin as a device to analyse the dialogical structure of literature in its different genres, was already implicit in the poetics of Aristotle, even when Bakhtin only admits an origin at a conference on the biological clock by a notable Russian biologist at the beginning of the twentieth century.

In fact, the "peripecia" and the "recognition", and their excellent poetic relation, which Aristotle establishes between both poetic "catastrophes", are already the basis of the "chrono-topes", and the origin of any possible socio-physical chrono-topo. A "chrono-topo" (time and place) is in Bakhtin generated through a narrative affinity or specificity of any literary genre. This affinity is built by two solidary aspects: a) a specific manner of organizing space and time of each literary genre in every historical moment, b) a specific social "figure" of one or various characters with a precise identity of: adventurer, heroic couple, man in the street, etc. (developing also in time).

But, above all, the "chrono-topo" articulates these two aspects permanently, and it is its articulation that marks the most "intelligible" of narrative in each specific case, which can be from an only work to the development of a literary genre through thousands of years.

We are before an instrument of dialogical analysis placed between poetics and rhetoric, historical reality and artistic work. Bakhtin insists again and again that the "chrono-topo" measures and makes intelligible in which way a work "represents" reality. Bakhtin says: I am amazed to see with which precision the "chono-topic" structure indicates how a work of art comes to represent reality. " (From fiction, obviously).

Put in another way, what the socio-physical "chrono-topo" will uncover is the affinity between space-time and social action, or the social interaction between characters, social characters or protagonists, or heroes, which Aristotelian philosophy described with the term "recognition", "Recognitio", or discovering that one character is another, or that I am different than I thought I was, etc.

This "affinity" is the base of any culture, and it is what obtains both the poetic catharsis and the rhetoric persuasion. It is what allows the reader or observer to participate in the social and space-temporal plot of the literary work, and they are not confused or lost too much on their "trip". This is what allows us to distinguish between tragedy and comedy, and between lyrics and epics. In architecture, as we will see, this device has different applications, but, in no case, as warn Bakhtin, architecture will behave as literary work. The whole work must be redone.

In different research experiences I have been able to see the decisive influence of school education in the conception of architecture and urbanism ideal to live in (3). The relation between the socio-physical experience at school and the culture of space is scientifically very important. But I do not refer to the experience of the physical space of the school building or to the experience of the space of the city, nor to the farm schools at summer camps, etc., but to the quality of dialogical education from theater, music, educational projects in urban history, ecology, etc., as long as the following conditions are fulfilled: a) Interaction between sexes: boy/girl. b) Interaction between different age groups (better if mixing sexes). c) Interaction according to calendar: traditional celebrations, school festivals, with fixed "roles" every year at different grades, ages or sexes.

The socio-physical, educational chrono-topo is generated, this way, at the school, from a social model of the city, with fixed cultural architectural articulations between the physical and the social, as, for example, that more construction means more money, that the old urban centers of the cities are poor and of little "modern" interest, etc., which are arguments that define the architectural culture at each school.

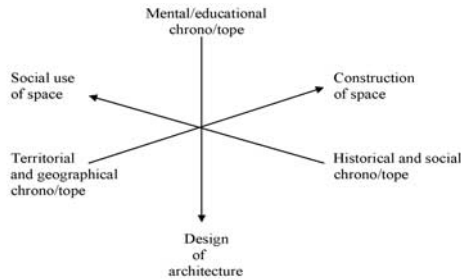


Diagram I: The triple nature of the social-physical chrono-tope

## 2.2 The Historical-Social Chrono-Tope

There are many works and doctoral thesis on the correlation between social behavior and the form of the city, specially in urban history in times prior to modernity (4).

We can see how the space-temporal order of the uses in the cities is defined by culture, and, therefore, a change in religion, in family structure, etc. affects the use of urban forms.

On the other hand, from the Archive of the Urban Form of Catalonia (5), it has been possible to analyse the cultural richness (chrono-topic) that represent the thousands of medieval Catalan villages that still exist, where their "architectural form" allows to "read" cultures from a process reverse to that of the educational chrono-tope mentioned above.

The creativity and the cultural value of the historical urban forms can only be understood from the detailed analysis of each village, because there never are two villages with the same chrono-tope.

In connection with contemporary urbanism there are also new studies that show the enormous chrono-topic difference between urban areas apparently physically the same, but totally different architecturally. As for example the studies on urban areas close to the lake of Geneva, in Switzerland, pointing to the easy question: What do you do when you run out of sugar at 8 p.m. (Do you go to your neighbor, to the Super, to the local store, etc.). With this we are able to see very important socio-physical chrono-topic affinities, as are: The type of relation between neighbours, the preference to take the car, train or public transportation, or the preferences to go to big or small stores. Contrary to what we could expect, globalization does not produce homogeneity, but great chrono-topic heterogeneity.

## 2.3 The Geographic-Territorial Chrono-Tope

In Diagram I we can see how the mental, educational chrono-tope orients itself to the design of architecture, as articulation between history and geography, and how the two chronotopes, the historical and the geographic, refer to respectively, preferably, social use and building of the land.

If the mental chrono-tope (design) relates use and building, and the historic (dwelling) relates building and culture, the geographic (land and building) closes the hermeneutic circle, articulating use and culture. Therefore, changes on the land produce a progressive change of use and of its relation with culture. Architecture (and urbanism) are in this manner ways of preserving and/or destroying, and/or transforming cultures.

The land acts as an immense socio-physical calendar in which each form, each geographical feature, each built wall, determine possibilities of use. Its chrono-topic power depends on the cultural capacity of imagining uses and behaviors, no matter what the reference theory is, from Neolithic cosmology to modern "avant-gardes", passing through the medieval guilds of the building of cathedrals.

To move from design to use, building is a necessary step. Therefore, the essential function of the geographic, cosmic chrono-tope is that of articulating the mental chrono-tope with the historic-social one. When it is not obtained, design and history remain isolated, and the urban chrono-tope disappears, is dissolved: there are not relations between the social and the physical beyond the fortuitous or the arbitrary.

Another perspective would be anthropology: between total nomadism and total sedentary lifestyle, the geographic chrono-tope establishes a certain equilibrium between movement and stillness, that is the base of any architecture of the land, which, as a giant clock, sets some invisible, but existing, space-temporal limits from any building.

Finally, let us say that any science has the word here from socio-genetics to bio-genetics, from geology to ecology. The "chrono-tope" of building covers all "cosmic" time, and, therefore, it is the very life that allows mental and historical development, and from here stems the persistent interest in the human body as "measurer" of architecture. (Leonardo de Vinci, etc.).

From the "natural" land to the most sophisticated cities of today, building establishes a physical cosmic space-time that makes a bridge between mental time and historical time. In here lies its strength.

### 3. Architecture and Social Dialogy

In 1973, almost exactly thirty years ago, when I published my first book, I indicated a few authors that had looked into the "dialogic" nature, that is, environmental, of pedagogy (6).

Today there are not many more, even though the influence of the ecological "environment" has increased spectacularly and, to a smaller extent, the historical-social "environment".

But the core of the problem of the profound relation between architecture and education is still obscure. The work by Bakhtin, and also the work by Jean Piaget, have opened to us enormous possibilities of improving our pedagogy from a dialogic-constructive perspective, or of interactive pedagogy. We only need, in this context, to uncover the content of this dialogic relation between architecture and education.

When a village, for example, modifies the architecture of a public main square, it is possible to establish a pedagogy from a dialogical perspective.

First, this perspective obliges us to analyse the change of the public square to know what has changed in the social interactive behavior, between ages, sexes and cultures. Because I suppose that it is very clear: changes in space modify the possibilities of social interaction between sexes, generations and cultures.

Second, it is necessary to reflect on losses and gains of the change. For example, losses of visual transparency of the landscape, losses of functional connection with the fountain, the river, etc. Gains: in the comfort of the new apartments, in security, illumination, etc. (if any). It is important especially to analyse the new social and cultural interaction in relation to the previous. This must be valued with utmost precision. (School-family relationships, grandparents-grandchildren relationships, etc.).

Third, it is necessary to develop alternatives to the built design: Would another building have been possible? Is the public square the best place for the new building? Etc.

With this little example, I would like to indicate that it is not necessary to teach architecture from the world history of styles. In fact, that will be of little use. Any transformation of space close to the life of children can be of enormous educational repercussion if analysed in the light of the critical law of the "chono-topos", and of the profound affinity between changes in space time and changes in social interaction. A teacher of young students said to me that this type of pedagogy was very dangerous, because it obliges to a radical and deep critical-social reflection. I answered her that I did not know why she would like to be educator of adolescents, if she did not accept this reality of social space as container of inter-generation, inter-"sex" and inter-cultural dialogy.

I will resume again what is essential in my deductions: if the fact of living and "being educated" among "humans", young and old, Muslims and Catholics, men and women, Japanese and French, etc., were not a decisive factor in the development of intelligence (scientific, ethic and esthetic), then everything I have said on space and architecture would be wrong. But it is a decisive factor, because the "wild" children of monkeys, bears, wolves, etc. do not develop correctly, they do not have the "chono-topic" and socio physical sensitivity that is specific for our species, and that we must educate, cultivate and promote. That is all I wanted to say (7).

#### Notes

- (1) Topogénesis. Edicions UPC. Barcelona. 2000. (Edition in French in *Anthropos*. Paris. 1996. Edition in Italian, in press).
- (2) See article, until this edition unpublished in Spanish, by Paul Ricoeur in *Arquitectura y Hermenéutica*. Edicions UPC. Barcelona. 2002. The ARQUITECTONICS Collection.
- (3) See: *Barcelona evaluada por sus ni.os*. Ajuntament de Barcelona. Institut d'Ecologia Urbana. Barcelona. 1992. (Texts in Spanish, Catalan and English).
- (4) For example, Magda Saura Carulla: *Pobles Catalans/Catalan Villages*. Edicions UPC. Barcelona. 1998.
- (5) This archive of research is at the National Archive of Catalonia (Sant Cugat. Barcelona). More than 30.000 plans.
- (6) *La arquitectura como lugar*. Ediciones Gustavo Gili 1973. Second edition in Edicions UPC. Barcelona. 1994. Third edition in Alfaomega. Mexico. 2001.
- (7) A more detailed version of education in architecture can be found in my discourse of admittance to the Reial Acadèmia Catalana de Belles Arts de Sant Jordi, 18 December 2002 with the title: *L'Arquitectura, es pot ensenyar? (Architecture, Can It Be Taught?)*.

## Annex 4

### The Child in The City: Towards a Dialogical Model of Children-Environment Relationships

Josep Muntaniola Thornberg. Architect

#### 1. The Chronotopic Dimensions of Architecture

In the last thirty years I have been working with children in a definition of architecture as a dialogical intersubjective cultural environment (Muntaniola, J. 1997). Along this rather long way, I have analysed excellent research works by R. Hart (1979), J. Valsiner; R. van der Veer (2000), and P.B. Baltes (1996), even though there are hundreds of works gathered in long bibliographies (Muntaniola, J. 2004).

As conclusion, I am more and more convinced that the key point of the general research field of developmental psychology and architecture is the notion of "interaction of minds" both from psychogenetic and sociogenetic perspectives (Valsiner, J.; R. van der Veer) and, more specifically, the role that architecture plays between these two developmental perspectives.

In my own experiences with children (see diagrams II to VI), I have noticed this psychosocial role of architecture, and that the structure of the environment conceived by children is chronotopic in nature, following the definitions by the Russian anthropologist and linguistic Mikhail Bakhtin (1990), and also the findings by L. Vigotsky. The chronotope is at the core of our cultural artefacts such as books, paintings and buildings, trying to make a clear distinction between these cultural objects and the machines and tools, which are also cultural, but not chronotopic. But we can go all the way around, and say that everything related to man is chronotopic, but that in the case of machines, the chronotope is monological and not dialogical. For the difference between monological and dialogical, besides Bakhtin, J. B. Grize is an excellent guide (1983). The following text by Bakhtin defines the chronotopic structure of man's cultures.

"In conclusion we should touch upon one more important problem, that of the boundaries of chronotopic analysis. Science, art and literature also involve semantic elements that are not subject to temporal and spatial determinations. Of such a sort, for instance, are all mathematical concepts: we make use of them for measuring spatial and temporal phenomena but they themselves have no intrinsic spatial and temporal determinations; they are the object of our abstract cognition. They are an abstract and conceptual figuration indispensable for the formalization and strict scientific study of many concrete phenomena. But meanings exist not only in abstract cognition; they exist in artistic thought as well. These artistic meanings are likewise not subject to temporal and spatial determinations. We somehow manage however to endow all phenomena with meaning, that is, we incorporate them not only into the sphere of spatial and temporal existence but also into a semantic sphere. This process of assigning meaning also involves some assigning of value.

But questions concerning the form that existence assumes in this sphere, and the nature and form of the evaluations that give sense to existence, are purely philosophical (although not, of course, metaphysical) and will not engage them here.

For us the following is important: whatever these meanings turn out to be, in order to enter our experience (which is social experience) they must take on the form of a sign that is audible and visible for us (a hieroglyph, a mathematical formula, a verbal or linguistic expression, a sketch, etc.). Without such temporal-spatial expression, even abstract thought is impossible. Consequently, every entry into the sphere of meanings is accomplished only through the gates of the chronotope." (In: Bakhtin, M. *The Dialogical Imagination*, University of Texas Press, 1981).

So, architecture has a chronotopic structure by linking the space/time cultural qualities of a built environment with the social interaction acting in this same environment. So, through their chronotopic structures, architecture conveys social meaning, and the architectural forms relate psychogenetic development and sociogenetic development (see diagram I).

This relation is made neither in the "real" world, nor in the "virtual" world, but in the way the latter represents the former, as Bakhtin himself insisted upon.

This chronotopic structure of the human culture developed by Mikhail Bakhtin is an extraordinary tool for our purpose of linking mental development, environmental design and social meaning of architecture and urban planning.

In diagram I, I have shown the three dimensions of architecture with its chronotopic structure: mental, environmental and social (Muntaniola, J. 2002). The mental and the social chronotopic structure was analysed by Bakhtin himself in detail. At a mental level, children always articulate physical space and time, with social space and time, so they have a chronotopic mind. At a social and historical level, we have books, stories and chronotopic cultural rites and myths. As Shirley B. Heath (1983) has shown, each social group and each cultural social structure, has its own way of telling "stories," and this same way impacts the whole life of the persons and the manner they communicate with each other.

However, a chronotopic analysis of architecture has not been clearly stated. Exceptions are L. B. Alberti in the XV century, a

proto-Bakhtinian, or Robert Venturi in the XX century. As I have described in a lot of publications the chronotopic structure of our environment, nevertheless, is difficult to understand because we tend to analyse our environment throughout its permanencies instead of its changes (Muntañola, J. 1996).

Environmental changes of form throughout history, changes of thresholds, that is of transitions between private and public use, thresholds between nature and culture, inside and outside the city, inside and outside countries, limits, barriers, etc.: these are the chronotopic elements that we need to relate with mental and social development. Children "know" perfectly well that it is this "threshold" quality of our environment that matters (see diagram II). To "move" and to "look at" are the basic elements of architecture and urban planning, both coincide in one "door," and they divert in a window to look at (without movement) and a "tunnel" (to move without looking at). Our environment can be analysed as a system of "thresholds," throughout them our bodies are "chronotopically" articulated (Ramirez, B. 2000). As Jaan Valsiner indicates we are, simultaneously, fighting against this system and we are attached to it. We have a living relation to it: birth and death are then environmentally linked (Valsiner, J. 2003).

The chronotopic relationships between mind, land and society can only be detected, as I have indicated above, if we look to changes, that is, to environmental, mental and social transformations in time. If we look at permanent physical forms, without changes, it is very difficult to understand the complex interrelation between mental attitudes and expectations, environmental degrees of satisfaction and social adaptation to urban planning policies. On the contrary, if social expectations are rewarded by environmental forms that responds to them, mental ideas, concepts and images develop attached to this process. This developmental model holds with the paradigmatic ideas by Jean Piaget about experimental behaviours for survival between the organisms, species and the common environment. This is a much more exact representation of reality than a pure Darwinian model or the Lamarckian contextual determinism. Neither chance, nor spontaneous genetic casual innovation can replace these experimental behavioural patterns the success of chronotopic cultural strategies in books, cities or music, arises from this same attachment to survival.

Each of the five diagrams gathered here (diagrams II to VI), about children's architecture, that are the result of diverse experiences, take a chronotopic form, where the space and time structures of our environment are closely related with social relationships. But, how "closely" are these chronotopic entities working? J. Valsiner in his book takes a surprising stand when he defines the role of the environment in man's behaviour:

"Human beings relate to any physical setting (natural or artificial) in which they are located by way of simultaneously being part of the setting and distancing from it..." (Valsiner, J. 2003, page 119).

This position of Jaan Valsiner looking at the environment as a "mediated place," is, to my opinion, in agreement with my findings on children's conception of places and Mikhail

Bakhtin's vision of "architectural" structure of ethic intersubjective relationships:

"The highest architectonic principle of the actual world of the performed act or deed is the concrete and architectonically valid or operative contraposition of I and the other. Life knows two value-centers that are fundamentally and essentially different, yet are correlated with each other: my self and the other; and it is around these centers that all of the concrete moments of Being are distributed and arranged. One and the same object (identical in its content) is a moment of Being that presents itself differently from the valuative standpoint when correlated with me or when correlated with another. And the whole world that is unitary in content, when correlated with me or with another, is permeated with a completely different emotional-volitional tone, is valuatively operative or valid in a different way in the most vital, essential sense. This does not disrupt the world's unity of meaning, but, rather, raises it to the level of a unique event." (In: Bakhtin, M. *Toward a Philosophy of the act*. University of Texas Press, 1993).

## **2. Dialogical Development of Children's Conceptions of Places to Live In and the Role of the Architect as a Chronotopic Socio-Physical Designer**

Children know that places are mediators between nature and culture, physical and social dimensions of life, and between space and time qualities of our culture and the social meaning of these "qualities."

The dialogical quality of architecture fits exactly with this behaviour of children and children development in cities. Everybody knows that children enjoy "stories," based on chronotopic enplotments with poetic and rhetoric qualities. However, just a few persons know that human space uses chronotopic articulations too. In diagrams II to VI the chronotopic structure of places to live in is clearly established. For instance, each school "projects" into the ideal city it builds the dialogical enplotment among the social group of children from the school. They do not conceive simply a space and time physical architectural model, but they attach to it, specific social meanings. In relation to diagram I, it is the mental, "educational," prefigurative chronotope that is in this way represented, where the architectural form, or design, articulates physical and social dimensions of human life.

In some PHD theses about the social attachment of physical forms of a city, history shows the same chronotopic dimensions. However, this time it is the refigurative values of culture that link culture and place. The more the social costumes are homogeneous, the more the space and time rhythms and structures are the same. Marriage, death, women roles, etc. define the way

spaces are used in specific times and with specific space and time paces.

This is the historic and social "refigurative" chronotope in diagram I (F. Mezghani 2002).

What is then the role of the "configurative" chronotope built in our territories? The way Jaan Valsiner describes this role that I have just mentioned is perfectly possible: The environment defines scales, distances, transparencies, opacities, etc., and the space and time structures are in this case "built," "configured," in order to attach to this same configuration the social interactions and social emotions, meanings, etc., children "explore," comparing and checking "inner" prefigurative projects with "outer" social refigurative values.

In conclusion, the built environment is the result of our "project" (or prefigurative dimension of architecture), and is simultaneously the constraint for one "affordable" refigurative historical environment. We are, simultaneously, as Jaan Valsiner indicates, the owners and the slaves of it. We transform the environment and we are constrained by this transformation.

Let us follow now the diagrams II to VI. Diagram II shows the general development of children's conceptions of places to live in, where the space and time conceptions develop simultaneously with the social co-ordination of actions, roles and family ties. It is important to notice the increasing role of "empty spaces" where the space and time conceptions and the social interactions attached to it can be related at a higher level of chronotopic complexity. I have described the different epistemological aspects of this development in several publications (Muntañola, J. 1996, 1997).

In diagram III, I describe the developmental correlations between time and space concepts in children's conception of places to live in. (Muntañola, J. 1980a, 1996). This is a key point in the chronotopic structure of architecture and urban planning: without this space and time correlation the sociophysical articulation, both at psychogenetic and sociogenetic levels of development, is destroyed. This is a developmental dimension that can also be analysed throughout psychoanalytical research, and through psychiatric studies (Muntañola, J. 1980; Garcia, B. 2004).

Diagram IV shows developmental changes, through graphic representations of social interactions in relation to places and bodies. In relation to diagram II, we can see a progressive "detachment" between body and place, thanks to an increasing representative power of the mind. Places have "legs", bodies have "doors" until three years of age, after that bodies and places have specific "chronotopic" roles: mother in the kitchen, father in front of the television, and finally "history," and "story" related to places, as in adult urban history "stories." The French philosopher Paul Ricoeur is the best analyst of the great significance of these body-place interactions: that is, first, our body as a "cosmic" natural object, second, as a social body related to the other's body and, finally, as a mental "subject," aware of himself. These are the three existential dimensions of human life and of human environments (city, buildings, landscape) too.

Diagram V compares two different places "socially," built by two different schools in Barcelona in 1990 (Muntañola, J. 1992). The first school (A) is what I describe as a "monological chronotopic school." No social interaction, no dialogue between children, no dialogue between behaviour, verbal expression and urbanism and architecture. School B, is what I have called a "dialogical school." Places have chronotopic significance, both visually and verbally in nature. Boys and girls interact roles and they interact with boys and girls of different ages. Forms reflect culture, not only business.

Diagram VI shows in parallel the main historical (sociogenetic) stages of chronotopic development by Sigfried Giedion, known historian of architecture (Giedion, S. 1964) in his posthumous work: *Architecture and the Phenomena of Transition*, with the main psychogenetic stages of diagram II. All kinds of considerations should be taken into account. We know from Jean Piaget's works, that sociogenetic place development does not follow the same stages that psychogenetic development. The social mind (Valsiner) does not follow the same developmental track that individual minds do, neither at geometric level nor at social, representative or behavioural aspects of development. Sociogenetic development needs representation first, psychogenetic development is mainly functional and modelisation (languages) oriented. I cannot go into detail here, think, however, just about phylogenetic and ontogenetic developmental differences, and you will have a fair good example of these developmental conflicts.

However, this ambitious book by Giedion shows a key aspect of "topogenesis," that is of the different stages of architectural development in human history as socio-psycho genetic structures. Giedion asserts that some transitional historical stages: Roman Empire, Modern Architecture, etc. mark a change on the chronotopic dimensions of the built environment. These changes affect the inside-outside relations of all the places built before and after, and affect the social interactions in relation to space and time too. As I have said before, this is not a strict psycho-social parallelism in time, but a first attempt in history of sociogenetic analysis of architectural historical stages. As I have analysed in other papers, the geometric development has a "chronotopic" reversal between psychogenesis and sociogenesis. That is, children follow a topo-projective-Euclidian order of epistemological development, and societies follow just the reverse order: first Euclidean, second projective, last topological. This is a very important fact, because if the psycho-social geometric processes were strictly parallel, men would have one unique global culture (Muntañola, J. 1996).

In conclusion: architecture and urban planning produce environments, buildings and cities that have a chronotopic structure by linking space and time with social representative interactions basic for survival. These chronotopic cultural affiliations between the mind (psychogenesis), society (sociogenesis), and land (topogenesis), (see diagram I), are always changing, however we can easily see invariants and permanences. And we should never forget that chronotopes articulate reality with virtuality. These invariants for survival can be analysed through the cognitive, ethical or aesthetical dimensions of human life, as

M. Bakhtin intended to do. It is not an easy situation to analyse, but we cannot reduce its complexity without destroying life altogether too with that "reduction." From a simple stone in our garden to the most complex city, the socio-psycho-physical game is open to play: Who knows the rules?

### 3. The Critical Developmental Dimensions of the Dialogical Human Chronotopes

The works by the English architect Bill Hillier (1996) uncover these chronotopic dimensions of our environment as a socio-physical "enplotment," in several examples about the chronotopic positive or negative articulation between a new neighbourhood and the new users according to if the "expectations" (mental project) of these users can be "plotted" to the historical characteristics of the new neighbourhood (refiguration). The cultural dimensions of these expectations are very important. Other studies concerning the lake of Geneva, in Switzerland, have the same results: very close neighbourhoods contain extremely different socio-physical chronotopical characteristics, even though they look very similar. This is what diagram I predicted.

In terms of development, I have summarised the critical chronotopic challenges in diagram VII. Where the psycho-social crossing chronotopes are more "critical" is where the role of architecture and urban planning is crucial. Of course, these critical chronotopic challenges change with changes in mobility, or better, they are very sensitive to the equilibrium between mobility and quality of life in private spaces (or between nomadism and sedentarism). However, this equilibrium, and the social "mobility" dimensions, are both constrained by cultural characteristics of a given social group.

As Bakhtin advises, the chronotopic dimensions of human life form "webs." He was one hundred years in advance of our social life "on the webs" of today. Internet is just a "photography" of this web of webs, and there are millions of "photographs" (see diagram VIII).

Nevertheless, these chronotopic webs are neither homogeneous, nor continuous, they have functional discontinuities that can destroy human personal and social development.

Globalization is a huge machine that can destroy specific cultural chronotopes (Rapoport, A. 2003), but it can help the development of new valuable cross-cultural chronotopes too.

But nothing justifies, for instance, the aggression and violence against children, and the critical psycho-social chronotopic "knots" in diagram VII are warnings about something that can be dangerous if it is not fast corrected.

The destruction of chronotopes has three different origins. First a physical origin, or pollution and contamination; second a psychic origin, or stress, mental disturbance; and a social origin, from war to cultural aggression, marginalization, etc. However, in diagram VII can be seen how a deadly "cocktail" between those three different origins are far more dangerous than the impact of one by one. In relation to the physical origin of health hazards in "mad-cows," cancer-radiation scenarios, it is easy to see the lethal combination between social control of information and physical danger, resulting in a huge chronotopic destruction of health, of landscapes and villages, etc. Most of the time, these scenarios take a lot years to develop, so it is a matter of generations.

However other key developmental chronotopic cases are easier to solve, for example, (see diagram VII) the noise that prevents babies to develop verbal language aptitudes because they cannot "hear" mother's and father's words. High levels of noise can be fatal for babies' development and for depressive or highly emotive "minds."

Other levels of analysis, in diagram VII, show diverse catastrophes, as the lack of experience of socialisation of children when they cannot play with mates near home or a home, or the excellent analysis by P.B. Baltes in relation to senior citizens and social policies with the elderly. These are social chronotopic conflicts related to the physical environment, but we can immediately see that it is the psycho-social chronotopic knots that develop more critical developmental problems. Terrorist attacks are now an important factor of critical underdevelopment as a permanent situation of war is.

The socio-psycho-topogenetic combination behind the chronotopic changes produces sometimes strange results, as the fact that suicide rates are higher in rich societies than in traditional environments, or that these environments can be better for children than more "modern environments, in relation to social interaction, etc. We should be very cautious at this point, because we can arrive to two wrong conclusions, either that architecture and urban planning are irrelevant for cultural development, so then we justify speculation and cultural demolition of the physical environment (both natural and artificial), or, on the other side, that "good" architecture and urban planning, "changes" behaviour and social interaction with some "cosmic" force or mysterious energy.

The chronotopic critical points described in diagram VII are neither magic, nor "natural," but social, mental and physical altogether. It is the combination of physical, mental and social energy that gives human character to children's lives and to the life and death of chronotopes.

We can feel at home in very far away places and do not feel at home in some places of our own country. This chronotopic dimension of our lives, as Mikhail Bakhtin indicates, makes us "dialogical" animals. Then each new object: computer, car, TV, new home, enter dialogically in our physical, social and mental lives, the result can be a chaotic structure, or the construction of a chronotopic, more or less, new, "socio-psycho-topogenetic" attachment, and life follows...

In conclusion, architects should carefully look to the children's conceptions of places to live in, if they want to design and build healthy environments. The thresholds between public and private places, between natural and artificial objects, between high

and low buildings, between noisy and quiet places, etc., are the key environmental and developmental factors. Our chronotopic mind link these key factors with social meaning, social survival and inter (and ultra) generation social relationships.

We cross the physical and the social "thresholds" simultaneously in space and in time. The chronotopic dimensions of each culture (global or/and local) measure the kind of attachment we have to these space and time socio-physical situations, they measure the cultural quality of human life. Our environment works as a huge poetic, semiotic and rhetorical scenario where we must survive thanks to experimental behaviours. Sometimes we succeed to survive, sometimes not. Architects should take seriously the ethic responsibility they have in this interplay between environment and behaviour. Let me say that to push children to the sea by force is not probably the best way to teach them to swim. On the contrary, this is perhaps the best way to kill them.

#### Bibliography

- Bakhtin, Mikhail. *Art and Answerability: early philosophical essays*. University of Texas Press, Austin, 1990.
- Baltes, Paul B.; Staudinger, Ursula M. *Interactive Minds: life-span perspectives on the social foundation of cognition*. Cambridge University Press, Cambridge, 1996.
- Garcia, Barbara. "Space and time pathologies of identity: children's development representations", in: "Child in the City", Second European Congress, 10-2004, London.
- Giedion, Sigfried. *Architecture and the Phenomena of Transition: The three Space Conceptions in Architecture*. Harvard University Press, 1971.
- Grize, J. B.; Borel, M.J.; Miéville, D. *Essai de logique naturelle*. Peter Lang, Berne, 1983.
- Hart, Roger. *Children's Experience of Place*. Irvington, New York, 1979.
- Hillier, Bill. *Space is the Machine: a configuration theory of architecture*. Cambridge University Press, Cambridge, 1996.
- Mezghani, Feriel. *Système morphologique syntaxique de la ritualité tunisienne*. Ph. D. Thesis, école Architecture Tunisia, 2002
- Muntañola, Josep. "Towards an Epistemological Analysis of Architectural Design as a Place-Making Activity" in *Behaviour and Meaning in the Built Environment*, Broadbent, Llorens and Buni (eds.) Wiley and Sons. London. 1980.
- Muntañola, Josep. *Topogenesis*. (3 volumes). Oikos Tau, Barcelona, 1980.
- Muntañola, Josep. *The City of Barcelona Evaluated by Children*. City Hall of Barcelona, 1992.
- Muntañola, Josep. *La arquitectura como lugar* (2nd edition). Edicions UPC, Barcelona, 1997.
- Muntañola, Josep. *La Topogénèse*. Anthropos, Paris, 1996. (Spanish version, expanded. Edicions UPC. Barcelona. 2000).
- Muntañola, Josep. *Khôra II. 1. General Bibliography*. (GIRAS, research group) 2004, ETSAB, Barcelona
- Muntañola, Josep. *Architecture 2000: Mind, Territory and Society*. Architectonics number 11. Edicions UPC. Barcelona. 2004.
- Ramirez, Beatriz. *En la penumbra: sobre el umbral en la arquitectura*. Ph. D. Thesis, Universidad Politècnica de Catalunya, 2000.
- Rapoport, Amos. *Culture, Architecture and Design*. UPC edicions, Barcelona, 2003
- Valsiner, Jaan. *Culture and Human Development: an introduction*. Sage, London, 2003.
- Valsiner, J.; Veer R. van der. *The Social Mind: construction of the idea*. Cambridge University Press, Cambridge, 2000

#### Webs

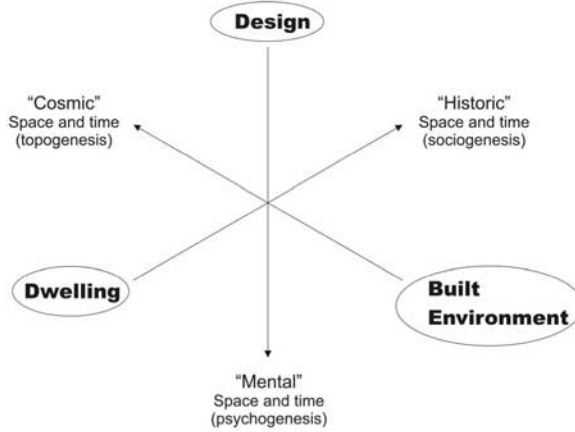
[www.architectonics.com](http://www.architectonics.com)  
[www.edicionsupc.es/](http://www.edicionsupc.es/)  
[www.upc.edu/pa/](http://www.upc.edu/pa/)  
[www.corainfo.com](http://www.corainfo.com)

#### Web of Webs

Key webs for our topic in the diagram VIII. (English and Catalan versions)

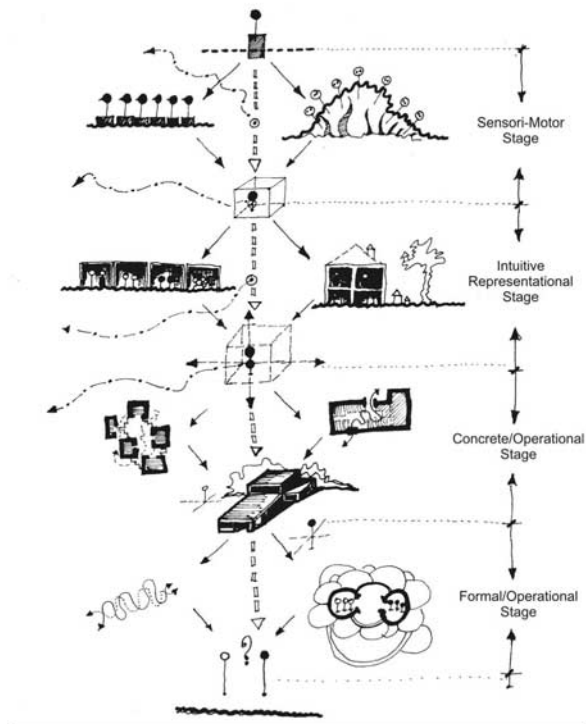
**Diagram I**

The three chronotopic basic dimensions of architecture



**Diagram II**

Psychogenetic development of children conceptions of places to live in



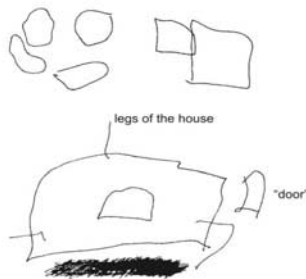
**Diagram III**

Space and time conceptual (chronotopic) correlations on the development of children's conceptions of places to live in

STAGE 0	PRESENTATIONAL CONCEPTION OF PLACES (0-2 years old) Sensori-motor experience only; there is no representation or evocation of places to live in.
PRE-ARCHITECTURAL ARTICULATION	
STAGE I-A	RITUAL TRANSDUCTIVE CONCEPTION OF PLACES (2-4 years old) Products: Massive non-empty places. Structure: Topology and symbology tied together through activities described; transductive reasoning.
FIRST ARCHITECTURAL ARTICULATION	
STAGE I-B	FUNCTIONAL PRE-OPERATIONAL CONCEPTION OF PLACES (4-7 years old) Products: Hollow single three-dimensional places. Structure: Topology and symbology tied together through identical characteristics among perceptual and sensori-motor qualities of places.
STAGE II-A	CONCRETE OPERATIONAL CONCEPTION OF PLACES (beginning) (7-9 years old) Products: Superposition of single hollow forms. Structure: Complex structures involving coordination between identities: embedding, rotations, etc.
SECOND ARCHITECTURAL ARTICULATION	
STAGE II-B	CONCRETE OPERATIONAL CONCEPTION OF PLACES (consolidated) (9-12 years old) Products: Hollow multiple places. Structure: Topology and symbology tied together through the concrete transformations of the material using previous experience.
THIRD ARCHITECTURAL ARTICULATION	
STAGE III-A	FORMAL OPERATIONAL CONCEPTION OF PLACES (beginning) (from 12 years old) Products: Complex formal models. Structure: Simultaneous invention of a physical and social setting using topological-symbolic interaction, in which past experiences are equilibrated with possible future social situations.

**Diagram IV**

Development of children's representation of places to live in



Sensori/Motor Stage:  
A body-house



Intuitive/Representational Stage:  
Differentiation between the body and the house

**Diagram V**

Dialogical versus monological children's conceptions of places to live in



Monological cities built without any dialogue between children, sexes, age-range, public and private spaces, etc.



Dialogical cities with socio-physical dialogue between boys and girls, theatre and architecture, age-ranges, private and public, etc.

**Diagram VI**

Sigfried Giedion's historical stages of human architecture versus epistemological mental development by Jean Piaget.

**Structural Sincronism between Historical Development of Architecture and Psychogenetic Conceptions of Places to live in**

<i>Historic Stages</i>	<i>Giedion Historic Stages</i>	<i>Common Features</i>	<i>Psychogenetic Stages</i>	<i>Body/age</i>
Paleolithic	Pre-architecture	Itineraries equal forms built	Presentational Stage	Up to 18 months
	First architectural transition		Transductive Logics	
Up to Greece	First Spatial Conception: Exterior Relations of Volumes	Itineraries and forms articulated by simple topological forms.	Intuitive Stage	2-7 year old
	Second architectural transition		Operational Stages	
Rome	Second Spatial Conception: Interior Relations of Volumes	Itineraries and forms articulated by two level topological forms.	Concrete Operational Stage	7-12 year old
	Third architectural transition		Formal Topological Operations	
Modern Architecture	Third Spatial Conception: Relationships Between Exterior and Interior Spaces	Itineraries and forms articulated by complex level topological forms.	Formal Operational Stages	More than 12 years old
		Future ¿?		

**Diagram VII**

Some key critical chronotopic socio-physical dangerous events for a healthy development of the body and of the mind.

<b>Critical Chronotopic psycho-social developmental problems.</b>	<b>Topo-genetic Dangerous. Scenarios.</b>
<u>One and two years of age</u> Too much noise delays the linguistic abilities in relation to the brain maturation, because babies cannot identify adults sounds.	Neighborg areas where with high level of noise in streets, private and public places when socia interaction with babies take place. War scenarios or repetitive terrorist attacks.
<u>Five to seven years of age</u> Lack or delay of abilities to socialize with other children. Too much TV and other "virtual" environments.	Neighborg areas without secure places to play near home/range with increasing freedom of movement with age, and children alone in private spaces without adults.
<u>Twelve to sixteen years of age</u> Lack of integration in social institutions. Deviant Behaviors and increase of violent attitudes.	City areas without institutions related to family structures. Lack of social policies and desintegration between educational working places.
<u>All ages</u> Sistematically, the elimination ofç this dangerous product was delay by a social, psychological and physical process of intimidation.	Asbestos or other substances contamination destroys physical, psychological and social lifes for economic "developmental" reasons, not in one year, but surely over the years.
<u>Old-age</u> Isolated persons (both rich or poor) die without social aid because of strong wave of hot weather in.	Urban environments where private places are separated from public spaces, old people cannot access streets, shops, parks, etc.

