

Extraction landscapes

**From the active quarry to the disused sites: methodological approaches
and future scenarios of the porphyry territory in Trentino.**

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to Lorenzo

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ABSTRACT

“... ‘Landscape’ means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors; ... Acknowledging that the landscape is an important part of the quality of life for people everywhere: in urban areas and in the countryside, in degraded areas as well as in areas of high quality, in areas recognised as being of outstanding beauty as well as everyday areas ...”¹.

The starting point for this research is the new landscape definition given by the “European Landscape Convention”. Landscape is - as per this definition - the degraded territory and the excavated sites created by the mining activity.

This research is focused on the analysis and interpretation of the porphyry territory in Trentino in order to achieve a sustainable transformation.

The natural scenery and the cultural features of the territory are deformed by the signs and over development that have unshaped the natural profile and morphology compromising the continuity and identity of the sites.

The aim of this research is to find strategies to propose a new methodology for the quarry planning capable to develop at the same time both the excavation typology and the future reuse of the sites.

In this perspective, negative topics as “refuse”, “recycling”, “scrap”, “wound” become occasion for rethinking and create landscapes.

The general aim is to rethink the extraction landscapes in Trentino in order to obtain their sustainable development based on a balanced relation between social need, economy and environment. This study aims to find the linkage between the quarry activities and the tourist, cultural and social features, so that the degraded territory can be transformed in new “created landscapes”.

This would appropriately fits the goals of the “European Landscape Convention”:

“‘Landscape planning’ means strong forward-looking action to enhance, restore or create landscapes”².

1 European Landscape Convention, Florence, 20th October, 2000).

2 Ibidem.

1. INTRODUCTION

1.1 CONTEXT AND PURPOSE OF STUDY

Quarries that are abandoned after closure cause extensive land disturbance and have environmental impacts. The original ecosystems get removed, the original topography becomes significantly changed, the fundamental ecological relations are irreversibly disrupted and the territory's identity is compromised.

Quarry rehabilitation legislation guidelines frequently give only generic indications, underlining the two different phases of quarrying: excavation and rehabilitation. These indications have proven to be ineffective on the landscape transformation.

This study investigates the mining landscape, with the aim of investigating the possibilities of slowing down and working together with the entropic processes that are accelerated by quarrying. By means of a preventive landscape design one can contain the devastating effects on the territory.

In order to read and interpret the landscape, comparisons with projects, as well as surveys conducted in agronomy, land-art, art and architecture were made.

The testing ground for this study was the territory of the porphyry quarries in Trentino, whose important production provides a strong identity.

Porphyry has been used as a roofing material ever since very ancient times but the first systematic mining activity began in the Trentino region around the end of the XIX century.

After World War II the activity intensified significantly following an increased demand for paving-stones, supported by a better use of mechanical devices. Highly developed technologies and enlargement of the variety of porphyry products brought forth a vast number of quarries



The new morphology of the Fornace-Lases quarry area.



Porphyry manufacturing in the quarry yard.

as well as manufacturing areas and distributive infrastructures.

A result of this rapid development in production was not only the increase in the excavated soils, but also the increase in the number of disposal sites and the expansion of abandoned and destroyed areas.

The main outcome of this is what one can call a “patchwork landscape”, an inhomogeneous territory where the natural scenery and the cultural features are damaged by the over-development that has misshaped the natural profile and morphology, compromising the continuity and identity of the site.

The worst situation is that of the redundant sites, where an ecological and environmental crisis joins with the social and economical question of the re-use of the land.

The local legislation, though, has concentrated mostly on extracting boundaries and attentively localizing the sites, without exposing clear indicatory principles regarding potential developments for natural landscape and human settlements along with production and commerce.

Very little attention is given to the idea of revalorization of the abandoned areas. The regulation asks the company “to restore the extracted areas”, without giving further indication of how to carry this out or suggesting alternative utilizations of the sites (such as assigning new functions), as opposed to simply allowing the redesign to the works of nature and leaving scars impressed in the ground.

The temporal gap and the tangible contrast between the phase of cultivation and the redevelopment are a clearly visible presence on the territory of those semi-abandoned areas that are left “awaiting”.

What are the responses on a national and international level?

In the last years, the attention given to the restoration of disused sites (with regards to the extraction activity) has experienced a continuous increase.

The rise in demand of building materials (for buildings and infrastructures) and the over-development of extraction activities in the past years, has given us many problems to solve: abandoned areas and disposal areas, with economical, social and ecological damages.

While, in the eighties, the need to obtain excavation and processing efficiency was urgent, in the last years the interest has been focused on strategies and methods of quality restoration of the disused sites (Trasi 2004¹; Berger 2004², Palerm 2007³).



The mining context of Albiano-Lases-Fornace.

1 N. Trasi, *Paesaggi rifiutati paesaggi riciclati. Prospettive e approcci contemporanei. Le aree estrattive dismesse nel paesaggio: fenomenologia di un problema progettuale*, Editrice Librerie Dedalo, Bari 2004. The research, through the analysis of a literature review, focuses on assessment and analysis categories and investigates National and International case studies of restoration of disused sites.

2 A. Berger, *Reclaiming the American west*, Princeton Architectural Press, New York 2004.

3 J. M. Palerm Salazar, *Projectar el Paisaje. Territorios en transformación: barranco*

An important milestone in this “reuse-development” came in 2000 with the European Landscape Convention.

This European treaty includes for the first time in the definition of landscape (and also landscapes dealt with by means of public interventions and plans which manage and protect) not only the “extraordinary” landscape, but also the “ordinary” landscapes, as well the degraded sites (Priore 2006⁴).

The European research “Rekula”⁵ (Restructuring Cultural Landscapes) in accordance with the outcome of the European Convention, has investigated the exhausted areas, - after the extraction activity - in three different European contexts (Veneto, Italy; Upper Silesia, Germany; Lower Lusatia, Poland).

The objective of Rekula is the development of a European-wide applicable set of tools to manage cultural landscapes that have undergone thorough change and disturbance in a short time. One major outcome has been, through the design of pilot projects, a management handbook to support the revalorization of landscapes (Zanon 2006⁶).

With the enclosed “letter of intent”, the Rekula committee has invited a European-wide discussion process, to exchange the existing experiences, ideas and best practices in the field of industrial landscapes.

However, Trasi’s study and the Rekula research have been limited to analyze the disused site, already exhausted and abandoned without paying attention to the transforming extraction landscapes.

Therefore, some issues remain outstanding.

What happens in situations where the extraction activity develops simultaneously and near disused sites?

How can a project be affected by a cultivation project, if its context is characterized by functions like agricultural, tourist and residential uses? It is then possible in the planning of mining activity to act in advance with a homogeneous project whose development is not a break between “before” and “after”, but sets a mining landscape in progress, in transformation, preventive, therefore able to predict and prevent damage?

If so, when and how can this project be inserted in a mining process and how may it affect it?



Dumping area near Albiano.

de Badajoz/Güímar, Saquiro, Tenerife 2007.

4 R. Priore, *Convenzione Europea del Paesaggio. Il testo tradotto e commentato*, Iiriti, Reggio Calabria 2006.

5 REKULA is a project within the Community Initiative INTERREG III B (CADSES) of the European Union towards furthering economic, social, cultural and territorial collaboration in Europa.

6 S. Zanon (a cura di), *Cave. Per un atlante storico geografico delle cave del Veneto. Reinvenzione e riusi*, in ‘Progetto Interreg IIIB, area Cadses, Rekula’, Fondazione Benetton Studi Ricerche, Treviso 2006.

1.2 OBJECTIVES

Considering these preliminary remarks, the present research progresses using the “Rekula” and the “Trasi” approaches to identify the critical situations and proposes further indications for the particular porphyry territory in Trentino.

In the study on the Trentino case, where the mining process is still active - unlike in Rekula and Trasi - the study on the transformation project, a priori, of a mining context can be deepened.

The worst situation, in the Trentino context, is relative to the extractive sites, still active, where the residential expansion nears the borders of the excavated soil and where the quarrying develops together with the touristic and agricultural functions. This is the situation of Fornace, Albiano, Lases.

However the problem to be solved is not only the “distant” future restoration of the site, but also the actual, near future of the typology of excavation, the transport of the waste and the simultaneity of excavation and temporary land reuse (this is determined by the type of cultivation, simultaneously descending terraces, the highest ones of which separate from the mining areas - that become abandoned areas - continuing the excavation in the steps below).

This research investigates the possibility to limit the restoration’s environmental costs (economical, ecological and social) proposing the simultaneity of both the quarrying and the reuse project, such as a single homogeneous plan. Based on the length of time and modalities according to which the project interferes with the extraction process, it will be able to control the type of excavation (if able to act directly on the cultivation project), the progress of redevelopment (if referred to work in progress) or procedures of redevelopment (if they control the process only at the end of activities).

This plan has to act as a guide to understanding the “extractive quarry landscape” throughout all its life: from the choice of the site to the re-thinking of the exhausted area, to the appointing of the dumping area.

One final goal is to propose a pilot project which rethinks the extraction landscapes in Trentino in order to obtain their sustainable development based on a balanced relationship between social needs, economy and environment.

Another final goal is to propose a method, a set of means, for a new interpretation and plan for the extraction landscape, considering the recent local and international experiences in similar situations, such as case studies of transformation.

The transforming landscape through preventive planning can suggest a



Monte Gaggio (Albiano) quarry site.

new meaning of the terms “restoration” and rehabilitation; therefore the relationship between time and excavation obtains a different declension. An expected outcome could be an increased sensitivity among the local administrations in order to improve the current regulations.



Lases Lake surrounded by ancient dumping areas (scrap material) and active quarries.



The historical Santo Stefano's Church near the town of Fornace in the foreground, the village of San Mauro.

1.3 METHODOLOGY. THE RELATION STRATEGY: THE MATRIX

“‘Landscape’ designates a certain portion of territory, as perceived by people, whose character derives from the action of natural factors, c/o human and their interrelations”.

(European Landscape Convention, Florence, 20th October, 2000)

“Reading (landscape) means to identify signs of physical space, extract them from their layers, interpret, rearrange and reassemble them in systems that are significant for us today. This reading must be carried out by a mind for design, to reveal the past and glimpse into the future”.

(Giancarlo De Carlo⁷)

“Landscape as relation: between nature, culture, society and individuals. Relation between different fields of thought and knowledge of the space. The project is intervention on the evolution of this space”.

(Daniela Colafranceschi⁸)

“For contemporary landscape the design of the relationships between things is a priority and more important than the project of the things themselves and of the objects”.

(Renato Bocchi⁹)

Starting point for reading and knowledge of a place, and therefore for an project interpretation is to identify the elements that constitute it, but also recognize the structure and the plot. Plot as a synonym of tissue, networking system, wefts, connections¹⁰.

The landscape is in fact a “system¹¹, consisting of relations, but also of non-relations”¹².

To read the landscape means to recognize and interpret the transformations, the mutations, and to be able to detect the overlapping layers of new signs over time.

To understand, as Turri stated, “which are the signs on the landscape induced by the most recent transformations - considering the landscape

7 G. De Carlo, in F. Bunçuga, *Conversazioni con Giancarlo De Carlo. Architettura e libertà*, Eleuthera, Milano 2000.

8 F. Zagari, *Questo è paesaggio, 48 definizioni*, Mancosu Editore, Roma 2006, p. 173.

9 Ibidem, p. 158.

10 In this there is a direct reference to the definition of context to which we refer in the second chapter.

11 No coincidence that the etymology of the word “system” refers to the greek σύν (= with, together) + στέναι (= be), and so talk of a system of relations would become a pleonasm.

12 J. M. Palerm Salazar, in Interview to Juan Manuel Palerm Salazar, in the third chapter.



The porphyry quarrying in Monte Gorsa site.

as an organised body of ‘signs’ that leads it to functional elements. To see what new elements have appeared on the landscape, how they are associated with each other and with the existing elements and what functions they have”¹³.

This would involve breaking down the landscape system into different layers¹⁴ and examining the nature, the extent and the hierarchy of relationships that unifies the elements of which it is made of - physical, tangible, but also abstract, of economic and social nature - in order to understand the “meaning”.

To decode and interpret the signs through a semiological¹⁵ research on the territory.

But as the linguist Emile Benveniste explained any semiology of a not linguistic system must use the means of language, and therefore can exist only within and through the semiotics of language.

Hence the use of themes, but more specifically of keywords that can “translate” the signs of the landscape. It is in fact, the relation - for likeness, representation, convention, function - between words and things that Foucault analyses in his “Archaeology of human science”, able to interpret, order the world¹⁶.

An important step, then, in the analysis of a place, it becomes the choice of words¹⁷ that describe the distinctive characteristics: the physical elements, the use, but also criticism. Again, if in the landscape there are important relations between the elements that constitute the fabric, the relationships between the words represent the plot of this system¹⁸.

13 E. Turri, *Semiologia del paesaggio italiano*, Longanesi, Milano 1979, p. 17.

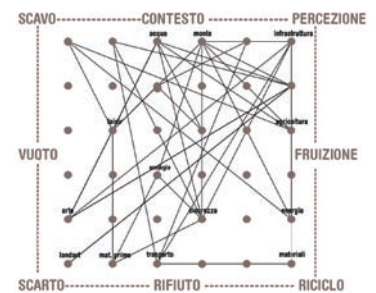
14 L. Adriaanse, T. Blauw, *Towards new Deltas*, Stichting Zeelandboek, Netherlands 2008.

15 “The terminology has been enriched to define structures and functions somewhat fixed, new words, new linguistic signs that bind to the complexification of the uses of the elements that form the anthropic structure of today’s geography The semiology or semiotics is now asked many times what the sign is, and it is revealed that the sign is also the element that calls a decodable function of the society which that element builds and uses. This obviously also applies to objects in the landscape, seen in their spatial correlations, which are the basis of their functionality.” In E. Turri, op. cit., p. 28.

16 “Things and words are closely intertwined: the nature is given through the grid of names, and just it, that without those names would remain silent and invisible, distant it sparks over them, continually present beyond the grid which also offers it to knowledge and makes it visible only when entirely filled by language”. In M. Foucault, *Le parole e le cose. Un’archeologia delle scienze umane*, Rizzoli, Milano 1978, p. 178 (op. original *Les mots et les choses*, Éditions Gallimard, Paris 1966).

17 Over the past decade, there has been a rich production of dictionaries, treatises on landscape and architecture, as to take pictures, classify the landscape and its continued rapid development. Examples are: M. Gausa, *The metapolis dictionary of advanced architecture*, F. Zagari, *Questo è paesaggio. 48 definizioni*, A. Roger, *Court traité du paysage*, G. Corbellini, *Ex libris*, A. Roger, *Mouvance I e Mouvance II*, P. Donadieu, *Des mots du paysage et du jardin*.

18 Again the reference is to the semiotics of language, by de Saussure. He formulates from the language the development of a ‘general theory of signs’ that he himself called ‘semiology’ with the intention of extracting general laws from the language to meaning and communication that can be applied to other fields of culture.



The diagram of the matrix applied to the study area.

In reading the carved landscape there are chosen keywords descriptive of stages, elements, effects, places of the mining process (inferred from reports on site-surveys, site visits-analysis of thematic regulations maps, but also by economic and social studies). Their relationships and connections are procedural, functional and related more to the principle of cause and effect than to similarity or difference.



The matrix diagram applied to the “Ex Cave” design competition.

On one hand, the key words¹⁹ are meaning of what they represent, their relations are new signs with new meaning, and so the plot thickens fixing for each relation new meanings, new words.

If the relationship between words creates a structure, language, and therefore a passage that can be read, in the landscape analysis of the relation between key words a reading path or story is identified. These various relationships then create multiple keys for reading.

Trying to see this plot made of connected words and lines, the ordering network²⁰ of “mathesis, taxonomy and genesis”²¹ comes to mind, that is, the project of a general science of order, a sort of diagram whose purpose was to rationalise the complex representations of things.

If, in addition to ordering the goal for the landscape analysis is to highlight the relationships between signs, a tool that can graphically represent this plot in a clear and complete way it is the matrix²².

“Today’s architect builds relationships. There are, in fact, invisibles lines running between thing. Material relationships, magnetic fields, sounds waves, light beams, lines of particles, ... , structural lines, movement of

19 The greek term for word, *λόγος* (logos), is inherent to the idea of relationship. In a sense, the word means “in relation to ...” it is an example of the Italian word “analogo(likewise)” that translates the greek *ανα-λόγον*.

20 “In this way it was designated in a sort of hatch, the large network of empirical knowledge. ... This same network defines the conditions of possibility of a debate or an issue, it is itself the bearer of the historicity of knowledge”. In M. Foucault, op. cit., pp. 88-90.

21 “These three concepts - mathesis, taxonomy, genesis - do not indicate three separate fields, as a solid network of inferences that defines the general configuration of knowledge in the classical period. Referred to mathesis, taxonomy works as an ontology in front of an apophantic; opposite the genesis, function as a semiology in front of a story. It thus defines the general law of beings, and yet the conditions of their knowability”. In M. Foucault, op. cit., pp. 88-90.

22 “Pertaining to the evaluation domain, the matrix-based approach may be considered one of the most commonly applied. Matrices are frequently used as assessment technique, and they may be part of more complex decision support systems such as multicriteria and cost-benefit analysis, etc. In general terms, by adopting a matrix-based approach, multi-objective problems (such as environmental management issues) and multicriteria decisions can be better addressed and supported, allowing to face limitations connected to the linear optimization used for addressing a single purpose. Based on preferred criteria, causal-effects relationships among different planning objectives or project alternatives and their likely consequences on the environment and socioeconomic conditions can be simultaneously depicted and assessed trough a two-dimensional matrix. In doing so, trade-offs among alternatives can be recognized, supporting the choice of the most desired, and therefore the decision-making process. Nevertheless matrices are not the assessment per se, and in order to be useful, they need to be properly integrated in a broader assessment methodology” (C. Bragagnolo)

particles, There is, then, a matrix of relationships, a matrix of real relationships and another matrix of virtual relationships. The matrix is real ... and we live within it”²³.

Palerm Salazar defines the matrix as a tool to decode the complexity of systems - whether they are the world or the landscape itself²⁴: “an instrument that can make clear the systems and understand that every place, every element, every project, every work, has no value in itself, but in the logic of being part of a system. We have built this system through the image of the matrix”.

By analogy, then, if the matrix represents a system, which is that of the landscape, the matrix is adequately able to represent the landscape.

Matrix as system, landscape as system, matrix as landscape.

Matrix as diagram able to represent and sort the items and the plot of the context²⁵, but also matrix as a generator²⁶ of a process, of a project.

The extremes of the matrix that represents the mining landscape is marked by eight macro-themes, key words, summarizing the stages of excavation and its effect on the territory and that “rule” the reading of the diagram: excavation, void (empty), scrap, context, perception, fruition (use), recycling, waste, that are arranged together with a logic of the case.

The words-signs of the landscape are distributed in the matrix in rows and columns in an order which, if it goes from top to bottom in the first column represents the action of excavation according to the principle of cause and effect in absolute terms, while from left to right describes the effects of the

23 Enric Ruiz-Geli in M. Gausa, V. Guallart, W. Muller, F. Soriano, J. Morales, F. Porras, *The Metapolis Dictionary of Advanced Architecture: City, Technology and Society in the Information Age*, Actar, Barcelona 2003.

24 In the second biennial of art, landscape and architecture of the Canary Islands, Palerm, director and curator, uses the matrix as a tool for interpretation of the landscape, guiding theme in the exhibition path. During an interview he describes the choice of this strategy: “*The matrix describes the mathematical rules. The difficulty of the matrix is the improbable. That it, the ability to introduce the contemporary world into a mathematical logic like that of the matrix. The logics of probability have to be constrained to a new timescale. Matrices are able to narrate how systems with different timescales are made. The research carried out through the Biennial of the Canaries had the objective of finding this improbability in the systems by means of an instrument (system) that could emphasise them through the research of those improbabilities and understand that every place, every element, every project and every work has no value in itself but only in the logic of being part of a system.*

This system we’ve built through this the image of the matrix. In order to build this system we need cross-connections between disciplines and between the concepts that each day we look to define a landscape. The matrix should be first of all the proposed route to work on the landscape”.

25 Jacques Derrida, in his conversation with Peter Eisenmann, describes the relation between writing-text-architecture by invoking the matrix as a structuring element with the text: “I usually prefer the word text to write because text implies more easily a chain or a process or context, not just a transaction but a network. It is a network, or grid. ... matrix rather than grid” in J. Derrida, *Adesso l’architettura*, Libri Scheiwiller, Milano 2008, p. 230.

26 In the etymological root of the term there are in fact a reference to the concept of mother. Gea is Mother Earth, soil that was dug.

excavation on the territory intended as a context composed of places and inhabitants, and subsequently on the anthropological use of the territory. If then, on one hand, the matrix identifies the distinctive characteristics of the mining landscape, on the other hand, reading through the intersection-relation of issues - researched also in different disciplines as art, bioengineering ... -, it allows their interpretation and therefore the project.

Hence the relationship between the excavation and its context: excavation, context, perception; between the excavation and its subtractive process: excavation, emptiness, waste; between the excavation and the rethinking of the wasted place: perception, use, recycling, among excavation and reuse of discarded materials: scrap, waste, recycling.

Although belonging to different conceptual categories the matrix allows to relate these issues and describes how critical elements of the territory (in this case, the abandoned quarries) may have a new meaning once restored to their synaptic connections (now discontinued) with other elements (physical and not), founding the analysed territory.

There are again the relationships between the individual macro-themes that are setting the reading order of the project strategy, formulating new scenarios for the excavated territories.

At the base of this matrix, as at the base of the landscape, there is the constant of change, the passage of time that controls and connects all the relationships, which underlies any relationship between the words-elements, which are descriptive of processes.

The matrix, as a complex system, representation of the landscape, is made of a dense network of infinite relations: zooming in on a point of this matrix brings out new relationships, that deepen, unfold new horizons of reading.

A prearranged reading order does not exist in this matrix. The possibilities of connecting points are numerous, as many are the keys to reading.

From the interpretation of the landscape, from the choice of a matrix reading path, the step to the landscape design is very short. The greater the degree of definition of the matrix mesh, the greater the constraints/directions for a project anchored to the landscape.

This matrix is used as a methodological tool for reading and interpretation of the mining landscape, but also as a structuring element of this research.

The relationships between the keywords - macro-themes in this matrix - determine thematic paths of research, and, finally, provide reading keys for the pilot project.

1.3.1 EXPERIMENTAL PROJECT “EX CAVE” COMPETITION PROJECT, 2009¹

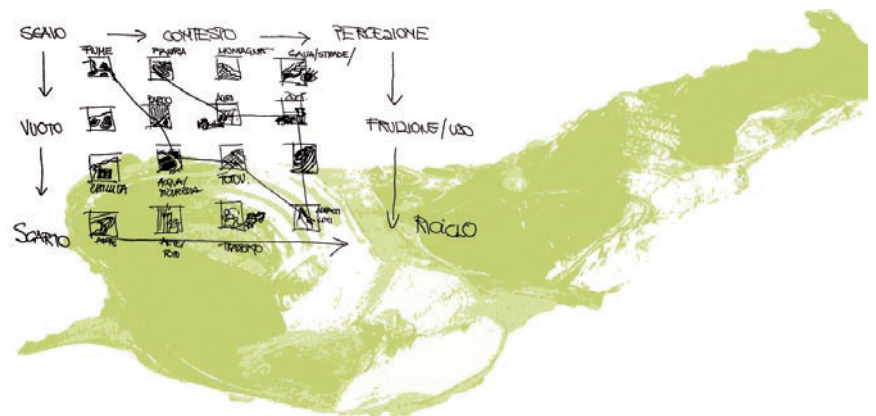
The experimental setting for the methodology used for reading and especially for the design of the extractive landscape was the competition, promoted by the Province of Modena, for the planning of new and future scenarios of the extractive sites in the province.

The area chosen for the project is one which is characterised by the presence of the Secchia river, protagonist in the planning strategy.

Lines, points and surfaces design the territory of the Modenese plateau.

The road infrastructures, now accentuated by the new tracks of the TAV (high speed train), are entwined with the lines of the water canals and with the two affluents of the river Po (the Secchia and the Panaro). Together with these we find the traces of the centuriations and those of the fields that are more subtle and faded. It is almost as though these indicate the marginal value that the agricultural areas, although vast, have adopted in this territory from a functional and economical point of view.

In this tangled network the points,



¹ Research group “Cave Valle di Cembra” (prof. arch. C. Battaino, arch. E. Schir, arch. L. Zecchin) with the contribution of ing. A. Giovanardi, arch. L. Siviero, prof. ing. P. Bertola.

that is, the inhabited centres of which the most important one is Modena found along the historic Via Emilia, generate in turn new branches which reach the Apennines.

Near to the two main rivers, shapeless, faded surfaces give evidence of a frantic search, human desire, for material: there we find the gravel and clay quarries that constitute an essential phase in the productive cycle of construction.

These vast areas, closed-off, often invisible and unreachable end up being disconnected not only by the physical elements of the infrastructure, but also by the populated areas.

In ten years time these surfaces will be concave: enormous holes to be filled and rethink.

Rethinking these voids becomes an opportunity to re-establish the relationship between the landscape and the community in order to create new liveable settings.

Perhaps it is the research of the relationships between the elements (lines, points, surfaces, water and agriculture) of the territory itself that, through practise and criticism can allow a first interpretation such that new scenarios that subsequently be hypothesised. This means reformulating the territory on the basis of the relationships of which it is composed.

An instrument used to visualize the connections between elements of different spheres (physical, economical and social) is the diagram represented by the matrix.

The matrix can be applied to the planning approach for the requalification of excavated territories establishing macro elements - key words that synthesize the phases of the extractive process and its fall-backs on the territory - that govern this procedure as excavation, void, discard, context, perception, fruition, recycle and waste, which are organized according to a logic based on the process.

From this derives the relationship between the excavation and its context; between the excavation and its destructive process (excavation, removal, disposal); between the excavation and the rethinking of the disposed of area (perception, fruition, recycle).

Although they belong to different conceptual categories, the matrix finds a relationship between these themes and describes how the critical elements of the territory (in this case the disused quarries) can have a new meaning, once the synaptic links with the other founding elements (physical or not) of the analysed territory have been restored.

It's the new relationship between the single macrothemes that establish the reading order of the planning strategy for the formulation of new scenarios regarding the excavated territories.

In this way, travelling along and reading the matrix from the theme of



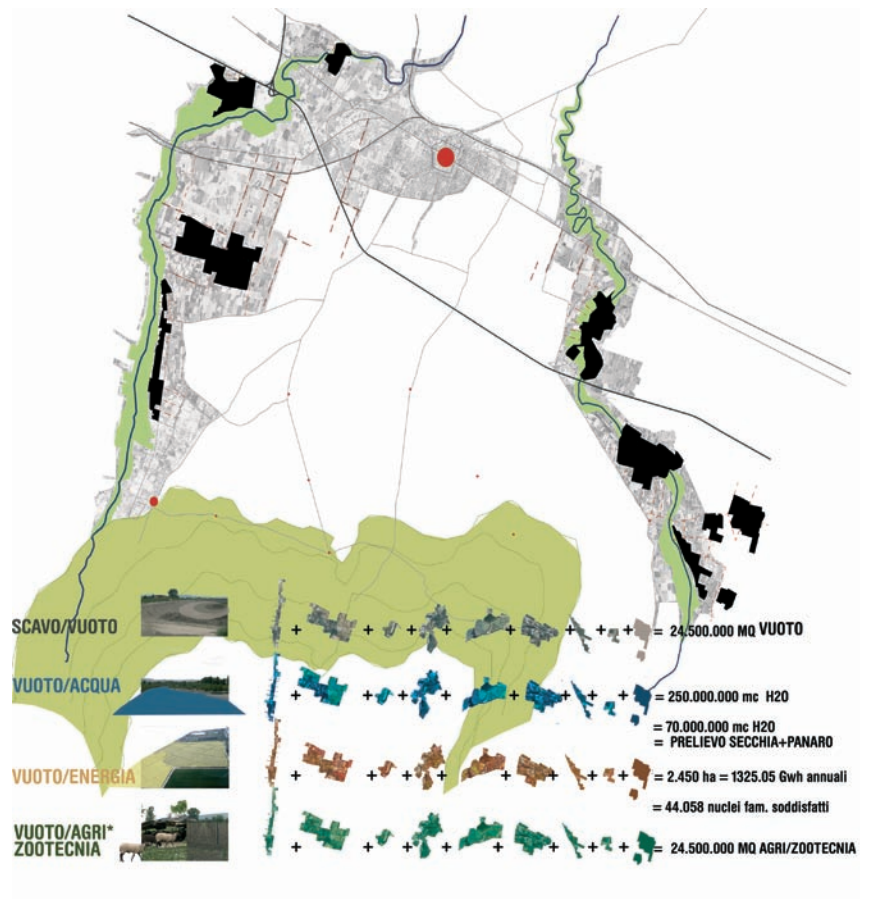
Images of the extraction activity in Secchia Riverside.

the analysed context toward the theme of fruition, new uses for the voids of both the river and plain quarries were hypothesised such as spaces for recreation, vast areas for agriculture and stockbreeding, or plants for the production of renewable energy.

For the redundant quarries along the river a new scenario could be linked to the theme of the water. The voids could be rethought as basins that serve when the river is at maximum capacity or as water storage basins, that can be used for irrigation.

The accumulation capacity of these basins obtained from the existing quarries would guarantee water for agriculture without having to withdraw it from the Panaro and Secchia rivers, especially in the months of drought when the equilibrium of the river's ecosystem is even more critical. The matrix, as by definition, allows to build relationships also between the microthemes of which it is made.

In this way the various types of fruition of the excavated territory can overlap. One possible scenario could interest a new image of that use of the ground that has now faded, that is, an “experimental farm” in which stockbreeding and agriculture can be powered by the water accumulated in the basins (impermeable due to the gravel discarded after being crushed) and sustained by the energy produced by photovoltaic plants inserted in



Study area and conceptual diagram (matrix) of mining sites reuse.



Reclaimed land for the Secchia River.



Mining machinery: the crusher.



Image of 3D project model ("Ex Cave" competition).

the voids.

If, in addition, this new inhabitative - productive model becomes perceivable and public, it can be hypothesised that the productive function is linked to the function of recreation. The quarries, the lines of the water from the rivers that power them, the furnished river banks, the paths along the perimeter of the fields and canals lined with trees, the rest areas and spaces for sport and free time and the views of the experimental farm are stratified on the existing territory giving a new public meaning to the agricultural space of the Modenese plateau.

Water, earth and energy - further subthemes of the infinite knit of the matrix - that become essential ingredients for this scenery.

WATER

Going into detail we see that the extractive poles 5 and 6 become a theatre for planning experimentation and for the application of the matrix concept. In these two extractive areas the relationship (and the contrast) between the founding elements of the territory and the extractive activity become even more evident.

The starting point is the theme/context of the water.

The idea is that of a mixed use for lamination (for the first three or four years) with the consequent natural impermeabilization of the river banks (due to the discard of mud and silt produced from the crushing of gravel) and the subsequent storage of the water when the river is at maximum capacity (also due to rainfall) for irrigation purposes.

The total water capacity of these quarries is about 30,000,000 m³, which corresponds to 75% of the water withdrawn annually from the Secchia river (40,000,000 m³) which currently are used to irrigate a surface of 15,000 ha.

The proposal is that of associating the hypothesis of storage water for the purpose of irrigation to an irrigation system that doesn't waste water and that is adequate to the intensive cultivation of maize and grain, composed of an sprinkler system (underground irrigation system with at least one metre of earth above the tube plus distribution point and sprinklers).

BASIN 6 (via Ancona, right side of Secchia)

The quarry plan foresees an extractive area with a depth of 12 m for the excavation. The adduction of the water in basin 6 of the Secchia river, which is suspended, takes place by means of skimming

The skimming flow construction, located south in correspondence with the non authorized extraction area, will be composed of: restoration of the banks for the necessary length in the section not currently present (demolished by the extraction); receiver/collector (allows 20 square

metre of liquid to enter, which corresponds to a 10/15 metre long and 2/3 metre wide opening, and dissipates by means of a stepped spillway of about 10 metre in natural stone).

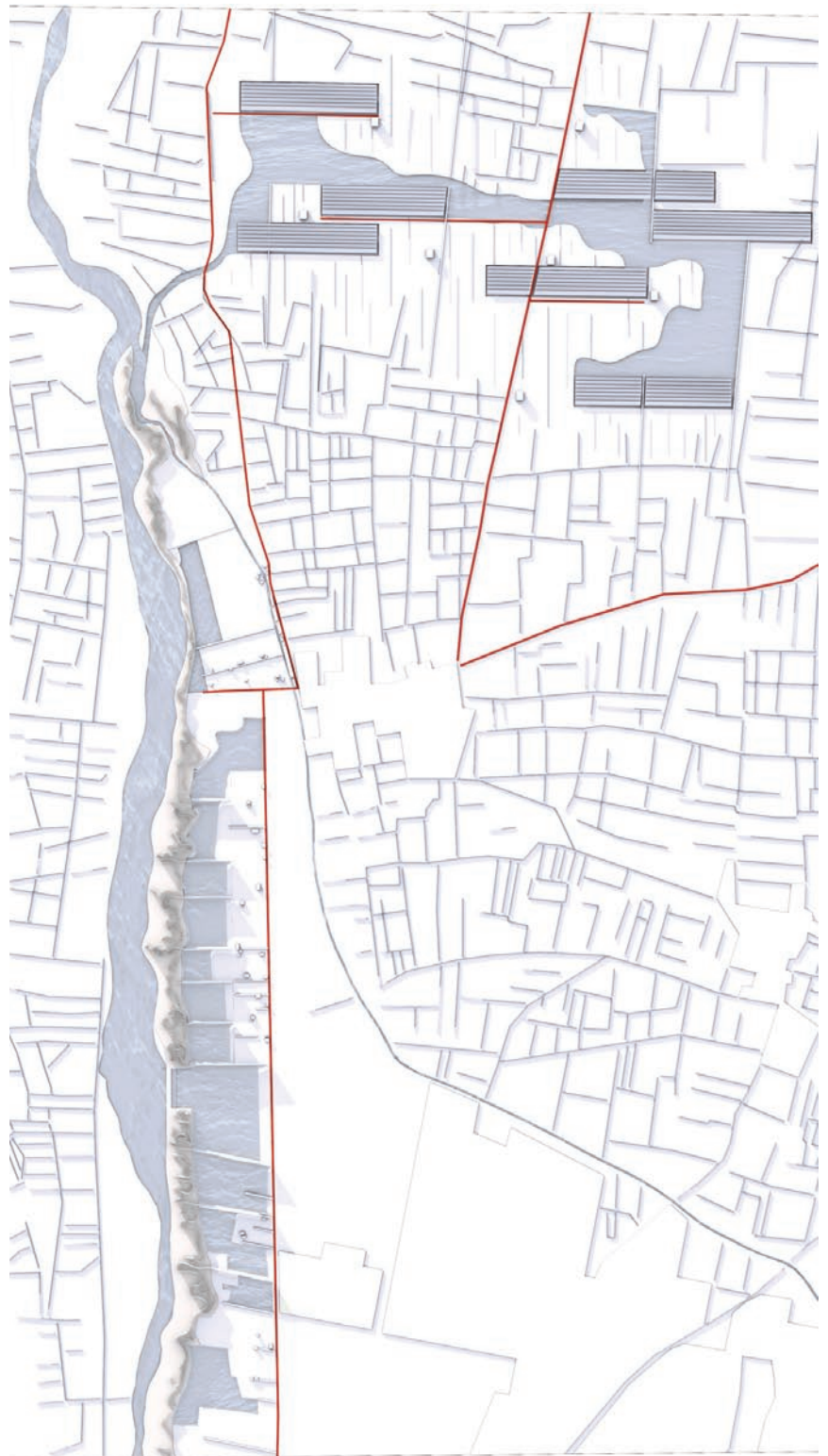
The water in the basin will be subdivided into pools. The current diaphragms between excavations will be remodelled in order to allow panoramic fruition, which will be further interrupted by skimming flow constructions which allow to gradually fill the various pools in succession.

In the last pool, located north of the system, which will be filled less frequently, a different modelling of the ground is foreseen (a more superficial excavation and less steep profiles) in order to guarantee the herbal purification.

In this solution the adduction of the water evidently won't take place by skimming but by means of an underground connecting tube. The distribution of the stored water will take place through an adequate number of extraction pumps powered by renewable energy.

Starting with the volume of water currently withdrawn from the Secchia we get 40,000,000 cubic metre/100 days/10 hours/3600s = 10 cubic metre/s necessary for irrigation, and 10 cubic metre/sx100ggx 10 hours = 10,000 MWh = 10 GWh of annual power necessary for the pumps.

Considering the multiple uses foreseen by the matrix quarries



3D model of the project areas: basin 5 in Secchia Riverside and basin 6.

(realization of energetic plants from a photovoltaic plant in the quarry)
the idea is to designate 20 hectares of ex-quarries to this use. It is also proposed to intercept part of the water that flows on the ground, keeping the canal network open-air.



THE EXPERIMENTAL FARM

BASIN 5 (via Pederzona right of the Secchia)

If, to the theme of water, its saving and reuse for agriculture and stockbreeding, we add another source of support, that produced by solar radiation, and promote a new model of “experimental farm”, we can hypothesise a new use of the agricultural space that is not only more sustainable but also more collective.

The development of a sustainable agriculture able to maintain a good production capacity in spite of a reduction in environmental pollution together with the use of renewable energy, is one of the main objectives for the near future of the tertiary sector.

One possible scenario is that to convert an excavated void into a photovoltaic field in order to satisfy the electrical energy need of the companies.

As an applicative case, we hypothesised an agricultural-stockbreeding company with direct product sales, agritouristic and educative activities - a public farm - which breeds 200 pieces of livestock and has a surface area of 460 ha subdivided in various cultivation areas; from stable meadows, to pastures, to the cultivation of cereals, to olive fields, to woodland. For a farm with these characteristics, an annual need of 3.2 GWh of electrical energy is estimated.

The surface area necessary for the installation of a photovoltaic plant that covers these needs is 5.27 ha, 4.97% of the total useful surface of the quarry in Pole 5, and a total construction cost of 6.91M € paid over 4.95 years.



Zootechny and agriculture in the experimental farm.

0 ANNI

3 ANNI

6 ANNI

9 ANNI

12 ANNI



The transforming extraction landscape: future scenarios of the redeveloped mining areas.

1.4 STRUCTURE

In order to understand better the structure of the research and to simplify the matrix diagram, it has been chosen to represent in standard form the relationships between the most important topics with a pre-established reading order.

The main connections are “excavation/context/perception”, “excavation/matter/void”, “excavation/time/transformation”, “excavation/waste/recycle”. In each chapter the single themes are exposed in different sections: the literature review, the first part, (connection of the three themes through surveys conducted in the field of art, architecture, agronomy, philosophy, geography), the ‘Case study’ (the analysis-interpretation of the porphyry territory in Trentino), the ‘Experimental projects’ (projects developed during the research elaborating similar methodological approaches), and the ‘References’ (realised projects with singular connections to the theme).

The references give further overviews through ‘Interviews’ of architects and researchers about their experience of the particular topics or considering the methodological approaches of some realised projects.

The ‘Excursus’ section as an in depth study, more specific about “parallel themes”, reconnects other specific subjects to the research matter.

The **first chapter** outlines the methodology of the research based on the relations strategy. In the **second chapter** declensions of the landscape and context definitions are the starting point of the study.

The connection among the themes “excavation-context perception”, defines the main structure of the landscape reading and encloses the particular pilot project area into the Trentino porphyry territory.

The visual perception is used as a tool to underline the critical situations, the discontinuity of the excavated soil, as well as the potentiality of the site.

The **third chapter** considers the excavation/matter/void relationship. In particular, through artistic and philosophic literature, the excavation design potential is analyzed as a void and as a generator of landscape.

The interview with Juan Manuel Palerm Salazar about the landscape consumption/landscape production connections creates further sub-subjects in the body research.

Excavation/waste/recycle are the topic’s key words of the **fourth chapter**. An overview of the artistic and social fields in the contemporary literature introduces the particular theme. Related to the topic “scrap”, is its transport infrastructures. The analysis of both the case study and the reference, as regards the infrastructural context, extends the subject.

In the **fifth chapter**, the interlacing excavation/time/transformation

exposes the interpretation and the definition of a “transforming landscape”. Implemented projects and research in the fields of architecture and landscape help to give different declensions of the word transformation. The reference/interview and the experimental projects analyse different methodological approach to the transforming landscape design. With the final step, the **conclusions**, the elaboration of the pilot project is the direct application of this research path. The methodological approach indicates future scenarios on the extraction landscape in Trentino. The topics, used to analyse the territory, are now the key words to understand and read the project.

1.5 GLOSSARY¹

Reading the carved landscape there are chosen keywords descriptive of phases, elements, effects, places of the mining process. Their way to relate, interlocking reflects relations of process type, functional, related more to the principle of cause and effect than of similarity or difference.

While the key words are significant for what they represent, their relations are new signs with new meaning, and so the plot thickens defining for each relation new meanings, new words.

If the relation between words creates a structure, language, and therefore a text that can be read, so in the landscape analysis the relation between key words identifies a reading path, a story. These various relations then create multiple keys for reading.

Please find below the definitions of the words chosen, indicating the variation that best represents them in the mining landscape. Every single word on this context of study, has a facility to refer to scales, times and uses other than the mining process. For example matter refers to the excavated site, but also to the stone taken away and the resulting material, the waste.

For some keywords it is emerged through etymological analysis, the direct relation of process type with others.

CONTEXT²: *from latin con-textus, an adjective which derives from the verb con-texo, which expresses the action of weave together, connect, interlock, join*³.

“The context of a project - the place, its environment - is much larger than

1 A. Berque, P. Aubry, P. Donadieu, A. Laffage, J. P. Le Dantec, Y. Luginbühl, A. Roger, *La Mouvance II. Soixante-dix mots pour le paysage*, Editions de la Villette, Paris 2006.

G. Corbellini, *Ex libris. Parole chiave dell'architettura contemporanea*, 22 publishing, Milano 2007.

P. Donadieu, *Des mots du paysage et du jardin*, Ecole nationale supérieure du paysage de Versailles, 2001.

M. Gausa, V. Guallart, W. Muller, F. Soriano, J. Morales, F. Porras, *The Metapolis Dictionary of Advanced Architecture: City, Technology and Society in the Information Age*, Actar, Barcelona 2003.

2 A.A.V.V., 'Casabella', n. 575, 576, 1991.

Convenzione europea del paesaggio, Firenze ottobre 2000.

G. De Matteis, *Possibilità e limiti dello sviluppo locale*, in: 'Sviluppo Locale', n. 1, 1994

V. Gregotti, *Il territorio dell'architettura*, Feltrinelli, Milano 1977.

R. Koolhaas, Oma/Amo, *Content*, a cura di Brendan McGetrick, art directors &&&, Taschen, Köln 2004.

G. Redaelli, *I paesaggi invisibili. Tre conversazioni portoghesi*, Libreria Clup, Milano 2005.

3 Translation from "IL", *Vocabolario della lingua latina*, L. Castiglioni, S. Mariotti, Loescher, Torino 1981.

the city or piece of earth upon which I will sit. It is greater than the historic discipline, larger than the traditional composite methodology. For us, there exists an amplified concept of context, in the same way that we understand that a work in architecture is not only found in its construction”⁴.

Translated into the architectural language thus refers to the dense plot of relations that unites the elements and characters of a territory. Context then, as a system of signs, and relations between the signs of an area: part of territory for the physical, morphological, topographical but also historical and cultural characteristics it differs from others: it is that place, that landscape.

In the second etymological meaning, deriving from “text”, “compose in layers”, the term context acquires a value of “project” nature, as if to indicate that, in researching the relations, connections, it is implicit and simultaneous as an action of composition⁵.

There is a close analogy with the definition of landscape, which is often used in research and interchangeably with the term context (while “context” refers more specifically, limited to the study area, landscape means wider area, generic, of the Trentino porphyry). It was chosen in the analysis of the territory of Trentino porphyry, and in the matrix system, to use the term context to emphasize the dual value of the analytical and design nature.

Related terms are: landscape, quarrying, perception.

EXCAVATION⁶: *the act of excavating, or of making hollow, by cutting, scooping, or digging out a part of a solid matter.*

Applied to the mining context, excavation refers to removing, take out, thus indicating an action of subtraction. The direct variation of the word is quarry, as the subject of mining site with different consequences for the

4 Definition from F. Soriano in the *The Metapolis Dictionary of Advanced Architecture*, in op. cit., p. 132.

5 Composing action implicit, as outlined Trasi, in the altered landscapes, that she calls, invoking the metaphor of tissue, “disjointed, shocked, laddered”: “to put a project into a site must sew a tissue, and this can be done only after knowing the history of this place” in N. Trasi, *Paesaggi rifiutati paesaggi riciclati. Prospettive e approcci contemporanei. Le aree estrattive dismesse nel paesaggio: fenomenologia di un problema progettuale*, Editrice Librerie Dedalo, Bari 2004, p. 47.

6 G. Gisotti, *Le cave. Recupero e pianificazione ambientale*, Dario Flaccovio, Milano 2008.

N. Trasi, *Paesaggi rifiutati paesaggi riciclati. Prospettive e approcci contemporanei. Le aree estrattive dismesse nel paesaggio: fenomenologia di un problema progettuale*, Editrice Librerie Dedalo, Bari 2004.

A. Berger, *Reclaiming the american west*, Princeton Architectural Press, New York 2004.

F. Espuelas, *Il vuoto. Riflessioni sullo spazio in architettura*, Christian Marinotti Edizioni, Milano 2004.

S. Zanon (a cura di), *Cave. Per un atlante storico geografico delle cave del Veneto. Reinvenzione e riusi*, in “Progetto Interreg IIIB, area Cadses, Rekula”, Fondazione Benetton Studi Ricerche, Treviso 2006.

territory as a natural context (voids in the soil) and anthropogenic (other than land use, perception).

The detailed technical terminology to define the excavation of porphyry, which designates the project and the type of excavation and production.

Related terms are: extraction, quarrying, processing, subtraction.

FRUITION: use or possession of anything, especially such as is accompanied with pleasure or satisfaction; pleasure derived from possession or use.

Unlike the verb to use, more connected to what is useful and convenient, enjoyment emphasizes pleasure, delight in the use of something.

This nuance may be interesting in designing a new use of disused quarries, thinking of a new identity linked to amusement and leisure. In this sense perception is linked to the consumption patterns of the site.

Related terms are: perception, use, recycling.

MATTER⁷: that of which anything is composed; constituent substance; material.

F. Soriano states. “Matter in architecture is elaborated substance. Concrete, metal sheets, etc. are not only abstract choice, but physicalities that must be established throughout a process Material has precise form and process of fabrication These form and size can determine a space, a way of building, a structure, measurement or proportion, Material itself contains an architectural idea implicit within it”.

In the context of porphyry mining area it encloses all the shapes and colours. From matter as excavation object, rocky mountain, which is dug out, to matter as the rock that is detached from the mountain, to matter as waste material of the first processing (extracting), scrap.

Related terms are: excavation, scrap, waste, vacuum, recycle.

PERCEPTION⁸: “In psychology, perception is the act/function, through which the mind represents the objects and spaces: to look, see, hear, listen, feel (smell and touch). The supposed perception of sensations (visual, auditory, tactile, etc..) and it ends with mental representations” (P. Donadieu).

⁷ M. Gausa, V. Guallart, W. Muller, F. Soriano, J. Morales, F. Porras, *The Metapolis Dictionary of Advanced Architecture: City, Technology and Society in the Information Age*, Actar, Barcelona 2003.

E. Cattani, F. Fedrizzi, C. Filz, G. Zampedri (a cura di), *Atlante della Pietra Trentina: Antichi e Nuovi Percorsi. Guida pratica all'utilizzo*, Nicolodi Editore, Rovereto 2005.

⁸ P. Donadieu, E. Boissieu, *Des mots du paysage et du jardin*, Ecole nationale supérieure

It's the act of perceiving; cognisance by the senses or intellect; apprehension by the bodily organs, or by the mind, of what is presented to them.

In the analysed context perception on which is most dwelt in the analysis of the place is visual, referring in particular to a subject in motion (passenger).

Related terms are: context, landscape, movement, enjoyment.

RECYCLE/RECYCLING⁹: *the act of processing used or abandoned materials for use in creating new products.*

Recycle = retrieve, add to the normal cycle of a given object, a new cycle, thus allowing a new use.

Applied to the context of mining/quarrying, recycling can be applied to the "matter" mountain, and then the context itself, in terms of the new use, a new cycle of excavated site, but also of the excavated material, stone, rejected, that, subject or less to different works, may be used again.

Related terms are subject, phase, process, time, processing, redevelopment, rethinking, scrap, waste.

SCRAP/DROSS⁹: *a small piece of something that is left over after the rest has been used.*

Dross = any worthless matter separated from the better part.

It defines what is separated, dismissed, as no longer useful, usable at present. In a production process the scrap before its refusal.

It refers to the results material of the first processing, as well as to abandoned sites pending future redevelopment.

Unlike the rejection, the scrap depends on the possibility of re-using the object in a different cycle from the one that created it.

Related terms in the mining process are matter, waste, recycling, transportation, infrastructure, process, third landscape.

EXCAVATION/SCRAP: The etymology of the words excavation and waste - in this application to the mining context is clearly evident - it emphasises the direct relation between the two measures of the waste

du paysage de Versailles, 2001, p. 46.

D. Appleyard, K. Lynch, J. R. Myer, *The View from the Road*, Mit Press, 1964 (ed. it. parz. in 'Navigator', n. 7, 2003).

K. Lynch, *Il tempo dello spazio*, Il Saggiatore, Milano 1977.

C. Greppi, *Guardare con meraviglia*, in 'Casabella', n. 575-576, 1991.

A. Corboz, *Avete detto spazio?*, in 'Casabella' n. 1983.

G. Clément, *Traité succinct de l'art involontaire*, Sens et Tonka, Paris 1997.

9 S. Aronson, *Aridscapes. Designing in harsh and fragile lands*, Editorial Gustavo Gili, Barcelona 2008.

(from ex-cepere: carve out, separate, remove from itself) and the dig (by ex-quarry: extract, pluck out).

TRANSFORMATION¹⁰: *the act of transforming, or the state of being transformed; change of form or condition.*

Process conditioned by time it involves a change in physical and tangible way or by use. It applies to the landscape as a result of layers of signs and different uses of the territory during the time.

It applied to the context of the study, it refers to transform the site being excavated, but even after the divestment of the business. The term also applies to the material that is extracted.

Related terms are: movement, transmutation, process, phase, cycle.

VOID/EMPTY/VACUUM¹¹: *“result of a drastic difference for reduction compared to model, an accumulated experience or simply the sensory density of perceptions a priori”.*

Direct consequence of the subtraction of material, made by excavation.

In the quarrying of porphyry it is perceived, by difference, from the new morphology of the mountain, concave, and the proportion of regular steps.

Related terms are: matter, excavation, subtraction, shape, perception.

WASTE¹²: *any materials unused and rejected as worthless or unwanted.*

It refers to something that is discarded, but with an additional nuance. The term encompasses a more negative rejection valence, as determined

10 G. Clément, *Le jardin en mouvement*, Sens & Tonka, Paris 1994.

E. Turri, *Semiologia del paesaggio italiano*, Longanesi, Milano 1979.

11 K. De Barañano, *Les Gravitation: reliefs de papier*, in ‘Chillida’, Galerie nationale du Jeu de Paume, Paris 2001.

F. Espuelas, *Il vuoto: Riflessioni sullo spazio in architettura*, Christian Marinotti Edizioni, Milano 2004.

R. Koolhaas, B. Mau, O.M.A., *S, M, L, XL*, The Monacelli Press, New York 1995.

R. Koolhaas, OMA/AMO, *Content*, Brendan McGetrick, Art directors &&&, Taschen, Köln 2004.

P. Virilio, *La procedura silenzio*, Asterios Editore, Trieste 2001.

12 A. Ponte, *Arte e rifiuti*, in ‘Lotus’ n. 128, 2008.

N. Trasi, *Paesaggi rifiutati paesaggi riciclati. Prospettive e approcci contemporanei. Le aree estrattive dismesse nel paesaggio: fenomenologia di un problema progettuale*, Editrice Librerie Dedalo, Bari 2004.

A. Berger, *Reclaiming the american west*, Princeton Architectural Press, New York 2004.

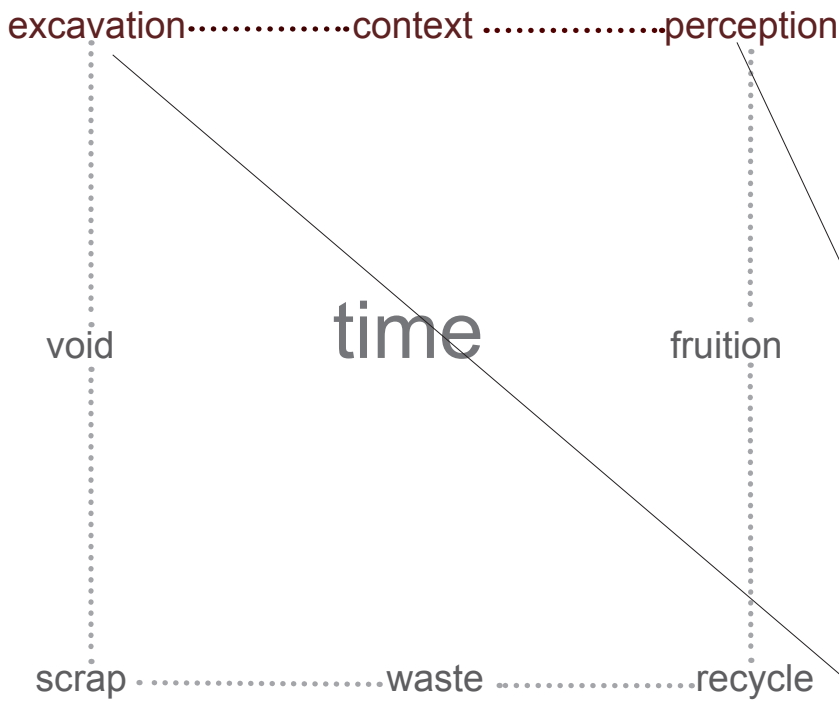
A. Berger, *Drosscape. Wasting Land in Urban America*, Princeton Architectural Press, New York 2006.

G. Clément, *Manifeste du Tiers paysage*, Sujet Objet Eds, Paris 2004.

by the person who refuses it. There is in fact from the rejecting party, the decision to deny the subject refused, repulsive, denying a potential recovery, recycling. It refers to a culmination of a process, and requires the total abandonment of an object, a total removal of this item rejected by the person who decides to refuse it.

Reported to the refused mining landscape, it designs an abandoned place, forgotten, without the will to re-use it.

Related terms are: waste, matter, landscape.



2. EXCAVATION/CONTEXT/PERCEPTION

2.1 FROM THE CONTEXT DEFINITION TO THE CARVED CONTEXT PERCEPTION

“... working with the available material, not only considering his physicality - the topography - but also with the materials of the place and region, which has nothing to do with regionalism: land, plants, stones and trees. This is the context”.

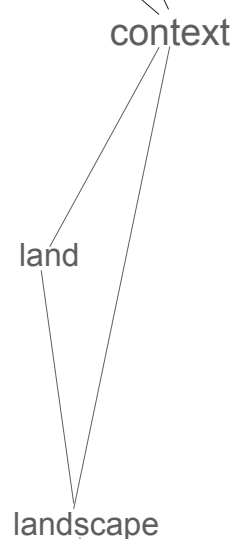
(Eduardo Souto De Moura¹)

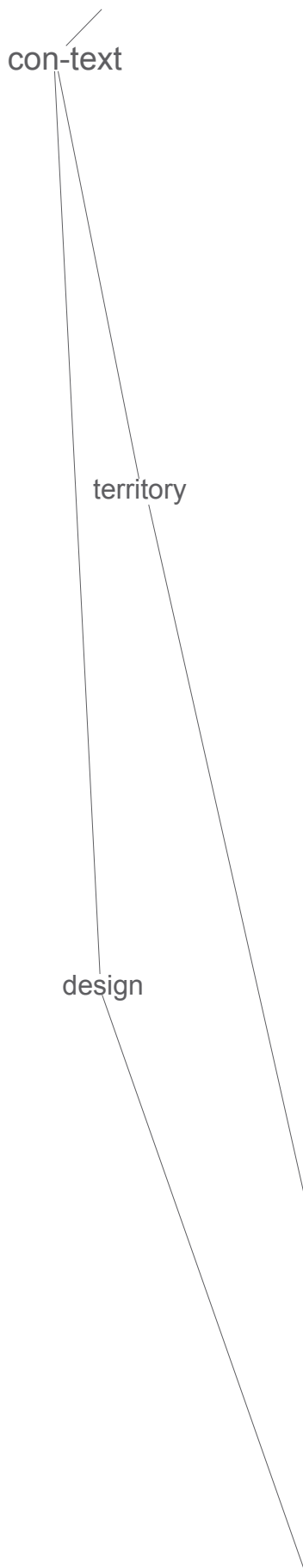
Context, therefore, considered as an ensemble of physical characteristics, and not only, as part of territory. Some nuances connect it to concepts of place, landscape, so that often it appears in the literature as synonyms²: “for me context and landscape are the same thing ... they are working tools and I do not think there is a big difference between the two terms”³.

1 E. Souto de Moura in “Conversazione con Souto de Moura” from G. Redaelli, *I paesaggi invisibili. Tre conversazioni portoghesi*, Libreria Clup, Milano 2005.

2 The arguments that follow do not have, as objective to investigate exhaustively the semantic values of the terms context, landscape and territory of which already exist a rich literature. The intent is not to “rein in” a term, limiting the scope of its meanings - it would be simplistic and limited with the risk to frustrate its meaning. The goal, in contrast, is to indicate how a different sense of the term context can add nuances to the term landscape.

3 E. Souto de Moura in “Conversazione ...” op. cit., p. 18.





But it seems important to emphasize just one of these nuances that emerges from the etymological root of the term context and highlights its relational and process character, fundamental for the logic of this research.

“Context” comes from the Latin *con-textus*, an adjective which derives from the verb *con-texo*, which expresses the action to weave together as to connect, interlock, and join⁴.

Compared to the verb *texo* which similarly translates the actions of weaving, braiding the suffix “con” represents a strengthening of intertwine, of weaving, emphasizing the relationship, the combination between the parties, “the weaving of the threads”.

And it is in this attention to the connection of the wires that constitute a plot, the relationship between things, and then, in the architectural discipline, between elements of the territory rather than the facts which are the base for this reflection.

Simultaneously, this being “united to...” “related to ...” - which also refers to common usage of the term - as being part of a body, to belong to a group with specific characteristics, it determines uniqueness, as the peculiarity of that place instead of another.

Also, if the identity of a place, its context, is that one not only in refer to the physical and geographical elements that constitute it, but also for its historical and socio-cultural characteristics, it is then evident in connection with the concept of milieu - French translation of the term context - that De Matteis calls as “permanent assembly of socio-cultural characters merged to a certain geographic area through the historical evolution of intersubjective relationships, which are then related to the use of local natural ecosystems”⁵.

Context then, intended as part of the territory for its physical, morphological and topographical characteristics but also historical and cultural, it is distinguished from others: it is that place, that landscape.

In the second etymological meaning of the term context, “composing by layers”, it is rediscovered a different nuance: it is inherent in the definition of context the project actions, as to indicate that, while researching the relationships and connections it is implicit and simultaneous an action of composition: “Reading as a choice and knowledge of signs constituting the matter in its layering process thus becomes a principle of the project”⁶.

And here we return to the words by Souto de Moura defining the context

4 Translation from “IL”, *Vocabolario della lingua latina*, L. Castiglioni, S. Mariotti, Loescher, Torino 1989.

5 G. De Matteis, *Possibilità e limiti dello sviluppo locale*, in ‘Sviluppo Locale’, n.1, 1994, pp. 10-30.

6 G. De Matteis, *Una geografia mentale, come il paesaggio*, in A. de Rossi, G. Durbiano, F. Governa, L. Reinerio, M. Robiglio, “Linee nel paesaggio. Esplorazioni nei territori della trasformazione”, Torino 1999, pp. 32-41.

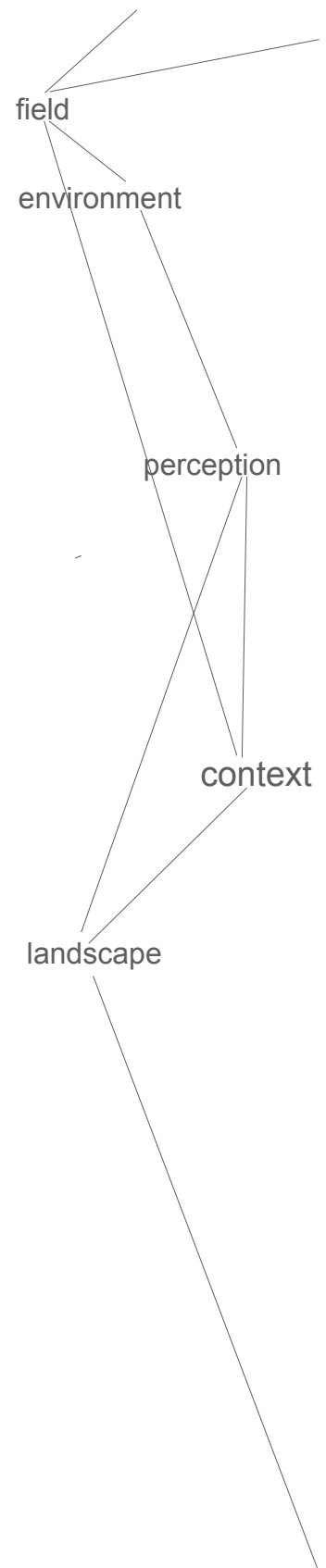
as a tool for project work.

Many years earlier, Gregotti⁷ called “the scope of discipline consistency for the architectural design” increasingly “connected to the surrounding (city or area) so to make increasingly difficult its detangled design from the context”.

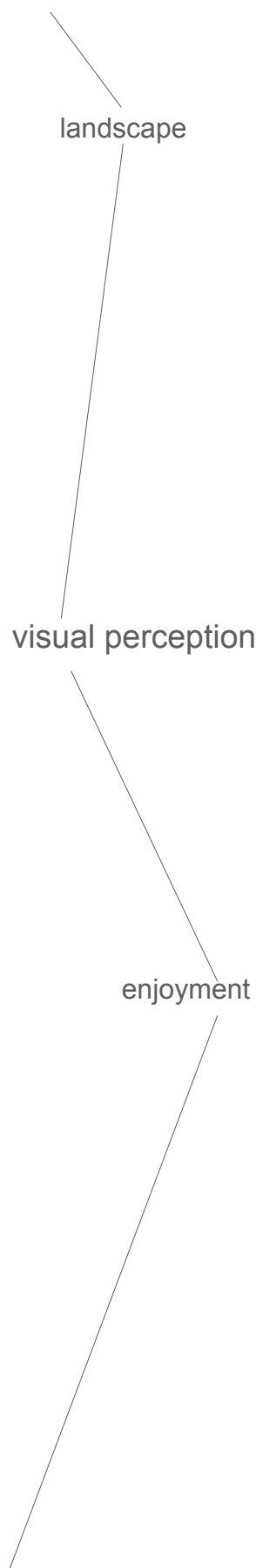
In Gregotti’s writings *contesto* (context), *paesaggio antropogeografico* (anthropogeographic landscape)⁸ and *ambiente totale* (total environment)⁹, are alternate, intertwined, where each term gains similar semantic values. But it is perhaps in Gregotti’s concept of *campo* (field) as an operating unit of reading the territory that we find strong similarities with the etymology of this word. It is recognized the presence of a field there, “where signs made by nature or by man establish formal constrained ensemble”, whose reading is done through detection floors (syntactic) consisting of “patterns of geometric relationships, sequences and polarities of the physical elements”, but also through “the intended use, the level and nature of the symbolic quality of places”¹⁰ (semantic planes)¹¹.

Field, context, which are interwoven with the concept of landscape in the “definitions” of Zagari: “The landscape design interprets, and ‘translate’, a context. Several interrelated and overlapping layers between them, each with a structure and a life of its own, help to define which ‘quid’ in a precise time and place can be ‘defined’. The contexts are more and more hybrids, they are large or small areas, affect the whole of a place as it is recognised and perceived by those living there or even a part”¹².

Besides, the European Convention¹³ defines “landscape” that “part of the



7 V. Gregotti, *Il territorio dell'architettura*, Feltrinelli, Milano 1977, p. 43.
8 Using this term Gregotti defines the built environment by the work or presence of man.
9 Ibidem, p. 47: “Restitution in terms of figure of the whole model of culture”.
10 Ibidem, p. 83.
11 In the different formal technologies of reading the landscape that are linked to a reading of visual arts, we find in Gregotti’s text a relationship between the concepts of context/digging (as operation on a geological support)/perception: a first reading is strongly linked to the relationship between perception of the context and culture as collective memory and draws similarities in the forms of the landscape with objects, familiar figures, where by defining a different meaning from the observed object, it leads to a total figural invention. Another way of reading it is done by increasing the distance with the observed object; it is an aerial view that allows getting points, geometry and relationships otherwise not detectable. The reading of the “geological support” can give an additional way finding of the territory (or context) through the interpretation of layers, heaviness, and the ability of matter to be cracked, distributed, piled and transferred. It is possible then to identify in the context exceptional places, topical, the natural totemic elements, the Acropolis, on which the mythological and technological reason has created and distributed their meanings.
12 In his book “This is the landscape. 48 definitions” Franco Zagari collects definitions of the term required scholars and authors from different disciplines, providing a broad and original framework of interpretation. Among these are clearly in the words of Colafranceschi, Bocchi, Priore the definition of landscape as a system of relations between elements of the territory and anthropic activities.
13 R. Priore, *Convenzione Europea del Paesaggio. Il testo tradotto e commentato*, Iiriti, Reggio Calabria 2006, ‘Art. 1’, p. 75.



territory as perceived by people, whose character is the action of natural and/or humans factors and their interrelationships.

If to the connections, plots, between the elements that constitute a field, a context, it is added another relation, the one that runs between the context and its observer, user, they come continuously in play analogies and interferences with the traditional (historical) concept of landscape¹⁴.

Is it possible perhaps to say that a context while in the act of being perceived, it is then transformed into landscape?¹⁵

Landscape, concept whose Humbolt's meaning¹⁶, as Farinelli recalled, may therefore represent the link between perception - and, in particular visual type - and context. The landscape, in fact, in his *double meaning*¹⁷ when referring to both the signifier (the image of a place) and meaning (the site itself), points out in its first meaning the character of perception related to the *impression of Nature* (Natureindruck), from that "reference to the edge"¹⁸ that is established between the frame which is represented by our visual cone, ..., and the strength from *Ausstrahlung* with regards of the forms of the world¹⁹.

This "impression" of what is perceived and observed implicates not only the realm of purely sensory perception (the eye), but the way we feel and perceive build in our culture, memory image, "koinè of objects"²⁰.

However, if for Humbolt, contemplation of the landscape, the ability to observe and to "compare and combine"²¹, was linked to a privileged position of observation and enjoyment, today's times, the modalities and perhaps the "quality" of that same "contemplation" (observation) have

14 For this paragraph we refer to the definition by C. Greppi of landscape: "Landscape is the result of changes in the environment considering the use of land resources: the result may be more or less valuable because it can be used, in an occasional or permanent way, obtaining an enjoyment, a pleasure that arises from a certain willingness and availability to observation." in *Guardare con meraviglia*, in 'Casabella', n. 575-576, 1991, p. 18.

"The landscape is the interface between the territory as it manifests itself in all its changes and its transformations and our way to understand it: it is the territory, the environment and - I would add the context - understood in its way to become form... at the very moment that we live or perceive a landscape as landscape, we think outside ourselves, within a space and time framework, as something complete in itself, as a form of its own", I. Pizzetti, *Luoghi della coscienza paesaggistica*, in Casabella 575-576, 1991, p. 49.

15 "Unlike the place, the landscape consists not of things but it is only a way of seeing and representing (to watch) the things of the world". in F. Farinelli, *Geografia. Un'introduzione ai modelli del mondo*, Einaudi, Torino 2003, p. 40.

16 "By which (Humbolt) the concept of landscape definitely turns, for the first time, from aesthetic concept in scientific concept, it passes from figurative and poetical knowledge to the geological description of the world ...", F. Farinelli, *L'arguzia del paesaggio*, in 'Casabella', n. 575-576, 1991, p. 10.

17 Ibidem p. 11.

18 I. Pizzetti, *Luoghi della coscienza paesaggistica*, op. cit., p. 48.

19 Ibidem p. 49.

20 C. Greppi, *Guardare con meraviglia*, in op. cit., p. 20.

21 A. Von Humbolt, *Cosmos. Essai d'une description physique du monde*, Turati, Milano 1849, in C. Greppi, op. cit., p. 21.

changed: “The society of goods has invented an own caricatured form of enjoyment of the landscape: the one of forced vacation, increasing of the working time ... you live and you move more or less at times in a landscape that begins where ends the time required for the reproduction of social wealth”²².

Changed times and opportunities to perceive the landscape, what can be impressed in the retina of the observer?

Can also change the image of a landscape if you change the mode of its implementation?

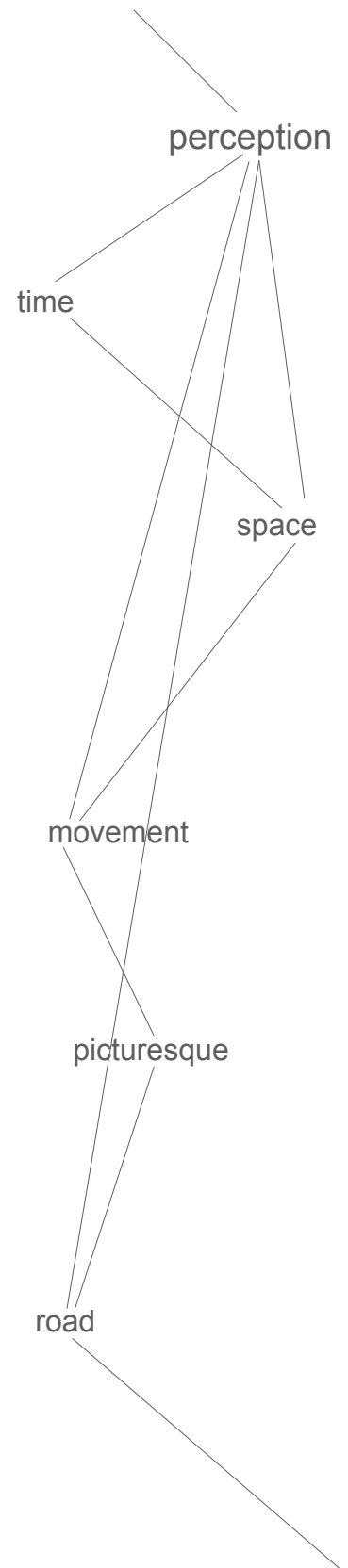
“We do not look at what is obvious, familiar, we observe what is far (in time and space). The spectator is a traveller, the effect of displacement that can be felt or because it was really outside from his “country” or because you look around with wondering eyes, [this] is the condition of enjoyment”²³.

It is noted, perceived the landscape “within the categories of contemporary perception of the world including the speed and distraction”²⁴ on “stretched” time required for work shift, the time of travel. Voyage no more as Humbolt’s way, (as it was understood in the nineteenth century) to explore and contemplate the landscape, but forced and compulsory travel, where the landscape is perceived at glance, at a speed different from slow, almost static for the explorer, from the corner of the eye, must be “awesome” to be learned, felt and marked.

Speed-car - “filter between the driver and the world that lies ahead”²⁵ - that “distorts” the landscape, or rather turns it into a cinematic sequence, framed and punctuated by scenes, far and close shots.

Therefore perceived landscape, discovered through the movement, is conceived as the ambulatory space and in a peripatetic vision that Smithson evokes as a landscape picturesque fruition²⁶.

The perception, the view from the street, put between the observer and the observed object a double-filter - to the “brain retina” is added the windshield frame with movement and speed - and it projects on the screen of the windshield a fixed scene made up of moments, breaks, surprises,



22 In this meaning of the term landscape Greppi connects the concept of landscape with time, critical for its enjoyment.

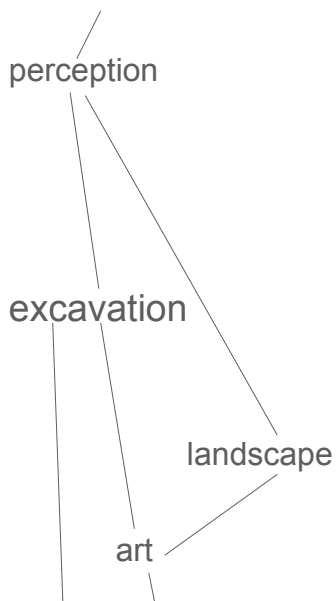
20 C. Greppi, *Guardare con meraviglia*, in op. cit., p. 21.

24 F. Purini, *Un paese senza paesaggio*, in ‘Casabella’, n. 575-576, 1991, p. 43.

25 D. Appleyard, K. Lynch, J. R. Myer, *The View from the Road*, Mit Press, 1964, ed. it. parz. in ‘Navigator’, n. 7, 2003.

26 “The contemporary picturesque notion as peripatetic vision embodied by the work of Serra leads to a notion of the landscape geometries based on topological and phenomenological concepts (genius loci, experiential space), of movement, body space, which in turn refer to perception phenomenology”, in R. Bocchi, *Architettura peripatetica*, in ‘Parametro’, XXXVI, n. 264-265, luglio-ottobre 2006, pp. 174-183.

With regard to the topological space, see A. Corboz, *Avete detto ‘spazio’?*, in ‘Casabella’ n. 597-598, 1983.



'Silver Lake Operations, #1', Lake Lefroy, Western Australia, 2007. Photo by E. Burtinsky.



'Rock of Ages, #15', Active Section, E. L. Smith Quarry, Barre, Vermont, 1991. Photo by E. Burtinsky.

process

determined by the sequence of “elements of attention”, openings of visual fields, targets, apparent movements that the development of the road itself produces: “The sense of spatial sequence is like the one that causes a large-scale architecture, while the continuity and insistence temporal flow are similar to those used in cinema and music”²⁷.

But if the mode of perceiving the landscape becomes the one of travelling -more or less fast and distracted, and with a double filter to the observed world- what is taken of the landscape with more attention, from what is the look “captured”?

We find an answer in “The view from the Road” by K. Lynch: the attention of the traveller that “moves continuously from side to side following the winding flow of the road and it changes with the increasing of speed; “are the larger spaces and forms of the territory which are more marked to become predominant” and it is by focusing his own look on the above, distant target, that the driver overlook a number of closer targets pending to the final goal. The approach to the finish line, through multiple and shifting points of shots and guidance, a sort of discovery in stages, will “impress” the driver with the surprise effect of a “goal” of exception.

Among these “more marked forms of the territory” we find the forms of the excavation, the figurative aspect of the excavation, excavation as it is perceived. In fact, its being concave in a flat terrain, or deep wound in the mountain, as being so perceptible, visible (and perhaps only from the road). As a not normal object, not “obvious”²⁸ it hits, “impress”, and is charged with an aesthetic value. Film, kinaesthetic sequences or “snapshots”²⁹ of the landscape - like images of Burtinsky Ghirri - and merely to emphasize the ability to “impress” these damaged places, carved, but perhaps also sculpted. They become places *artialisé* (artialized)³⁰, they gain that aesthetic value that turns them from simple space to landscapes³¹.

This is not to confer these spaces with a positive or negative value (consumption-abuse relation to the process of land), but to acknowledge in a territorial context the poetic-figurative ability, capable of determining the identity of a place.

Perception-digging-context: changing the logical sequence of actions-object it is revealed how the very perception of a carved place determines the identity of the landscape (Landscapes extraction).

And again: the image, that an eroded or excavated place, cause in its

27 D. Appleyard, K. Lynch, J. R. Myer, op. cit., p. 9.

28 C. Greppi, *Guardare con meraviglia*, in op. cit., p. 22.

29 F. Purini, *Un paese senza paesaggio*, in op. cit., p. 44.

30 A. Roger, *Court traité du paysage*, Editions Gallimard, Paris 1997.

31 N. Trasi, *Paesaggi rifiutati paesaggi riciclati. Prospettive e approcci contemporanei. Le aree estrattive dismesse nel paesaggio: fenomenologia di un problema progettuale*, Editrice Librerie Dedalo, Bari 2004.

surrounding - whether the erosion is the result of a natural process, or it is produced by man - perhaps the visual impact made more evident by a chromatic contrast of the erosion limits, it belongs to this strange mechanism, to that “glance” captured that Clément defines as *art involontaire* (involuntary art), “trace of human labour on its territory, which it seems to escape from a total decision” involuntary man trace on earth.

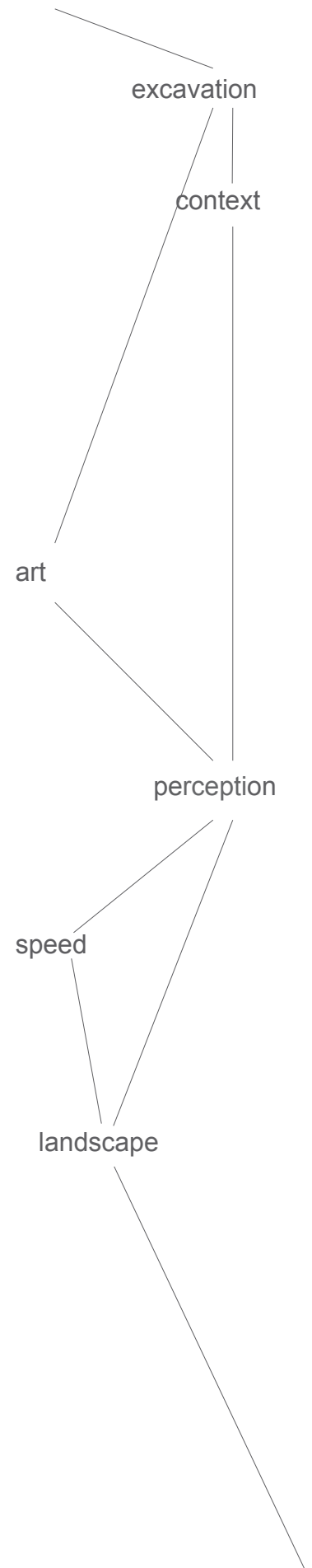
Very often the source of marks, scars, visible in a landscape, are the result of an irreversible human process (entropy) that determines the positive or negative meaning of. We find however in Smithson’s description of Niagara Falls close similarities with the vision of Clément: “It looks like a giant open quarry. There are the same great vertical walls that shocked the eye of people who observe open air quarries. These are considered as defects, these great walls that exist in the quarries, ... yet around the Niagara Falls the cliffs just recall to the existence of excavation and mining, but this is the work of nature ...”³².

In a clarification requested to Clément on unintentional art, referring to the quarries of porphyry in Trentino, he assimilated them to the poetic “aggressiveness” of “naked” rock of the mountains viewed during the journey to Trento.

It is wrong - in his opinion - to load everything that is produced by man with a negative value, valuing instead the work of Nature, since man himself is part of Nature, it belongs to the unique great system called Nature. Man and Nature, indeed, become unaware artists of those signs, involuntary art, “lucky result of an unexpected combination of situations or objects held together by harmonics rules as result of chance”³³.

Objects, traces of ancient mining activity, and observation points for their enjoyment, context/excavation/perception, are the elements of the project by B. Lassus for the Crazanne quarries and for the highway A 837.

Lassus’s choice was to draw the outline of the highway within the abandoned quarries, made re-emerged from hills of rubble, “to open perpendicular views to the road and to allow to the drivers to discover a series of contiguous characteristic spaces”³⁴, building a rhythmic scene by “protrusions and recesses, lights and shadows”. Close targets and far ones made of rocks and meadows, full and empty spaces are perceived through the windshield, not only the uniqueness of the context, element of surprise in a “boring” neighbourhood, but they intrigue the traveller, through the perception of internal access - inviting to enjoy, to discover the landscape



32 R. Smithson, *The writing of R. Smithson*, ed. by N. Holt, New York 1979.
 33 G. Clément, *Traité succinct de l’art involontaire*, Sens et Tonka, Paris 1997.
 34 B. Lassus, in *Nuove infrastrutture per nuovi paesaggi*, C. Micheletti, L. Ponticelli (a cura di), Ed. Skira, Milano 2003.



landscape

excavation

context

perception

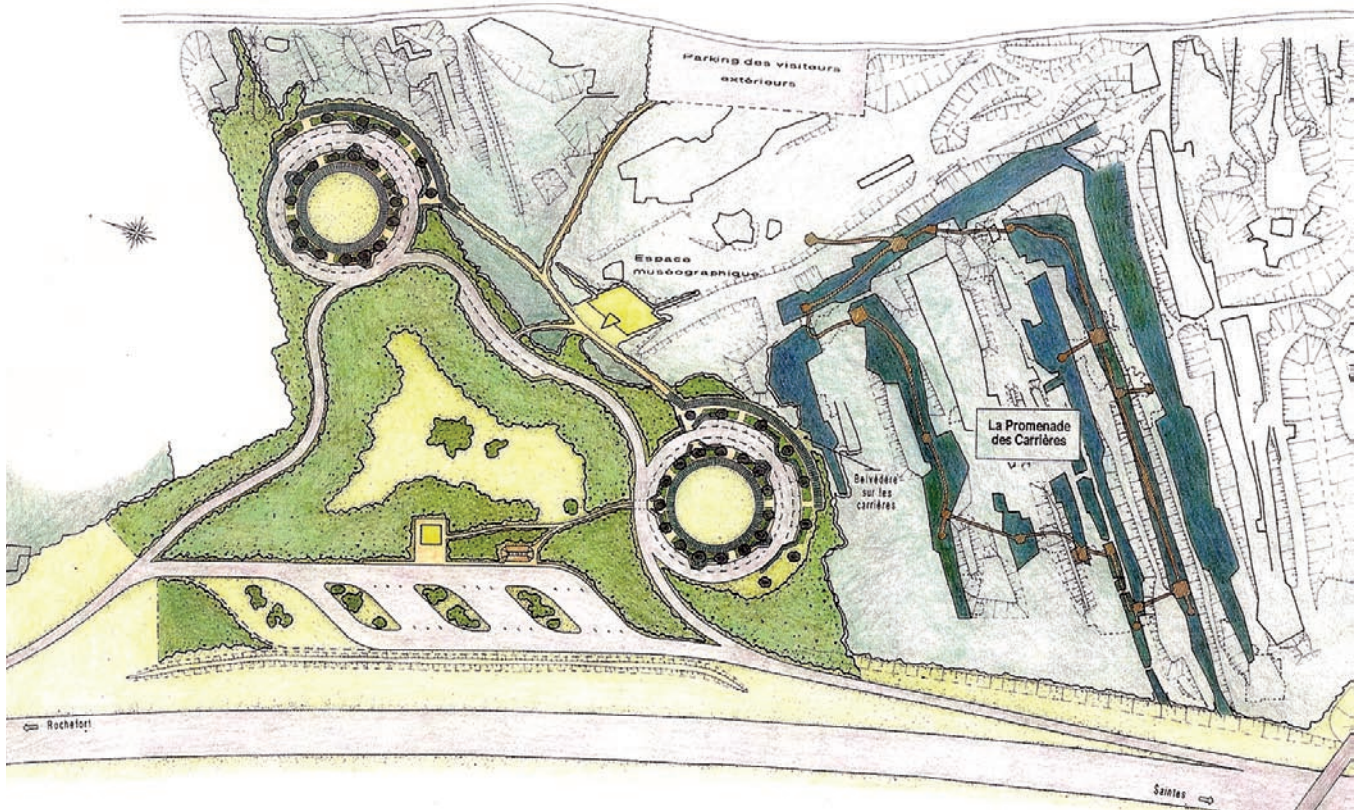
carved out with another speed, once stopped in a parking area, true path to the rediscovery of ancient archaeological caves, invisible to the driver.

This is an approach to the finish line (the visit to the quarries) - recalling Lynch - in stages and with different speeds and quality modes of different perceptions.

Designing the highway and bringing back to light a carved place, Lassus designs a landscape in the “full” meaning of the term, drawing not only the object to be observed, but the possibility and the way to observe it, thus turning this “pay” into a “paysage”³².

“By proposing new ways of seeing the new infrastructure he reinvents this place and make it available to the eyes of a wider audience ... the new infrastructures reinvent our landscape, and thus our identity”³³.

Excavation-context-perception becomes the elements that identify a landscape.



Project of Crazanne rest area. Siteplan by B. Lassus.



Crazanne's rest area along the A 837 highway.



2.2 CASE STUDY

THE RELATION STRATEGY AS LANDSCAPE DEFINITION AND IDENTIFICATION: THE PORPHYRY TERRITORY IN TRENINO

“Reading means to identify signs of physical space, to extract them from their stratifications, interpret, rearrange and reassemble them in systems that are meaningful for us today. This reading must be accomplished by designing mind, to reveal the past and glimpse the future”.

(Giancarlo De Carlo¹)

THE MATTER

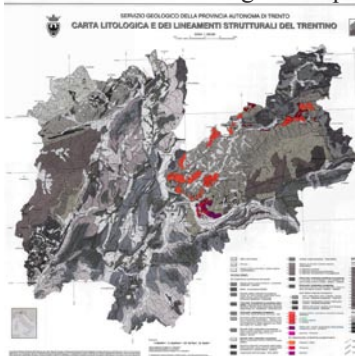
Porphyry, the red gold of Trentino, particular type of volcanic rock - ignimbrite - belonging to the so-called “atesina volcanic platform”, it extends for about 7,500 km² in Trentino with thicknesses that reach 2,000 meters².

The Atesino volcanic Group is geologically bounded on the south by Valsugana line, north by Pusteria Valley, east by Dolomites and west by Giudicarie Valley North Line.

The outcrop of porphyry is found both in the province of Bolzano, along the Adige Valley between Merano and Ora and along Ega Valley, both

matter

Above: Fornace quarry area.
Below: Trentino litological map.



1 F. Bunçuga, *Conversazioni con Giancarlo De Carlo. Architettura e libertà*, Eleuthera, Milano 2000, p. 9.

2 These rocks, extremely diverse and varied, both in chemistry and as formation mode, are the result of intense volcanic activity, developed with linear eruptions through numerous fractures, which began 260 millions years ago, in the lower Permian, and continued for several millions of years with a continuous repetition of eruptive phases and stages of stasis. Among the various modes of deposition of these rocks particular importance are the so-called ignimbrites, as it is these that have given origin to the “porphyry”. These streams of liquid mixtures - aerated with variable thickness generally ranging from 5 to 20 meters and with a fairly constant chemical composition, to form the so-called ignimbrite units, reaching hundreds of meters thick. Porphyry currently cultivated is limited to one of these ignimbrite units (classified as rhyolitic ignimbrite), characterized by vertical fissures and fractures of percussion very clean, essential for production of “porphyry”; the cultivable thickness, in the paving absence, it is of about 100-200 meters. Taken from E. Cattani, F. Fedrizzi, C. Filz, G. Zampedri (a cura di), *Atlante della Pietra Trentina. Antichi e Nuovi Percorsi. Guida pratica all'utilizzo*, Nicolodi Editore, Rovereto 2005.



in the province of Trento, particularly in Cembra Valley and on the Pinè Plateau.

The unique type of quarrying, by multiple terraces, the shape of the excavation with open fronts and location of mining sites - mountain quarries at half coast and tops in a territorial context by “excellence” - along with dumping areas of waste material are clearly visible on the landscape, so that often they end the “productive” identity.

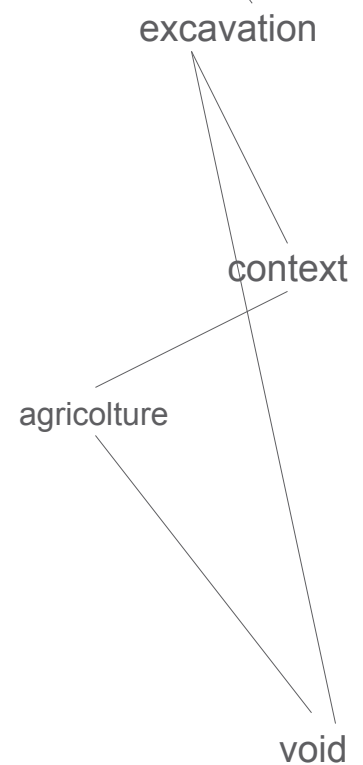
Within this vast “patchy” carpet - so the mining sites looks from a zenith aerial view - it appears an area where for more widespread use of breakpoints in the forest area and extension of individual areas, it clearly identifies as the richest of matter the district porphyry of Cembra Valley. This Valley has two faces: one of vineyards and one of quarries. Two production systems that have been laid on the territory over the centuries and that have changed the original morphology. While terracing of dry wall draws by addition (“gaining ground”) the north side in order to accommodate the wine; the other side, in shadow, is modeled by the excavation steps that subtract the matter, almost as an effect of “compensation” that seems to represent its equal negative.

But further narrowing the area, going up the Avisio Valley, the opening branches off to accommodate, at Lases Lake the last branch towards Valsugana north; on a single mount, the Gorsa, alternate extraction and dumping sites of material, along with lakes, biotopes, thematic paths, villages and terraced vineyards (in Fornace area the agricultural activity, thanks to morphological conditions and exposure, is particularly significant). A single road, the S.P. 76 combines mining, agriculture, tourism and residence.

An area, a context, multi-faceted, whose plot - returning to the context term - is full of relations between the elements that constitute it.

And it is not only about physical elements, the topography of the context, the landmarks - among them we include the large vertical concavity - but the use of resources of this land, its fruition, as well as its perception.

In the system of relations of the mining site Fornace-Lases there are

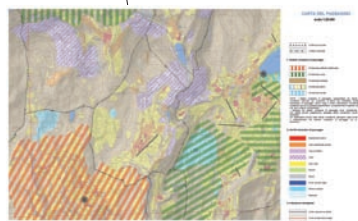




View from Albiano quarry to the Cembra's vineyards.



View from Cembra's vineyards to Albiano quarry.



The Landscape map (*Carta del paesaggio*) of the P.U.P. (Provincial Urban Plan).

The 'volcanic' road to Lases ('Chipe').



connected agricultural functions with production activities (extraction) and "direct" tourism, linked to the summer use - static - of Lases Lake, which in turn are intertwined with an "indirect" tourist use, tied to the - dynamic - visual perception of the area by tourist flows on their way to the Piné Plateau ("high quality landscape" in the *Carta del paesaggio*). "Visual use" therefore as an additional resource of context.

The visual qualities of a landscape visible in motion to a driver or a spectator, they are an added value to be protected but also exploited.

A first reading of the elements of this territorial context is confirmed by the detailed thematic maps of the legal instruments in force (*Piano Urbanistico Provinciale*, Urban Provincial Plan)³.

The overlap of different themes, layers, allows to have a complete picture of the constraints that protect the area, but also the potential of this area.

Tourism, mining, agriculture, alternate and intertwine in their use of resources, the soil itself that makes them available.

Soil with an ancient productive history linked to mining production⁴, as

3 Fundamental in the context reading it was the analysis of the *Piano Urbanistico Provinciale* (Urban Provincial Plan) and the thematic maps related to it. In the *Inquadramento strutturale* structural framing ("it summarises the systems, sites and resources of greater environmental, territorial and historical-cultural importance, as recorded by the knowledge framework. This is the means by which it is read in a comprehensive way all the structural elements, such as those designed components or long-term relationships who are deemed to continue to feature the territory, directing choices of transformation") of the Fornace-Lases-San Mauro-Albiano context there are found next to the perimeter areas of the quarries, the presence of historical quarries of ornamental stones, historic settlements (*Quadro Secondario*, Secondary Framework), artifacts and archaeological sites (near the Lases lake), architectural and artistic goods representative such as Santo Stefano and San Mauro church (which are present in the *Carte delle tutele paesistiche* - landscape protection).

Although wooded areas cover most of the zone, adjacent to Fornace quarry, considering the favourable exposure, there are agricultural valuable areas.

In the context under investigation there is the strong presence of areas "with high naturalness", which are invariants of the territory, exception elements that constitute the identity characters of the territory (numbered and listed more specifically in the enclosed documents). "The Plan assigns to these areas a central role in the logic of ecological and environmental networks and in the associated guidelines. The identification in the P.U.P. and Districts Plans pursues to protect the territory and its naturalistic conservation and to highlight the important natural networks for the purpose of evaluating various options of development". Among these six sites in the European network Natura 2000 including three provincial natural reserves (Santa Colomba Lake, Lases biotope) and four local reserves (the biotope "Alle Grave", "le Buse della Torba", "Palù Acquadiva" and "Palù dei Preti"). In the analysis of local law considerable interest is given to the *Carta del Paesaggio*: "The P.U.P. analyses the theme of landscape working on, at the related scale, a preliminary classification of elementary fields, complex systems and units of landscape that form the structure territorial identities and invariants to be considered a priority in assessing the sustainability of development and territorial balance".

In the *Carta del Paesaggio* in the primary areas (*ambiti elementari*) there are quarries and historic settlements, recent urban areas, rural areas and productive areas in a single unit of perceptual landscape: the rural linear landscape.

In particular, the definition of perception landscape units - landscapes depending on the point of view appear as complete and unitary - confirms in this research the unitary nature of the analysed context.

4 The toponymies of this local context highlight the history linked to the richness of

well as protected area, area of high ecological presences: from the biotope of Lases Lake to the nature area 2000 of Santa Colomba Lake, that triangle with the natural provincial reserve of Laghestel.

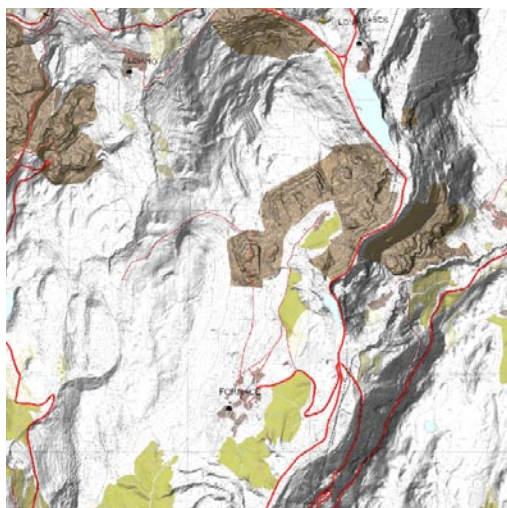
Environment that is home to many agricultural areas of high value,

subsoil, and the subsequent processing of the extracted materials. Fornace, in fact, according to the historiography of the name, derives its name from the thriving mining area developed in the Middle Ages; from the Calisio Monte Piano silver was mined - there are still traces of mining activity in so-called *Cadini* (name that shows the mining pit from which the silver was mined), and *Canope*, and more specifically in Valle del Monte, in the immediate vicinity of the town there were the ovens (furnaces) for the processing of the extracted material, and also the limestone (documented as early as the sixteenth and seventeenth century and active until a few decades ago), which heated the rocks to get the lime. Of the thousands of wells/pits, present centuries before on the entire Mount Calisio plateau, today they are about 80 still open. Most of them were filled with debris collapsed from the sides, while others, those deemed most dangerous by the peasants, were intentionally lavished. The ancient silver mines, called *Canope*, probably derive their name from the German word "Knappe" (miner). During the reign of Bishop Federico Vanga (1207-1218) the activity reaches its maximum development, accompanied by the arrival from Germany of many miners nicknamed "canopi" experts in mining technology. The exploitation of silver mines located on the Calisio mountain lasted uninterruptedly until the beginning of 1500, then it began to decline in total abandonment till the end of the century. The *Canope*, mine at horizontal development with internal development often extremely complicated and labyrinthine, was excavated along the position of the stratified rocks. The cross section of these burrows is variable: you can reach local enlargements up to produce voluminous rooms and not infrequently there are found small passages so as to prevent the passage of a modern man.

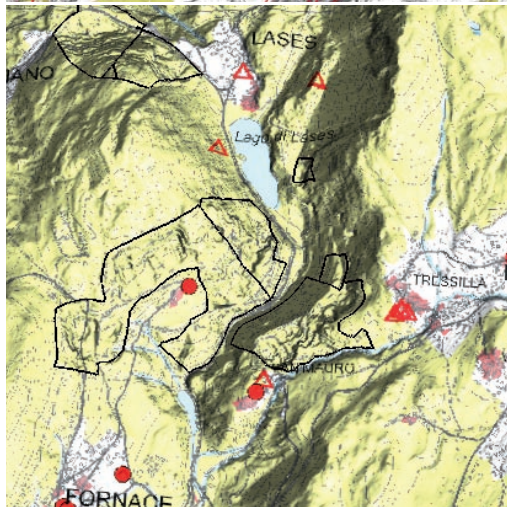


The context: the quarry area of Albiano, Lases, Fornace.

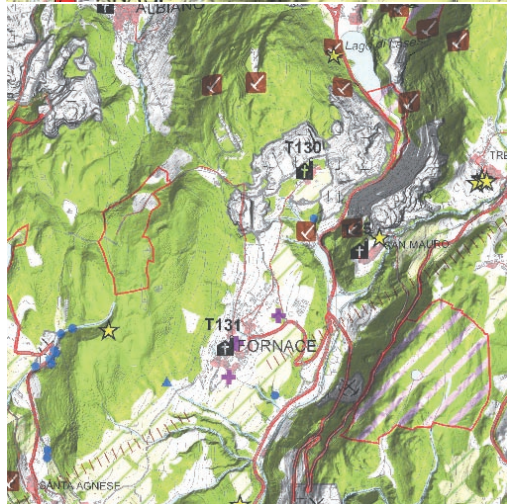




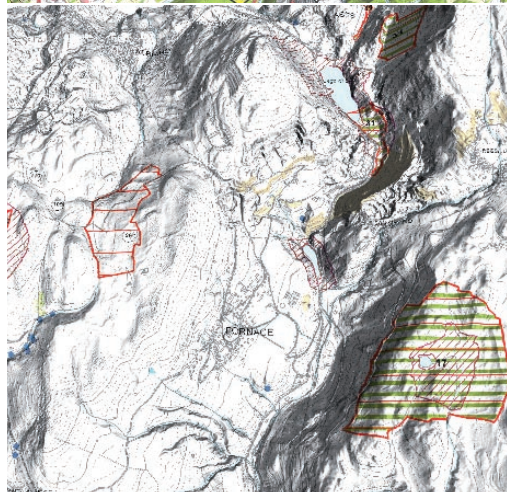
P.U.P.: residential system and infrastructure network.



P.U.P.: landscape protection.



P.U.P.: structural network (above), ecological and environmental network (below).



especially in Fornace, a tourist basin related to the summer use of Lases and Santa Colomba Lakes, but also a dense trails network - themed paths - (170 km circa) surrounding the Argentario plateau⁵, branching off to Gorsa Mount, and continue down towards Trento.

These filaments are probably the true pioneers of an interesting territorial “system”, which re-unites branching physical elements, but not limited to the Cembra, Valsugana and Adige Valleys.

LANDSCAPE PERCEPTION

But above all, an area where the stronger relationship, obviously, is that one which exists between itself and its observer, where the quality of perception (visibility) is its unique character, the resource, that makes of an environment a landscape.

The dense network of infrastructure that crosses, hugs the coast and dominates the area, it is the

⁵ Among the main routes there are: The *Canope* path, the biotope *Le Grave* path, the limestone path, the porphyry route, the Calisio rocks and it is interesting to underline the bustling activity of the Argentario, eco-museum to preserve the natural character, but also the cultural history of this area. The very existence of the museum not only reinforces the importance of the site, but thanks to its function to enhance existing trails and build new theme trails with relative connected activities, it promotes one of the most interesting and sustainable exploitation of the territory.

For further investigation please visit the eco-museum website: <http://nuke.ecoarge.net>.

primary means of enjoyment and observation. The dual nature of these facilities, related to the productive character of the context but also to its particular propensity (vocation) to tourism, also leads to different times and modes of perception and “enjoyment” of this analysed context.

The eye of the driver, is captured by the apparent wound of the mountain - “they are the larger spaces and more pronounced forms of the territory to take over”⁶- made even clearer by the colour contrast between the quarried area and its surrounding⁷.

6 D. Appleyard, K. Lynch, J. R. Myer, *The View from the Road*, Mit Press, 1964 (ed. it. parz. in ‘Navigator’, n. 7, 2003).

7 Interesting in this regard is a study conducted by some Spanish researchers, which suggests some guidance based on the quality perception of a territory (and its tourist value) for the setting of new mining areas and where and how to intervene on the most “sensitive” areas with actions of redevelopment or rehabilitation.

This research - V. Pinto, X. Font, M. Salgo, J. Tapias, T. Mana, *Image analysis applied to quantitative evaluation of chromatic impact generated by open-pit quarries and mines*, in *Environmental Geology* (2002) - will propose a new method, based on the analysis of images of a landscape to explore and assess the visual impact resulting from extraction. This innovative method evaluates the colour contrast between the open quarries and the surrounding landscape. This method is based on the analysis of images from which you can obtain a mathematical function of the colour impact based on the sensitivity of the human eye to different wavelengths.

The analysis of the image (this technique uses photographic reproductions or films of parts of the territory wounded, dug) determines the degree of contrast between the quarry and the area surrounding using a developed data





Driving along the main road to Pinè tourist site it's perceivable the local quarries and dumping areas.

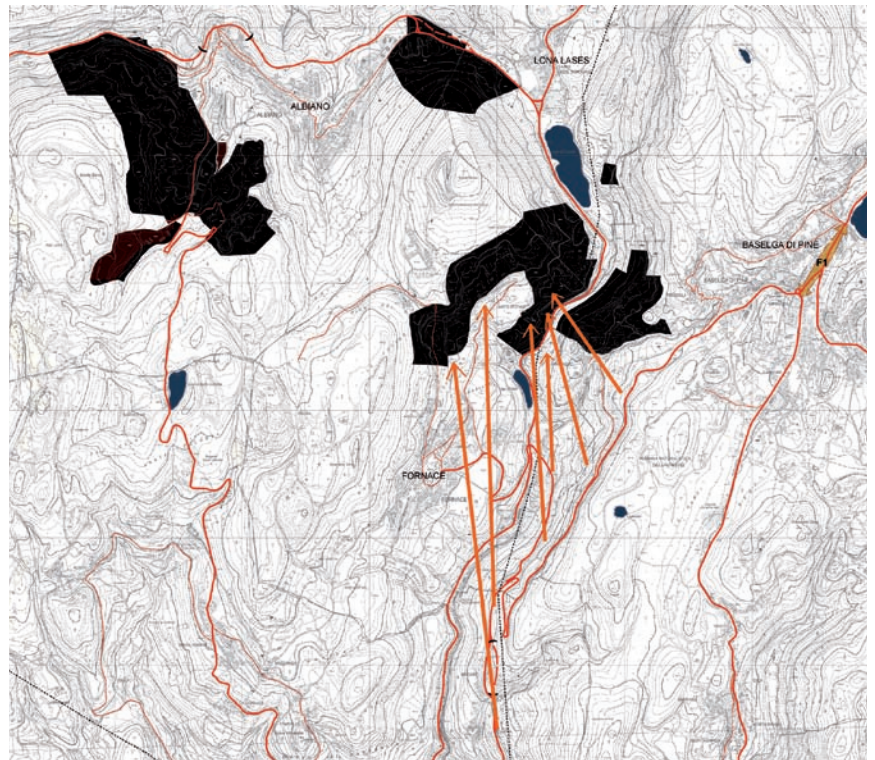
As in a film sequence, to the driver are alternate targets closer to the sides of the road made of pine and chestnut, a more distant shots of the sinuous road let to perceive in stages, instant flash, until the ultimate aim, in which the driver, intrigued by the 'abnormal' image across the board, may decide whether to go thoroughly the discovery and going down, closer to the extraction site, a true volcanic landscape. The kinesthetic sequence continues: this is the spectacular image that the viewer sees coming down the road of *Quadrate* to the Lases lake. A mountain made of porphyry waste, the *chipe* of San Mauro memory of the processing of the material, seems to stifle the street and calls to mind the walls of Etna or the Teide. The space is reopened and the look lies relaxed on the waters of Lases Lake. First aim. The journey continues and, along the mountain front to Albian, the indiscreet eye rests on that deep wound, "gutting" operation of the earth mother: the Mount Gorsa quarry.

system (a set of data processing systems).

A data file, which assumes the form of a grid where each single pixel external to the analysed quarry has an impact value between 0 and 1 (0 no impact, 1 maximum impact), is elaborated during the process. The chromatic impact assessment is expressed through an histogram of impact, a horizontal gradient of impact (in order to delimit areas of major or minor impact values), a gradient direction rose diagram and a value of dispersion index. These procedures (already experimented by other authors in different contexts) allow the interpretation and quantification of an environmental problem through the evaluation of sensible data.

The final goal of this research is to provide useful indications, related to the visual qualities of a territory (and its tourist vocations), capable of localizing new quarrying activities and suggesting how and where the most "sensitive" areas are subjected to re-naturalization or planning reuse.

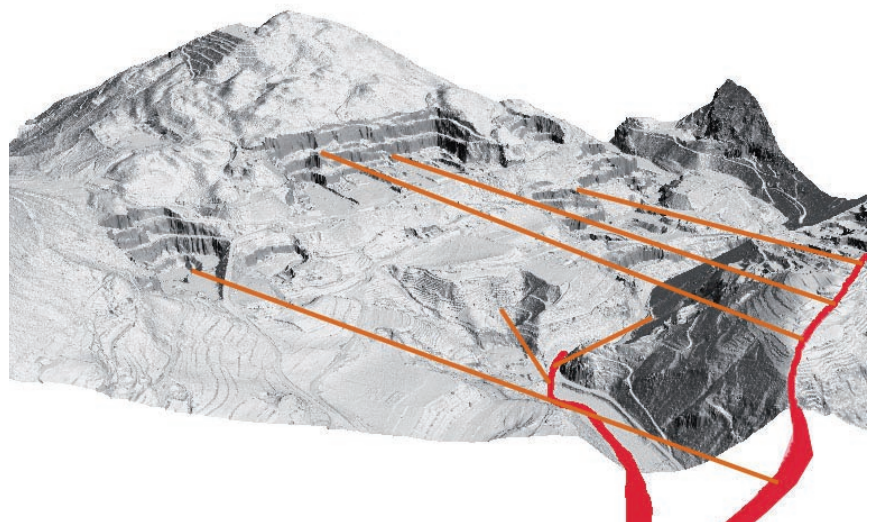
The eye of the driver, is captured by the apparent wound of the mountain: “they are the larger spaces and more pronounced forms of the territory to take over” (K. Lynch).



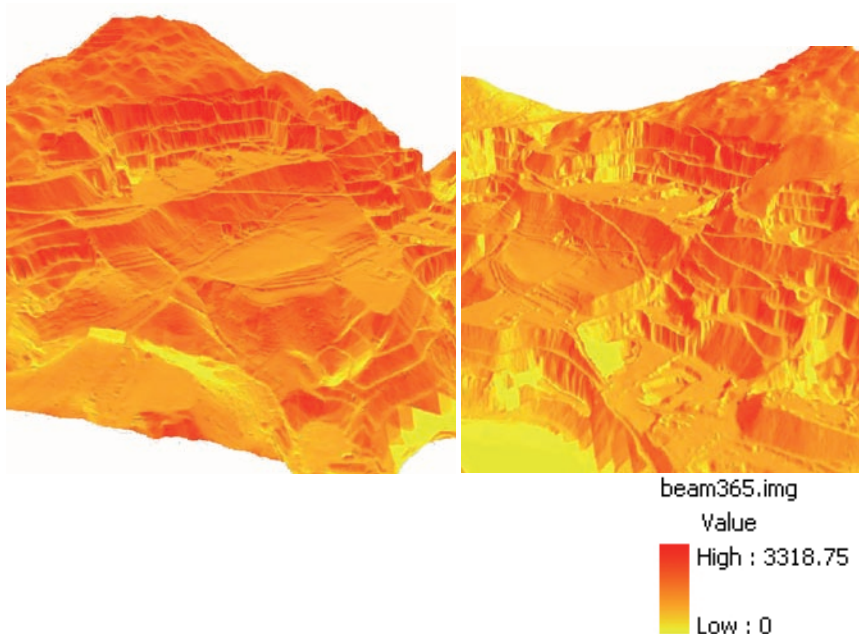
Above: Viewpoints to the Fornace quarry area from the S.P. 83 to Pinè. From the tourist road this quarry area assumes an added value as an indirect tourist urban field.

Below: 3D model of the area.

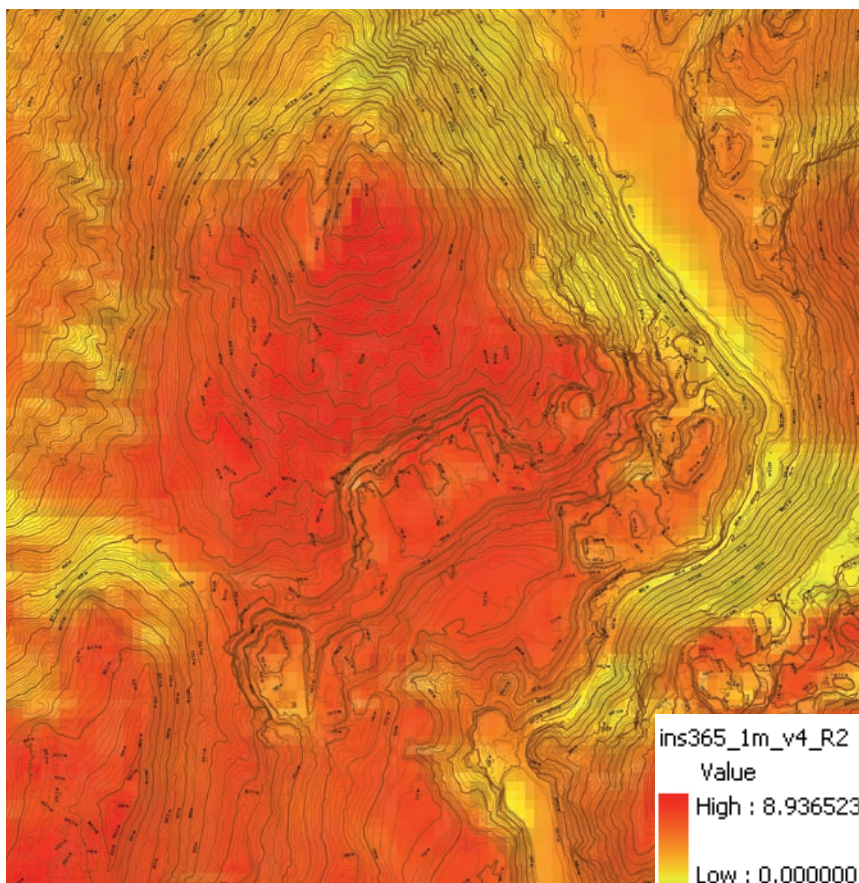
The basic data for model elaboration are: Rilievo LiDAR (Laser Scanner) provided by PAT (2008).



Estimation of solar radiation on Quarry Fornace area.



Above: direct radiation. Unit: W/sqm/day. The estimate refers to the average daily “direct” radiation incident on a surface calculated on the annual average. The algorithm used for estimation is contained in R. SUN, as part of the GRASS GIS software. The basic data for estimation are: Rilievo LiDAR (Laser Scanner) provided by PAT (2008), DTM 10 meters provided by the PAT (2000), atmospheric turbidity coefficients provided by JRC (2007).



Below: estimate of daily light hours. Unit: hours light / day. The estimate refers to the number of hours light / day calculated on the annual average. The algorithm used for estimation is contained in R. SUN, as part of the GRASS GIS software. The basic data for estimation is: Relief LiDAR (Laser Scanner) provided by PAT (2008), DTM 10 meters provided by the PAT (2000), atmospheric turbidity coefficients provided by JRC (2007).

For more details on the procedure of calculation see Vettorato and Geneletti (2009). Vettorato D., Geneletti D. (2009), Estimation of potential solar energy at urban scale: an approach based on LiDAR images analysis, in Representation of Geographical Information for Planning, Esculapio.

2.3 REFERENCE

THE CONTEXT AND THE QUARRY SYSTEM IN THE *BIOVALLO* MASTER PLAN BY ARCH. LUIGI CENTOLA¹

A recent study and project conducted in Campania, in the *Vallo di Diano*, represents an interesting example of best practices to an extraction landscape design.

The *Vallo di Diano* is a valley at the southern border of Campania, closely tied to Basilicata by the territorial boundaries and cultural traditions. Along the A 3 highway this *Vallo* is entirely run beside the Tanagro River which runs this Valley from south to north.

A single local context that involves 15 municipalities and where it is located the *Vallo di Diano* Extract District as one big system.

As backbone of the entire valley, this highway A 3 is also the trait d'union with the mining landscape: around the A 3 are localized 70 abandoned sites (detected).

There were many proposals in recent years - and controversy - for a new reuse of these abandoned mines (for some sites we thought about waste deposit).

The Bio Wall Project was established with the objective that a rethinking of individual brownfield sites can become an opportunity to redevelop the entire context with a tourist and ecological key.

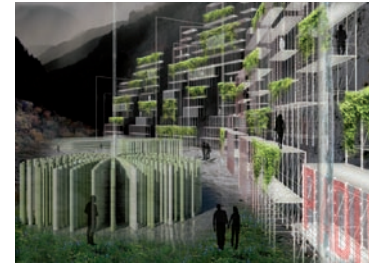
Perhaps it is the infrastructure and its role as a vehicle for the *Vallo*'s perception, and then of the quarry areas, to be an important element in the new landscape of the former quarries.

Highway as showcase of the Vallo landscape, but also as tourist attraction to the rehabilitated sites.

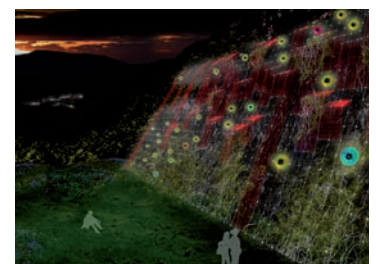
Highway, then, as recalled by Lassus, as extraction landscape generator.

To encourage the resolution of the problem the Campania region, in the recent Regional Plan for the extraction (P.R.A.E.), provides the opportunity to quarrying the abandoned sites, in part, for a limited time after the approval of a proper regeneration project and re-naturalization. Public and private can make save the dangerous quarry front, mitigate the visual impact and reshape yards, recovering valuable space for recreation, sports and cultural events, tourism and business in harmony with nature.

Project goals are ushering in a new 'Green Economy' in support of the Province, the Region and the country, limiting the building spread, protecting biodiversity, agriculture and water networks, promoting the conversion of non-profitable crops, developing research and production of biomaterials, biofuels and renewable energy, revitalizing the historical traditions, culinary and religious premises, rethinking the system of



The cultural garden reproduces Vallo's botanical system. Site Atena Lucana.



Environmental reconstruction and installation of light with renewable energy. Site: Monte San Giacomo.

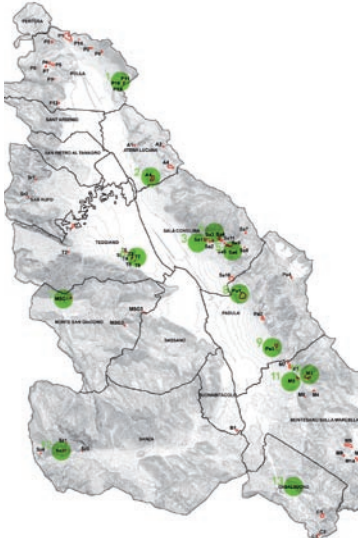
¹ Report based on the text provided by the designer.

mobility and tourism development and recovering some abandoned and unfinished buildings.

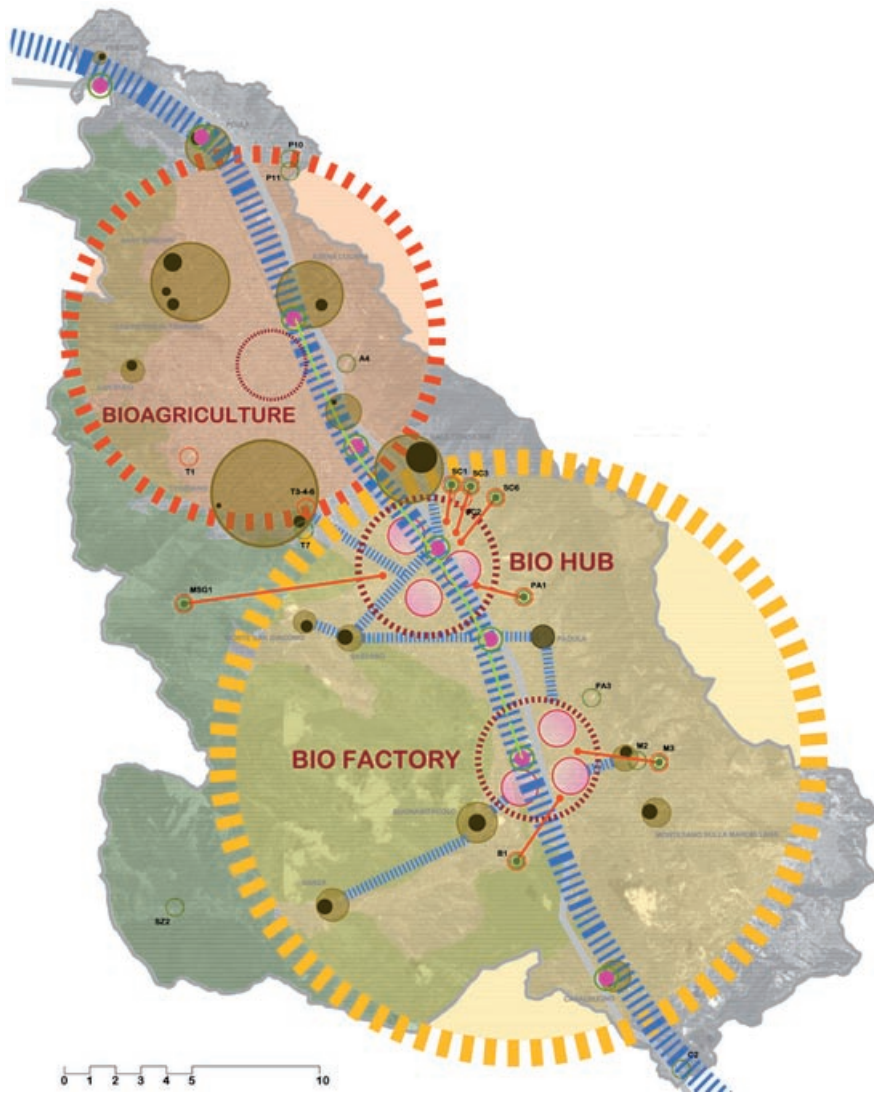
With a strategy that seeks the 'Restoration of the disfigured Landscape', depending on the geometry, orientation and needs of the quarry fronts were developed several techniques for making safe, that included impact mitigation and renaturalization using hemp ropes, nets in natural fibers, tubes innocent recycled.

The guiding concept for the recovery landscape is to achieve minimal technological supports overlayer to the rock, often abandoned for years, to allow nature to take its slow course healing the wounds caused by man.

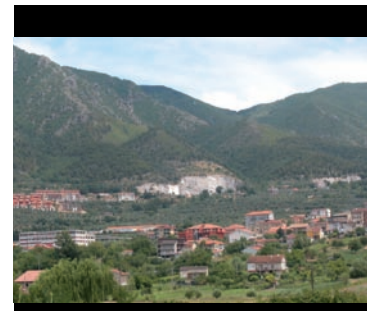
The strategy in the BioVallo territory is the total reuse of seventy quarries designed as so many laboratories for sustainable development and, subsequently, the establishment of three new production centers in the service of the cultivation (organic farming), research (BioHub) and production (BioFactory) self-financing thanks to the carbon market for its effective contribution to reducing global CO₂ emissions. All the energy is used for the management of productive activities and for public spaces have been recovered, including those necessary for the construction of facilities and public lighting will generate, using only the sun, wind and water.



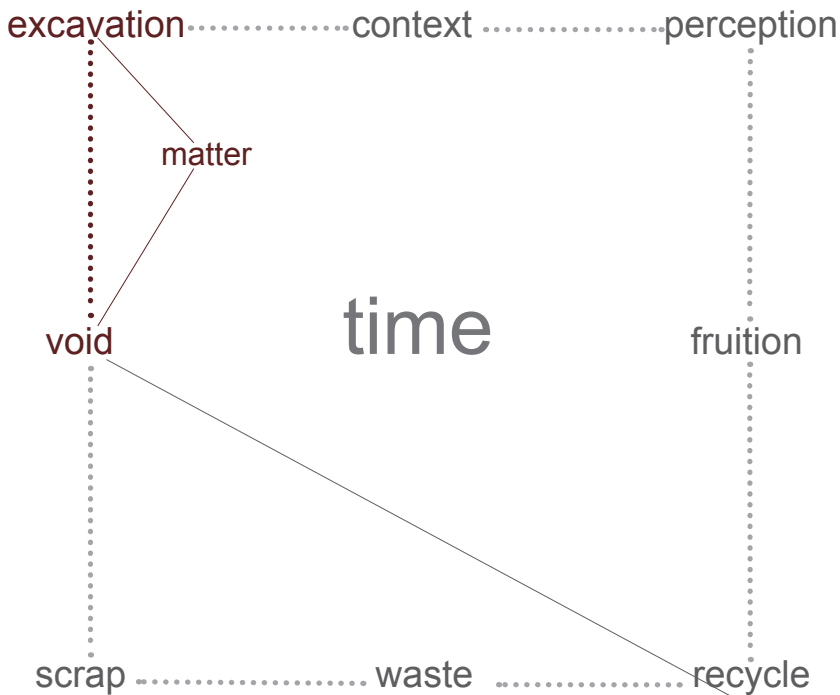
The localization of the 70 quarries in the *Vallo di Diano*.



The strategic masterplan to the rehabilitation of the 70 disused quarries.



Driving along the A3 highway they are perceivable all the abandoned quarries areas.



3. EXCAVATION/MATTER/VOID (VACUUM)

3.1 THE CARVED DESIGN AND THE VOID AS POTENTIAL GENERATOR

“Io intendo scultura, quella che si fa per forza di levare”.
 (Michelangelo Buonarroti¹)

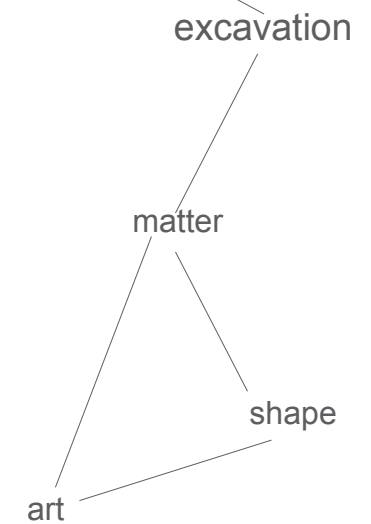
This was for Michelangelo to sculpture. He presupposed to remove, a subtraction of matter, digging the superficial in order to reach, obtain the perfect shape. Matter, marble block, which already it contained that perfect picture that the sculptor pursued:

*“Non ha l’ottimo artista alcun concetto,
 Ch’un marmo solo in sé non circoscrive
 Col suo soverchio; e solo a quello arriva
 La man che ubbidisce all’intelletto”².*

These sonnets above are recalling the words of pseudo Dionysius the

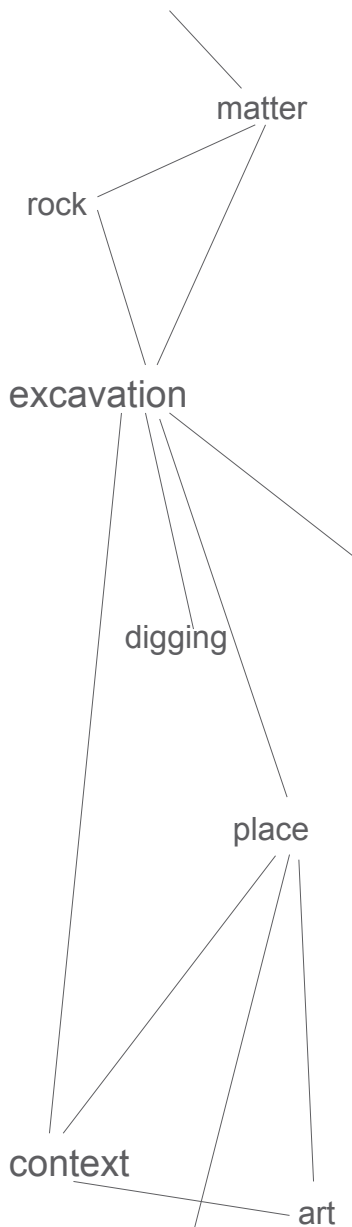
1 *“I intend sculpture, as the one that is made by removing”.* Letter from Michelangelo to Benedetto Varchi.

2 *“The great artist has no concept, / that one marble per se could circumscribe / With its excess; and only to that it comes. / The hand that obeys to the brain”.* Sonet to Vittoria Colonna.



‘Prigioni’ by Michelangelo.





Rushmore Mount (south Dakota).

building



El Khazneh, Syria.

Areopagite: “The art of those who carved in stone an image that seems alive, is made by removing from it all that prevents a clear view of the latent form, revealing the hidden beauty only by removing the superfluous”.

The shape, the ideal image, the idea that greater it gets as the stone disappears, it surfaces, comes alive only through the sacrifice, the destruction of matter.

A freeing from matter, then, in the neoplatonic sense: to extract pure form from the rough stone it gains a religious significance, it becomes like a cathartic action.

Matter that Argan defines, linked to the concept of mass, weight, as a “dialectical counterpoint of the design or concept”, materiality, or lack of spirituality which, through subtraction may be converted into form, idea, absence of materiality and then spirituality. This spirituality is reflected in Michelangelo’s work in a continuous and eager digging of the block, the material, to free the prisoner shape.

And it is in particular in *Prigioni* or in *Pietà Rondanini* that clearly it is shown the tension, the stress of the form that breaks out from the rough stone, or just sketched, as a contrast between matter and pure form.

An oxymoron: to create by destroying. But the final form, the idea, “the concept” is still “visible”, stone, still matters, “will be a matter that the human form imprints from its elective impulse constraining to transcend their effort and higher is the rise, more is the weight and harder the difficulty”³.

What happens, however if, with a leap in scale, the matter is a place, a specific context?

Where to sculpt the material means to work where nature has placed it, where to take away this material involves working with the site? Where the sculpture does identify the place itself?

Quick snapshots, cerebral snaps from memory are recalled: the famous faces carved into Mount Rushmore or the greater Crazy Horse Memorial, or even the regional scale sculpture *Double Negative* by Michael Heizer.

Going even further in time, how can we forget the villages and the rock churches of Cappadocia, in Anatolia, in Lalibela or in the nearest Matera? The Valley of the Kings in Ancient Egypt, the temple carved into the rock by Queen Hatshepsut, or the ancient Petra⁴?

This digging (excavate) into the rock, to enter the core of the earth, refers to a primitive human instinct: “the underworld, which better than any other

3 G. C. Argan, *Michelangelo scultore*, A. Curcio Ed., Roma 1964.

4 Excavation to create matter for housing, architecture, it was the “constructive” technique for excellence in the first century A.D. for Nabatean in Syria, who were digging (excavate) from top towards down they tore out of the rock - but not from the site - the great monasteries tombs such as El Khazneh or El Kair.

expresses a fundamental condition of reference for the man is, in memory, an original perception of building. Everyone, thinking about an early form of building thinks about digging⁵. And it is by “piercing the earth’s crust” that man has built since antiquity his last, eternal home⁶.

To the excavation in matter - the earth, the rock - it was related an empty⁷, a space empty inside, an interior⁸.

Empty not only to house a dead, but also able to “activate” a space, space - as said by Espuelas - of topography nature, defined by reference of sensorial and kinetic character, “by the interior relation of man with the surround”⁹.

The excavation on the matter - on the rock or on the ground - matched a gap, a void within, an interior.

Vacuum not only to house the dead, but able to generate “activate” space, space-like states Espuelas-topological in nature, that is determined by sensory and kinetic character references, “by the inner man’s relation to what the surrounds”.

Space that is “active” in the burial chamber of Newgrange in Ireland when the penetration of the first sun ray in the winter solstice through a precise opening in the tunnel that leads to the main room - it is not difficult to pair this with the geometry of light in Roden Crater by James Turrel - “recharges” the space, and it is possible to perceive this light for the visitor, mystically, as it reproduces the mystery of the life cycle: the fertilization of the earth by the winter sun that will give origin to the plant birth in spring.

Excavation that produces vacuum (void), it generates the empty space, and light identifies the form because “only through form we can perceive this emptiness”¹⁰.

5 F. Venezia, *Teatros y antros. El retorno del mundo sub terraneo a la modernidad*, ‘Quaderns d’Arquitectura i Urbanisme’, n. 175, p. 39 cit. in F. Espuelas *Il vuoto: Riflessioni sullo spazio in architettura*, Christian Marinotti Edizioni, Milano 2004.

6 From the fourth millennium BC till the greeks tholoi to dig the earth was designed to recreate a home and a mother’s womb. If during the Neolithic dig meant returning the deceased to the bowels of Mother Earth for a new renaissance, at a later stage excavation gained more symbolic values.

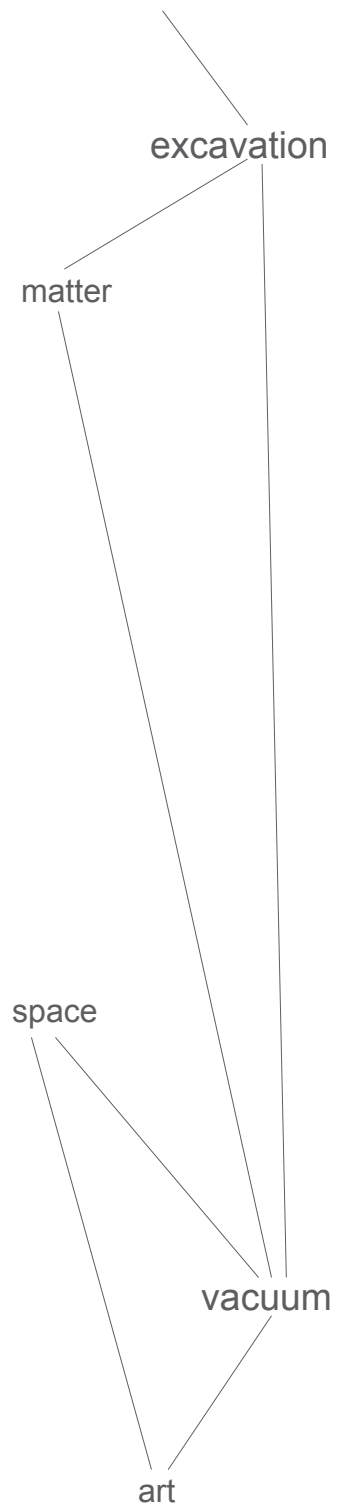
In the empty excavated, man restated his house, with eternal character; excavation to build through the earth became a sort of “intrusion into an environment that was denied to man ... action that (had to) overcome the inert resistance of a world with a different scale of potential” in F. Espuelas, *Il vuoto: Riflessioni sullo spazio in architettura*, Christian Marinotti Edizioni, Milano 2004, p. 26.

7 “Empty and matter built are the basic polarity of the architecture. Since Democritus, it means as empty that quality of space that allows movement... . The void is the result of a drastic difference for reduction compared to a model, an experience or simply to the density of precedents sensory perceptions”, Ibidem, p. 9.

8 “With the funerary chambers it is determinated the centre of attention of the internal space. These spaces, built with a immutable ambit and with a transcendent aim, they absorb the best building efforts from the beginning of architecture”, Ibidem, p. 27.

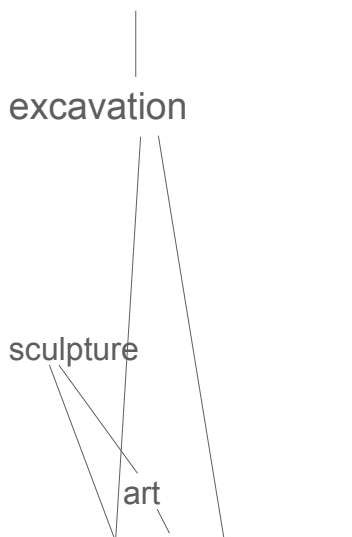
9 Ibidem, pp. 26-33.

10 Ibidem, p. 26.



‘Lo profundo es el Aire’ by E. Chillida.



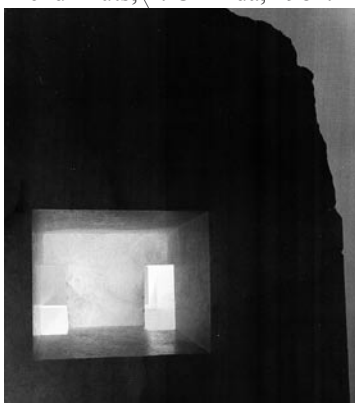


'Elogio de la luz', E. Chillida

matter

vacuum/void

Mendi Huts, E. Chillida, 1984.



'Lo profundo es el Aire': this is the name of some works "series" by Basque sculptor Chillida - taken from a verse of the friend poet Jorge Guillén - that seem like a small-scale reproduction of the ancient eternal dwelling dug into the ground.

It is especially in works of stone, alabaster or granite, that Chillida, digs, carves the stone to recreate that ancestral vacuum, the depth of the air: "a deep space, a lung, a tank of air that gives us life. A space inside. Inside the ground, inside the matter"¹¹.

Chillida excavates, removes matter from the material not to find a perfect shape, but to find the void, building space, an architectural space, highlighting the limit with the penetration of light, which, as a new subject, permeates the space, it models and allows to the matter to express itself¹².

In the 'Elogio de la arquitectura' and in the 'Elogio de la luz' the sculptor works with light and vacuum in the area that best expresses the tension of space: the alabaster that glows as if lit from within.

And, perhaps, it is in these alabaster works - in 'Elogio de la luz', 'Mendi huts', 'Hommenaje a la mar' - and in the series 'Lo profundo es el aire' where greater is the contrast between the outer limit, bark, a rough-hewn stone and internal limit, carved, sculpted, sanded; between inside and outside, between matter and empty space, cable, where it seems to find the rough material and the pure form of Prisons.

But "unlike Michelangelo Chillida, by force of removing, he does not discover the form imprisoned in matter, but he gives form to something that is alive in the bowels of this matter"¹³, he is not limited to work by subtraction of matter, stone, but by way of addition, he "puts", he adds, space.

To free the matter is to fill the empty space, is to separate what it conceals this vacuum.

Chillida (s) clears out and fills at the same time, he lightens and exchanges matter with space. He sculpts the void.

Chillida defines negative space, that one that by subtracting matter, it remains inside: the void, the hole, the concave space. Negative space as the negative of the photograph in which the base of the point of view,

Vacuum that reaches the perfect form in the tomb of Atreus (XIV sec. B.C.) in which "pure space, (...) there is no clear added to disturb its integrity".

Empty, almost pneumatic, air bubble, which recalls the mother's womb, and the generative potential associated with it. In F. Espuelas, op. cit., p. 27.

11 R. Bocchi, 'Land Architecture' in *Finestre sul Paesaggio*, V. Bonometto, M. L. Ruggiero (a cura di), Gangemi, Roma 2006.

12 "The space as framed-incorporated in these masses is loaded with spirituality thanks to the play of natural light".

K. de Barañano, in *Les Gravitation: reliéfs de papier*, in 'Chillida', Galerie nationale du Jeu de Paume, Paris 2001.

13 Ibidem p. 56.

the negative becomes positive, so is the space that occupies the piece of stone, the caved space that it formed in the middle, surrounded by matter, and space that is generated around¹⁴.

Empty hollow, concave, which is created when the sculptor cuts through the stone and simultaneously, in the same action, he removes the excess and creates a vacuum, he re-creates the space.

“A void measured by non created space, a vacuum similar to silence of which Marguerite Yourcenar was writing, an active silence, a silence alive¹⁵. A void, a silence actually full of background noise, the silence - *à la* John Cage - that silence, tinnitus, according to Paul Virilio, necessary to man in the century where multi media art, television and cellular phones have cut out the voices of silence and suffocated the view¹⁶.

“Chillida knows that the material of the sculptor is the space as the vacuum, and that only with both it is possible to build space loaded, so as he knows that the material of music is sound and silence”¹⁷.

Over turning the traditional function of sculpture that “occupies the space” Chillida frees the space, (...) he questions nature in its intimacy, making of sculpture an art of non occupation of the space¹⁸.

“Chillida becomes an architect of the space that does not build, but dis-occupies and articulated new spaces and new looks”¹⁹.

But the relationship between excavation/matter/empty is found even in architecture.

From the architectural sculpture to the carved architecture, from void as essence, non occupation of the space, to the built void, emptiness, space cable, is a central theme of the whole work of Rem Koolhaas. From the Ville Nouvelle Melun-Senart (1987), to the Duch embassy in Berlin (2003), to the Casa da Musica (Porto, 2004), the project is synonymous with the excavation, the interior spaces, as well as urban areas, are obtained by subtraction of matter. Matter as building, matter as architectural volume. Full space, occupied, full of relations, that by digging, subtracting matter,

14 “Estar a veces en el limite de no saber si lo que estoy separando del espacio, lo que estoy sculpiendo, es la masa de materia que estoy trabajando, o es el aire que se está haciendo pasillos ya interiores y cerrados para siempre”, J. A. de Ory, *Chillida, el desocupador del espacio*, in ‘Circo’, n. 151, 2008, p. 3.

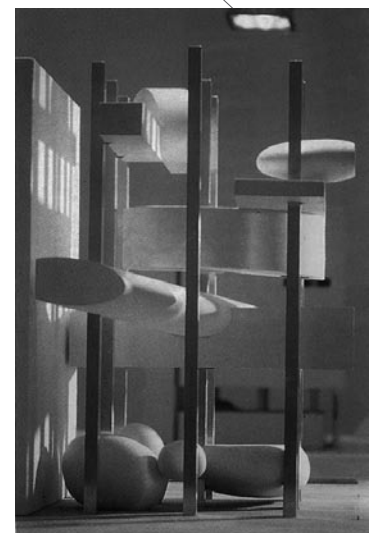
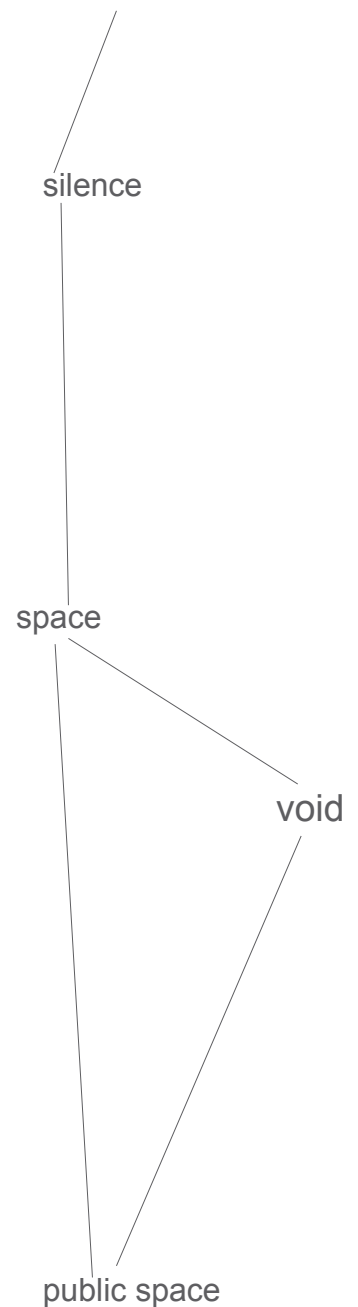
15 M. Yourcenair, *Alexis or Treaty of Useless Comabat*, mentioned in K. de Barañano, op. cit., p. 55.

16 P. Virilio, *La procedura silenzio*, Asterios Editore, Trieste 2001

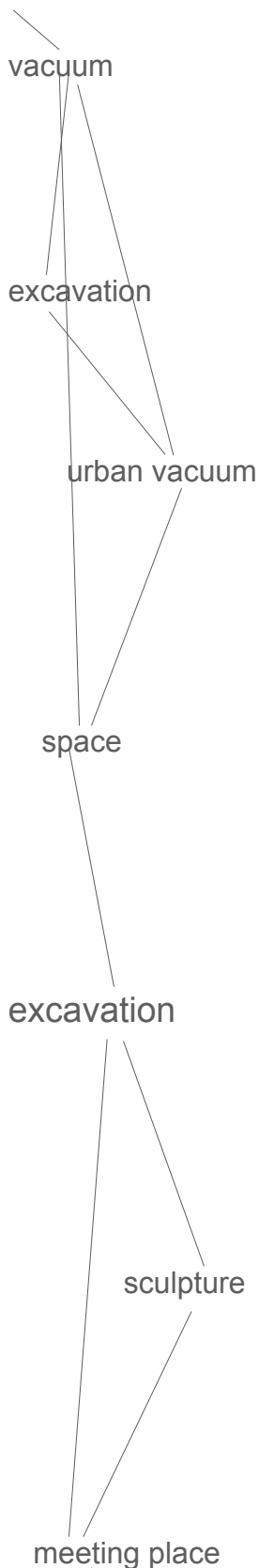
17 K. de Barañano mentioned in R. Bocchi, ‘Land Architecture’ in *Finestre sul Paesaggio*, V. Bonometto, M. L. Ruggiero (a cura di), Gangemi, Roma 2006.

18 “Es que la escultura tradicionalmente era un arte de ocupación del espacio. Y la originalidad de Eduardo es que desocupa el espacio (...), interroga a la naturaleza en su intimidad, es decir, la penetra. Es como si se tubiera desplazado la función de la escultura, que era un arte de ocupación. Y en Eduardo es un arte de desocupación del espacio.” J. A. Valente mentioned in J. A. de Ory, op. cit. p. 4.

19 K. de Barañano, in *Les Gravitation: reliéfs de papier*, in ‘Chillida’, Galerie nationale du Jeu de Paume, Paris 2001, p. 56.



Très Grande Bibliothèque, Paris, R. Koolhaas. View of model.



Tindaya Mount, Fuerteventura, Canary Island.



Koolhaas does sculptures in 1989 in the project of the Très Grande Bibliotheque in Paris.

The contemporary architect builds the full, the volume that will house the library from which it digs, he clears out the matter for the construction of the empty spaces, interiors, by removing. He builds “the earth, the rock” in which he excavates the interior of the “cavern (cave)”.

Koolhaas interprets the TGB as a solid block of information, an archive of all forms of memory in which the main public spaces - reading rooms, exhibition spaces, auditoriums - are defined by air bubbles, non building, voids that are excavated and they are “floating in the memory, they are multiple embryos, each one with its own technological placenta”²⁰.

Again excavation, removal, of matter that is no longer the rock, but the building itself. A kind of subtraction, simultaneous “erosion”²¹ action of creation of the object, to obtain voids, full of life; but again the metaphor of the female womb, of the uterus, as to indicate the potential generation of these voids, generating in this case, of relations between persons: “the image of the building consists of regular and irregular spaces, where the most important parts consist in the absence of construction”²².

The result is an object “residue of a process of elimination, subtraction, and voids filled with life”²³, scenarios of human social interrelationships, a reminiscent of the urban void as it was conceived in the Greek city states (and in particular Miletus, where planning was originated), non residual vacuum, but the united empty space to fill.

Dense void, through which and in which it was developed the public life, the city was born, the polis as a meeting of people (many), community (πόλις/πολύς). Urban public space designed as an urban vacuum, “able to accommodate human action and to stand it out, where it is produced movement and change, where it is defined the passage of time and of human action, measured vacuum, shaped and prepared to become one scenario appropriate to the urban events”²⁴.

Urban Vacuum, cosmopolitan square, relational space, carved into a mountain, excavation/matter/vacuum, this was the vision and the culmination of the work of the basque sculptor, Eduardo Chillida, the utopian project “to create an internal space, inside a mountain, a meeting place for men of all races and colours, a large sculpture of tolerance”²⁵.

20 O.M.A. R. Koolhaas and B. Mau, “S,M,L,XL”, The Monacelli Press, New York 1995, p. 616.

21 Ibidem, p. 640.

22 Ibidem, p. 626.

23 Ibidem, p. 639.

24 F. Espuelas, op. cit., p. 64.

25 Declaration from E. Chillida to the press on July 1996, in Kosme de Barañano, *Integrating art and nature*, in Montaña Tindaya, Eduardo Chillida, Gobierno de Canarias, Fuerteventura 1997.

The chosen venue, ideal for this grandiose project was Mount Tindaya, in the Canary island of Fuerteventura. Sacred mountain, different, by geological characteristics from the other hills, marginalised mountain in the flat landmark, refuge for the early inhabitants of the Canary Islands, whose tracks, *pedomorfe* footprints were carved on its top.

In Tindaya Chillida he no longer works with alabaster, granite, but with the “inner spirit” of the mountain, with its empty.

Occasion, pretext, it is the site of a marble quarry which the sculptor architect, wisely, recovers part of the excavation to an experiential path.

Chillida materials are still the empty void, the light, but the sculpture is made from within, as to spell out more clearly the concept of vacuum space already experienced in ‘Desde Dentro’ (iron sculpture of 1953), ‘Espacios perforados’, ‘Rumor de limites’, ‘Lo profundo es el Aire’. He recreates at real scale, sculpture in alabaster ‘Mendi Huts’ (empty mountain) that it is dug in a mountain and it becomes a real space to live, architecture. From inside the mountain, from its internal vacuum, Chillida also creates the identity of a place: “inside the mountain he creates a symbol”²⁶.

Chillida sculpted a cube by 50 meters side, removing 125,000 cubic meters of stone and, as in the ancestral areas of Newgrange, two specific vertical openings to the outside that let to penetrate through two long tunnels, the light of the sun (from south) and the one of the moon (from north).

A fissure on the west side, prior access to the ancient quarry, allows the view to the marine horizon. “The sculpture is not noticeable from the outside of the mountain. But every person who enters into its heart can see the light of the sun and moon of the mountain that overlooks the sea, the horizon, a mountain out of reach ...”²⁷.

The empty space, inhabited/ habitable , it becomes usable space, viable, and, again, topological space²⁸.

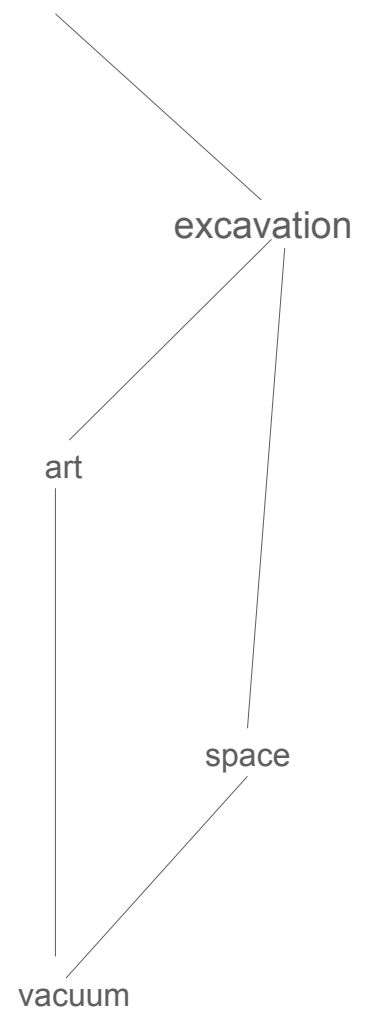
The space inside the mountain is not a simple three-dimensional space, but a “visual, auditory, emotional, sensory combination”²⁹, vacuum space, empty, in which precisely by the absence of disturbing elements, strongest are the perceptual experience of a user and the sensorial relations of man with the reality that surrounds him and that, moving from time to time

26 Ibidem, p. 84.

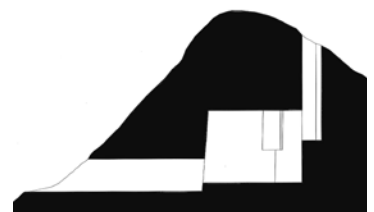
27 “... in sculpture, man gains conscious of the presence of the mountain and its meaning, that sunrise, noon, sunset and night are placet for the sun and the moon”, Ibidem, p. 84.

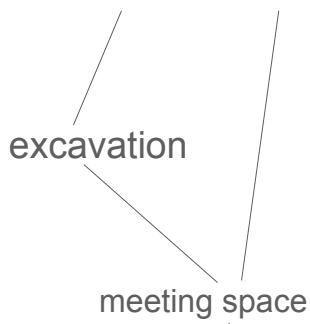
28 It is interesting in this matter the insight by Kosme de Barañano on the empty space of Tindaya in relation with the theories of Oscar Shlemmer “Man and Space” about the cubic abstract space and its perception. In this empty space there are, not only the mathematical rules of the cubic space, the “rules” that manage the internal human space, the emotional space – the cardiac rhythm, the respiratory system, the cerebral activity and the nervous system- whose centre is the human being and its movements and emanation that create an imaginary internal space.” op. cit., p. 62.

29 Ibidem, p. 65.



Above: carved space in Tindaya Mount. Model.
Below: sections. E. Chillida.





changes, so the man “becomes conscious of himself and the universe, projected inside”³⁰.

What most disappointed the basque sculptor, denied the opportunity to realize this grandiose project, it was the apathy of some who would not understand the simplicity and, I would to say today perhaps with a abused term, the sustainability of the work, its irrefutable logic design and the case: “... if there are people who work in the mountains, why can not I? Many people work in the mountain, quarrying stone without knowing that they are actually introducing space inside the mountain. So why not direct, plan this process and create a sculpture?”³¹

His goal was to mediate the development and exploitation of natural resources, mining, preserving the natural heritage of the mountain, giving to the place an added value. Chillida as quarryman/sculptor who brings out on the mountain would build both an internal space to live, a vacuum: “the void as a meeting space, a space to gather - concept essential to the sculpture of the twentieth century”³².

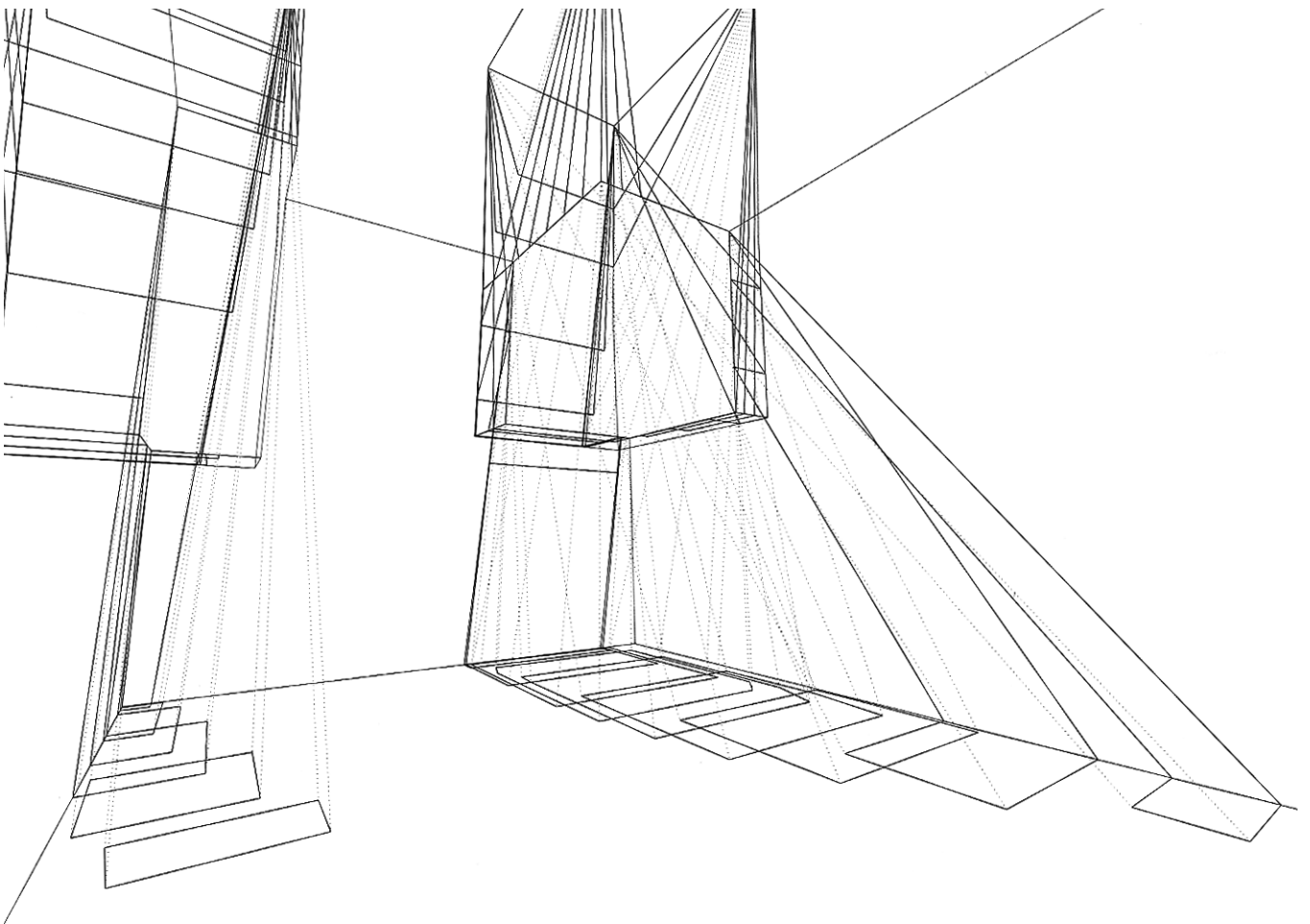


Light in the interior of the Tindaya space (model). E. Chillida

30 Ibidem, p. 65.

31 Ibidem, p. 83.

32 Ibidem, p. 83.



‘Lower view with the effects produced by the change in light. One must keep in mind that in addition to the various different positions of the beam of light in the space, the large hall it is also filled with a diffuse light in which over the course of the day, the clear and blue lights of the mountain are transformed into the warm and golden light of dusk.’ (K. de Barañano)

3.2 CASE STUDY

THE EXCAVATION TYPOLOGY IN THE LOCAL REGULATION

“... There is a picture of a hill excavated in terraces that can be seen in backlight. It makes me think of a negative physical form of cities: the natural size of the hill were reduced to become a building material of new urban centres. ... The limes obtained from these quarries, will be taken elsewhere to build new towns: when you build something in a place you must remove something else from another place”.

(Nicoletta Trasi¹)

The demand of specific works for a growing number of uses in construction, opening for a foreign market together with the development of increasingly sophisticated technology in terms of machinery for the extraction and processing on site, in recent decades² has led to a rapid spread of mining sites, dumping areas, and infrastructure for the processing and distribution of porphyry³.

Matter, then, that is removed, moved, taken away to build other material: eighty extraction sites (quarries), about one million tonnes of material mined each year, 3,572,328 m² of surface to “erode” and 40.250.000 m³ of probable matter reserves⁴, of which the 64% is discarded.

This is the situation in the district of Trentino porphyry, in Cembra Valley, area of study. It may seem sterile numbers, but they have a tangible implication, visible in context: extensive erosions on the ground, concavity on the slopes of the mountains, empties⁵. Vacuum, at the Chillida, around the matter, geometric patterns, still always form, which remains in place.

Matter, stone, porphyry, volcanic stone, which for the chemical-mineralogical characteristics⁶ it is subtracted from the mountain, it is

1 N. Trasi, *Paesaggi rifiutati paesaggi riciclati. Prospettive e approcci contemporanei. Le aree estrattive dismesse nel paesaggio: fenomenologia di un problema progettuale*, Editrice Librerie Dedalo, Bari 2004, p. 13.

2 Over the last 30 years from 1971 to 2001 it was extracted about 30milions cubic meters of porphyry.

3 E. Cattani, F. Fedrizzi, C. Filz, G. Zampedri (a cura di), *Atlante della Pietra Trentina. Antichi e Nuovi Percorsi. Guida pratica all'utilizzo*, Nicolodi Editore, Rovereto 2005.

4 It is about the estimate of mining areas surfaces contained in the ‘Piano Cave’, Quarry Plan. The Provincial Plan on the utilization of minerals was approved on its 4th updating with resolution of the Provincial Government 2533 on 10 October 2003.

5 The evolution of excavation techniques, using ever more powerful machines, has greatly enhanced the expansion of this activity and therefore the negative environmental effects with the immediate consequence of morphological changes on soil and landscape.

6 “Porphyry currently quarried belongs to one of these ignimbrite units, the rhyolitic ignimbrite, characterised by a reddish or grayish-pink colour and by a sub-vertical crack probably due to the cooling and highlighted by later tectonic movements.

This crack above, that together with vocation to a clear percussion fracturing, it is essential for its processing, it’s interesting that ignimbrite units to a depth of about 100-200 meters, which extends intermittently caused by sudden and unpredictable

matter

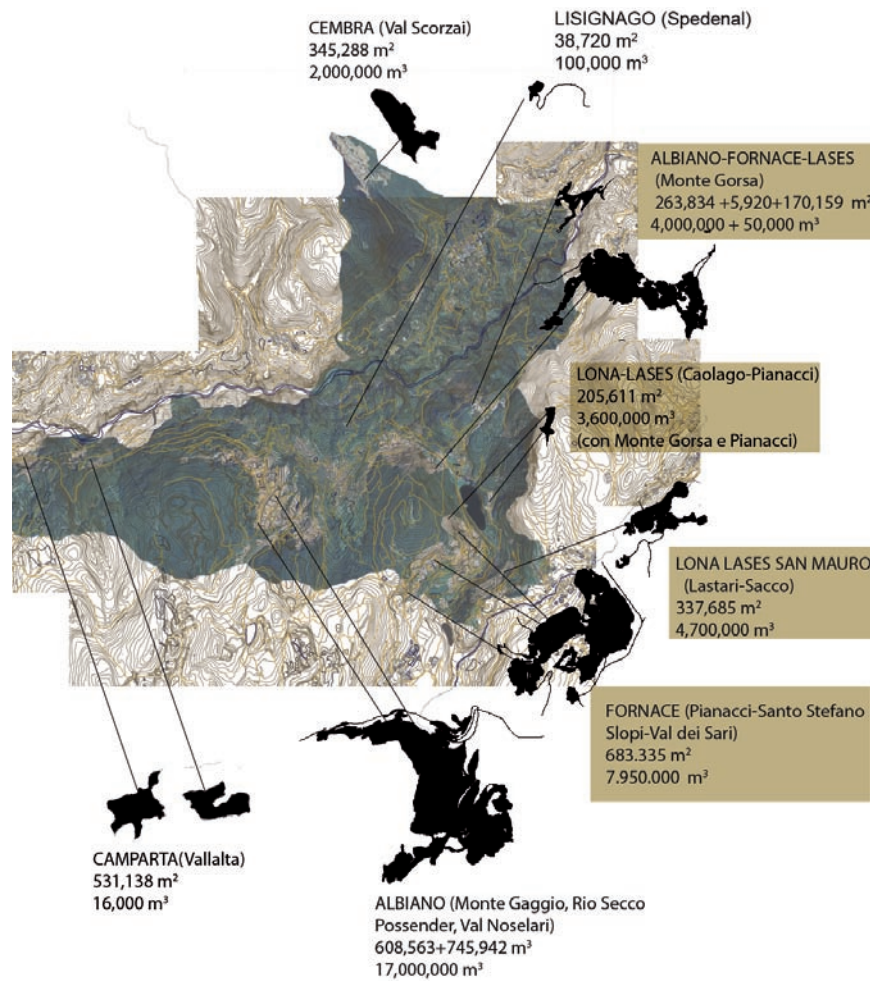
consumption

quarry

*cultivated*⁷ “slicing” the rock, through explosions - *volate* - creating steps in carved front.

And it is this particular kind of quarrying, in fact, dictated by the material, the morphology of the excavation context (*a mezza costa*, halfway), and the return of the prospect, which results in the mining areas of Cembra Valley the type of excavation (contemporary descendants steps) and carved shape (with open front): the result of the subtraction of material from the site.

The Fornace, Lases, Albiano Quarries redesign the landscape from the south-east to north-west, surrounding Mount Gorsa, with different morphologies. If, in fact, the size and proportion of steps are fixed constant, the relationship that develops with the morphology of the mountain is the dependent variable. In Fornace



Estimate about the surface areas to be excavate and the matter reserves for quarry site.

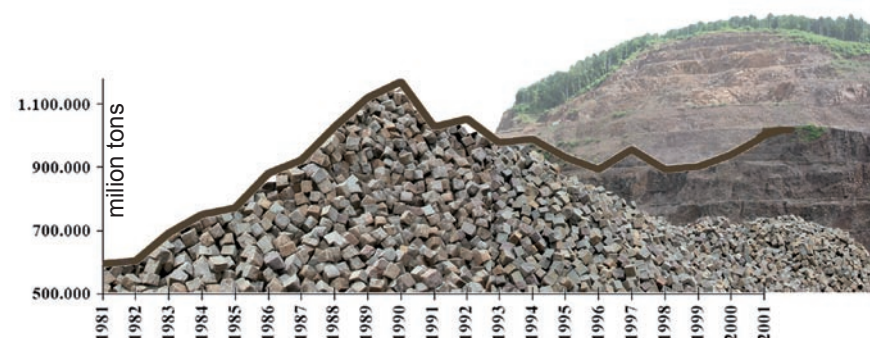
disruptions of its structural peculiarities, limiting substantially the quarrying in large areas”.

E. Cattani, F. Fedrizzi, C. Filz, G. Zampedri (a cura di), *Atlante della Pietra Trentina. Antichi e Nuovi Percorsi. Guida pratica all'utilizzo*, Nicolodi Editore, Rovereto 2005.

7 “Cultivate comes the Latin clergy, which has various meanings, such as till the soil, cultivating friendships. ... The excavation of mineral resources is an activity like many other cultivations where it is extracted raw materials from natural resources and these matters are needed to man since the dawn of civilization. ... The cultivation is emblematic of the mineralised removal of a mass from its original location and the technical operations to transform it into a product usable on the market”.

In G. Gisotti, *Le cave. Recupero e pianificazione ambientale*, Flaccovio Editore, Milano 2008, p. 14, 50.

MATTER PRODUCTION EVOLUTION



excavation

morphology

perception

void/vacuum

Quarries (Pianacci-Santo Stefano-Gorsa), in fact, the excavation draws a large rectangular concavity in the mountain and, in the area bordering with Lases Council, this concavity is more evident since the excavation affects the top of the rocky coast to San Mauro (quarry peak). In Lases the new consolidation system of reinforced soil regulates, rectifying, the natural contours, the slope toward the lake. In Albiano's extractive area, instead, the going of the steps reproduce almost an AutoCAD "offset", the north-west slope of Mount Gorsa, making artificial the movement of the convex side.

The subtraction of matter is visibly detectable at the lack of vegetation in the carved area (by chromatic difference and by extension of the area) and the new morphology of the area determined by the shape and size of the step⁸.

A new form, then 'surrounded'⁹ by the emptiness of matter that hid it, absence, black hole, as if by a gravitational force, sucks, attracts the eyes of an observer¹⁰.

The picture that emerges is the one of a territory whose natural and cultural character, shall be in crisis, a consumed landscape, obliterated by the signs of production and exploitation, which have distorted the morphology, the natural contour and that compromise the identity and continuity.

The existing legislation (Piano Provinciale di utilizzazione delle sostanze minerali), in line with the trend at national level¹¹, seeks to reduce the number of quarries and promotes the growth of production using existing mining sites by increasing the extension: from 100 quarries in 1981 with a production of 596,591 tonnes of material was passed in 2001 to 90 sites with an annual production of 998,762 tonnes¹².

Against the spread of new extraction sites of modest dimensions - increase

8 "With regard of new quarrying are usually used raises of 10-12 meters maximum and only in case of particular existing situations it could be accepted, with precautions, higher raises. The treads shall have a width proportional to the raise and when used even for the viability on site, the size shall be sufficiently large to ensure the safety of transit. Quarrying should be conducted normally from top to bottom by descendant steps. The step below, when considered in the quarrying project, can be initiated even before the exhaustion of the above provided the tread maintains a higher deep enough to ensure the security and stability", extract by Quarry Plan.

9 As Chillida defines.

10 With this regard, see chapter excavation/context/perception.

11 "Alongside with the increase of the production there is a decrease in the numbers of quarries from about 12,200 active quarries in 1965 to about 5,500 today. This reduction is related to the concentration of facilities that tend to take the dimensions of industrial activities". In G. Gisotti, *Le cave. Recupero e pianificazione ambientale*, Flaccovio Editore, Milano 2008, p. 27.

12 The size of the quarries was increased by an average of at least 40% on the width of the quarry front, thus creating the conditions for the necessary increase of the yards. In the subdivision of new areas it should be instead followed the policy of increasing conveniently the size of the present plots. It was shown that the size of the existing plots, although some have allowed the maintenance of all enterprises in the early 80s, on the other side they have instead highlighted problems. Plots with larger size would

of the excavated areas, but of small dimensions - the existing legislation promotes thus few but large erosions more visible in the landscape.

The mining areas sites are widen, the production increases and, as a direct consequence, the dumping waste areas increase (which is average the 64% of the extracted material) for its reuse.

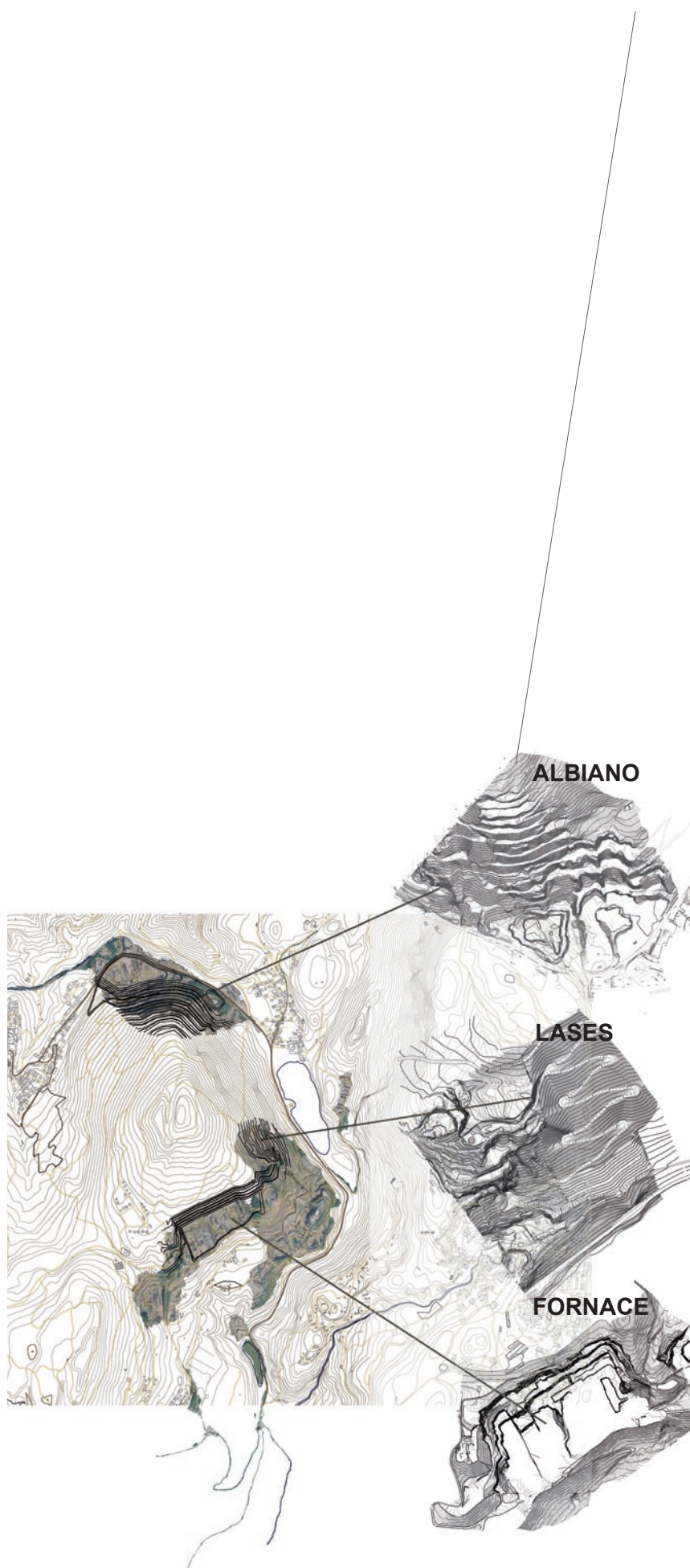
While on one side the mountain is eroded by following the precise geometric rules of steps (void subtraction), the waste was deposited in their territory over the decades in ways and different locations (matter addition): from the old “*chipe*” of S. Mauro’s quarries toward the Lases Lake that shape the west side of the “Quadrato”, to the wedge-shaped accumulations of material near the mills (Valcamino, Cirè).

Over time even the design of the steps has changed: if in the past the height of the steps could reach 30 meters, now the current legislation provides that the average height of a step to be of 10-12 meters.

A different dimension, in proportion with the step of excavation, draws a front carved differently, a new form, a new image of the mining landscape.

make possibile the following:

- More rational and safe *crop* even with the possibility of contextual extraction recoveries;
- Economies of scale, as it could be optimised the use of facilities and equipment;
- More long-term programmes for the contractors.



The different morphologies of the extraction sites.

excavation

scrap

dump

morphology

What does determine then the proportion of this step? What has changed the original type of excavation? What is the degree of subjectivity in the design of a mining landscape?

The choice of the type of excavation is driven primarily by increased security and stability of the fronts of the quarry. Now, of course, you add the search for a more rational method of quarrying¹³.

If the criteria of greater efficiency and safety are a priority, it remains to explore how much space is left to the subjectivity of the technician working on the cultivation project of a quarry, for the design of its front, creation, in essence, of a new mining landscape.

¹³ “In order to ensure stability and control of borders, the height of the steps must be sized in relation to the characteristics of texture and natural fracturing of the material. Proper height of the ridge also prevents excessive fragmentation of the material as a result of the fall, especially when the layering is thin” in P.P.U.S.M..

3.3 INTERVIEW.

FROM THE LANDSCAPE PRODUCTION TO THE LANDSCAPE CONSUMPTION, JUAN MANUEL PALERM SALAZAR

“We must be fully aware that we, the human beings, are the main agents of (the landscape) transformations and, also, that the exploitation of the land is not opposed to the conservation and improvement of the environment and of its landscape values.

One of the possible issues that is very topical at the present moment is to study the role in front of this phenomenon of transformation of the landscape, of the visual aspects of nature and of their possibilities of arrangement, utilization and improvement.

In this way, the attractive idea of projecting the landscape arises. The idea of dealing with the natural surroundings and the city where the elements that make them up are arranged in an ideal way.

As a result, it is necessary to generate new visions, new ways of looking, interpreting and understanding the landscapes to adapt ourselves to a many times not wished reality”.

(Juan Manuel Palerm Salazar¹)

From December 2005 to July 2006, the international architectural workshop *Proyectar el paisaje, en Territorios Transformaciòn* was held in Tenerife, involving fifteen European universities and other design organizations. The initiative promoted and sponsored by the architect Professor Juan Manuel Salazar Palerm was designed to test the project proposals, future scenarios for the scenic corridor of the Barranco of Badajoz in Güímar as a direct consequence of the new territorial special plan for Güímar gorge². Valley, hollow, that of Güímar that for its special geological-materials - alluvium with variable stratigraphy - it represents a major economic and social asset to the island for the extraction of aggregates: sand and gravel. In the absence of a specific legislation the non-rational exploitation of the resource over the years has produced a landscape characterized by a strong environmental degradation that threatens the future development of the area.

These are the premises of the seminary that produced twenty-five hypothesis of a mining landscape in transformation, whose projects range from rehabilitation of the worn-out site to new types of excavation in base

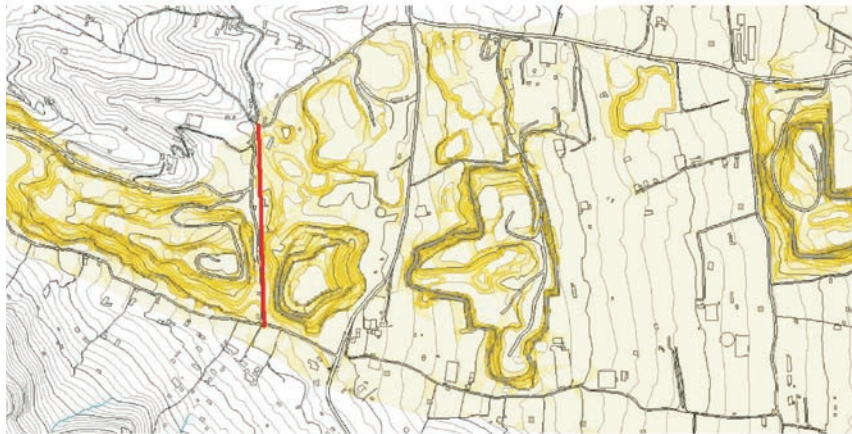


Photographs of the quarry site *Barranco di Badajoz* in Güímar, Tenerife.

1 J. M. Palerm Salazar, *Proyectar el Paisaje. Territorios en transformaciòn: barranco de Badajoz/Güímar*, Ed. Saquiro, Tenerife 2007.

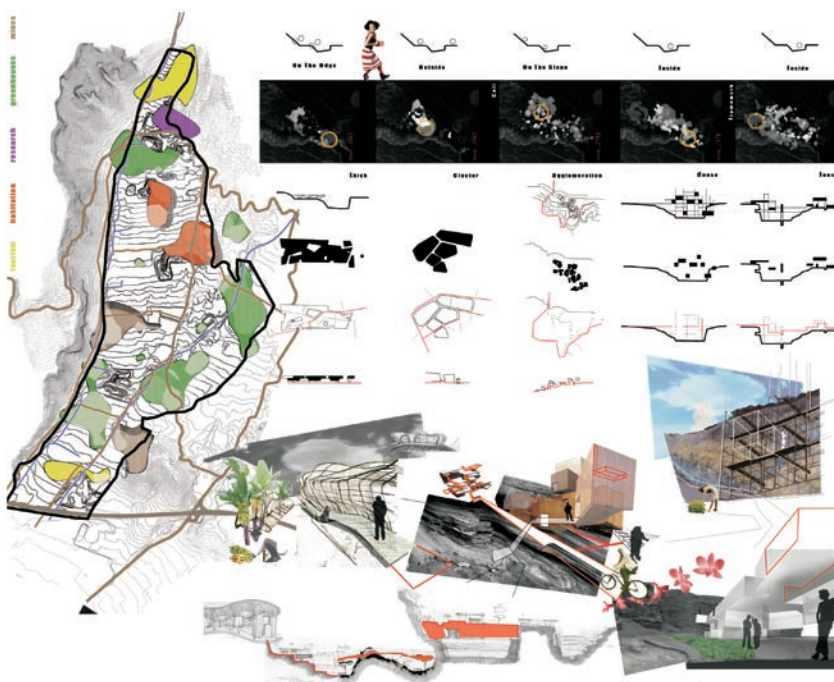
2 Dated February 2005, the Insular Council adjudged the projects of the Special Territorial Plan of the Güímar Gorges with the object of looking after the criteria for dry goods extraction as well as the restitution of the plots incorporating the most adequate ones for their future exploitation, as the decisions from the Insular Plan indicated.

of the future use of the area. One of my visit to the Valley of Güímar on the occasion of the second Biennale of Architecture, Art and Landscape of the Canaries, it has allowed a comparison of this difficult but interesting territorial context with similar themes with which I was experimenting during my research. Another valuable contribution to the research it was a conversation with the promoter of the Seminar on Güímar, Juan Manuel Salazar Palerm, to who I wanted to ask some clarifications with regard of the topics covered in this chapter.



The context: morphology of the site.

What is it for you the landscape? *In recent years there are many definitions of landscape. I really do not know if I have a definition of landscape; I tell you that I have an uncertainty in defining this term. For me landscape is a geographical term. I think anyway that those who are nearest in understanding the importance of landscape were the geographers. For me the word landscape is the one that might replace the term space. Today space is dead. It doesn't exist no longer as a term linked to architecture and territory. The space was bound to a Cartesian and Euclidean form. Now when it comes to space, from Heidegger on, this term does not exist anymore. The landscape replaces him as new relationship with the world, with the elements that build the territory, a new*



Project "Reclaiming Barranco de Badajos: emergent clouds" by Morpho Papanicolau working group.

relationship with spaces that build the contemporary home.

In describing the reading of landscape, we can speak of a connections system among the elements that constitute it?

Not only as a system of relations, but of system per se, because the reports are only a part of a much more complex system, which is precisely the landscape. It is not about whether the reports are a formal, biological or environmental type. We need to understand the landscape as a system. But not just of connections. In this system are important also the non connections.

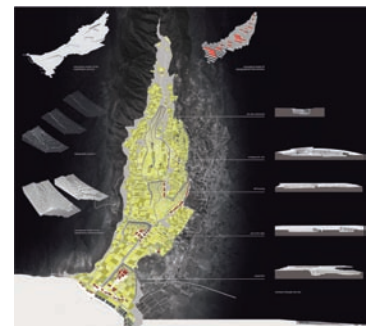
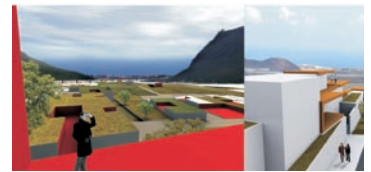
In the construction of a reading path and interpretation of landscape.

In what terms can we speak of consumption and production of landscape in the territory of porphyry mining?

The relationship between the terms production and consumption is very real, but very dangerous in the way that they are two concepts very close. The question that then arises is: to what extent we have to produce in order to consume more?

The ratio of production to consumption is bound to the society of welfare, so I write of production and consumption tied to welfare. And this is a vicious cycle that leads us to ask ourselves how far do we have to consume more and to what the extent we have to increase production in order to live better? I do not believe in this relationship between production and consumption.

I do not think that the solution for the territory and the landscape is in the relationship between production and consumption, there are other elements to put in play between these two terms. I do not think we should produce more roads to live better or to save five minutes to get somewhere. Perhaps we need to change a bit the mentality and lose more than twenty minutes and avoid building with too many roads in places where it would be much better to do them. It is a mentality, a choice bound not only to production and consumption, but to the cultural aspects related to the territory. In this meaning, I believe with regard of the porphyry, as mining activity and as quarries, signs on territory, that we should not put the issue on whether to do quarries or to continue to excavate, but instead it would be more appropriate to build, starting from the quarries, a new culture on quarries and on the materiality of porphyry. We must not demonise the miners, or who earn by capitalizing this production-consumption cycle, we must instead understand whether and how to exploit the disaster caused by excavation to create new spaces, a new territorial resettlement bound to the quarries.



Project “Living the edge” by Vojteh Ravnikar working group.

Is it possible, in your opinion, to think in mining planning, to a single cultivation project where the excavation and reuse of soil can be contemporary?

It is about thinking contemporary not only to the excavation and its reuse, but also to the system. It has to be a system. A system not only as a relationship between the two phases, but as an environmental system, a system tied to the territory, a system of thought and cultural on territory. A system to understand the landscape as space in his ability to read and of implication on how it is a system.

In an our conversation on porphyry you had hinted at one aspect of the excavation and reuse of the material talking about the desire of matter. How do you apply it in the mining context in Trentino?

Is not just a concept tied only to the porphyry context in Trentino. The desire of matter is a necessity, a today's need implicit in the project, but also in the research.

I believe that the matter, especially now, considering the technological and development capacity in the creation of many artificial objects in wood, stone, concrete, plastic, vinyl Now we're getting free from this desire above. I believe that this desire of matter is one of the most important conditions in order to do landscape, but also to the build architecture. It looks to me that all the elements that apparently seem to contradict the desire of matter, such as porphyry quarries, at this moment they are important because they speak of how we have destroyed a matter which is beautiful and how its transformation has become object of worship, not for the matter itself as porphyry, but for that matter which is not there, the fact that this matter, the Trentino porphyry, is spread around the world.

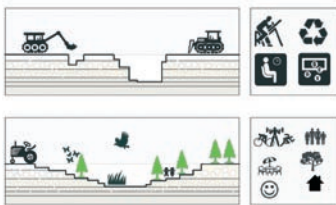
The world then is also a bit Trentino. To be able to get this it is one of the best conditions for understanding the new contemporary landscape.

The desire of matter referred to the Trentino porphyry is to understand that Trentino is able to build the world through the stone that it is then no longer linked to its consumption, but to a cultural destination, central, as it was the grapes for wine.

It is a contradiction to say that excavation is destroying nature or that in order to avoid the "stone extinction" it must be created and used an artificial substitute. Today we are realising that providing artificial materials is much more dangerous for the building itself and for its sustainability.

Therefore we need to bring a new process, which is precisely the desire of matter a human condition.

It is sad to think of a person who has no desire for anything and that thinks only to this meaning of sustainability, economy, consumption and production.



Project "The importance of the program" by Rafael Escobedo de la Riva workgroup.



Quarry machineries in Guimar.

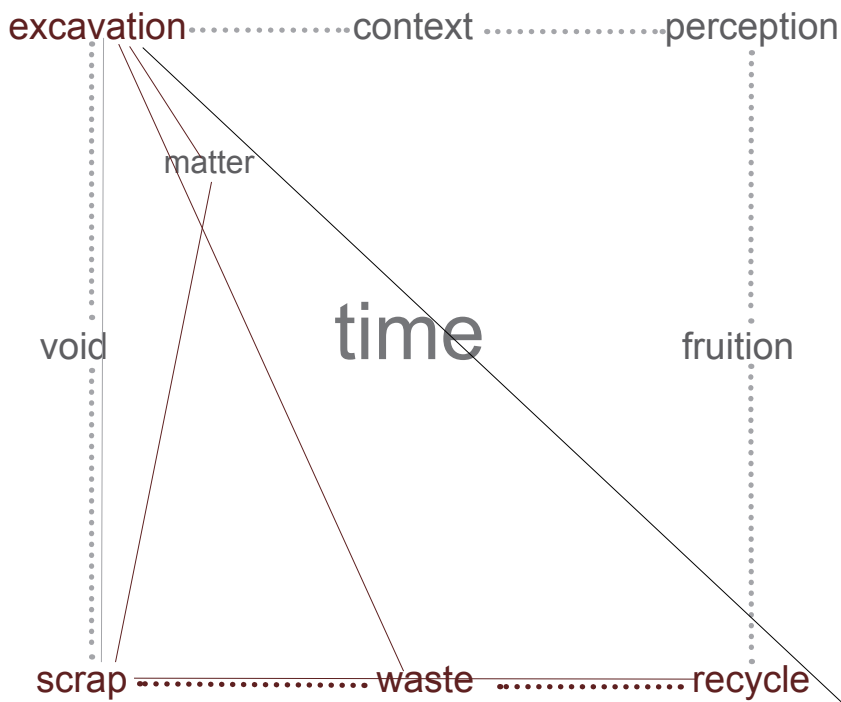
The desire of matter is binding to its process (design and creative). Without the desire of matter we can not even do a serious study of the stone. This stone is not just a beautiful, “precious” and valuable material. The desire of matter has nothing to do with price.

This desire must be found in ourselves.

When Michelangelo was sculpting, he had first to choose a piece of marble, and he did not choose it because of its beauty but for the desire of that matter, to sculpt that matter. The desire of the stone did not come before the desire of the sculpture, they were contemporaries. In the two slaves for Julius II’s tomb there is the ultimate expression of the matter desire because they are unfinished work, they let see something more, something that could still be, that the matter could still do. Michelangelo created these sculptures leaving to someone, maybe to the same matter, stone, the possibility to complete them.

Porphyry’s products ready to export.





4. EXCAVATION/SCRAP/WASTE/RECYCLE

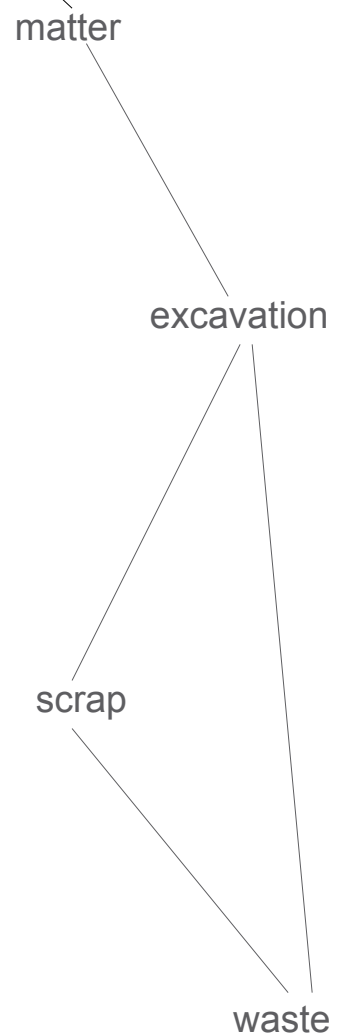
4.1 “WASTE-SCAPES, DROSSCAPES, EXTRA-ORDINARY-SCAPES”

“The extraction of minerals is an epitome of breaking and discontinuity. The new cannot come if something is not wasted, thrown away or destroyed... . The chronicle of the mining industry (extractive) is inconceivable without waste”.

(Zygmunt Baumann¹)

The etymology of the words excavation and scrap emphasize the direct relationship between the two measures of wasting (from Latin *ex-cepere*: take out, divide, pull away from itself) and of excavation (from Latin *ex-cavare*: extract, scoop).

In “Vite di scarto” the author underlines this connection emphasizing how the procedure to excavate, to extract, beside being an irreversible process, is the example by excellence of how a creative action is followed by a “destroying one that generates waste. Every human procedure based on choices, from a thinking mind, to an action mind, involves a separation between what it is considered correct and what it is inevitably thrown



1 Z. Baumann, *Vite di scarto*, Laterza, Roma-Bari 2005.

scrap/dross scape

matter/scrap

scrap/dump

waste

away as refused, as waste.

To excavate is to extract in order to gain, to take away something better, but also to excavate in order to “create”, to choose “the perfect form hidden inside a shapeless block of raw stone. Because something might be created something else might be delivered to waste”².

In this context of excavation-scrap-waste, the scrap is accepted in three different ways. During the extracting process the scrap is the remnant material as well as the quarry site and the storage waste site is discarded³. If this waste is the last result of the excavation and of the further processing of this material, then with the disposal of this activity above the site is exhausted, emptied not only by the material itself but also from the identity value given by the excavation production, this site is then wasted too, refused, often abandoned from any functions and users.

It is implied in the scrap-waste process the action of pulling away this waste, as unneeded, and this presuppose to put between the waste and who is refusing a variable and “critical” distance. The place itself, chosen as shelter of this waste is then “wasted”⁴ as well.

The extramoenia area, the ancient *geénna*, once a repository of urban waste (and others), with the extension of limits, of urban boundaries, are now beside the inhabited centre.

The once imaginary fantasies of Leonia - Calvino describes her in the 1972 - whose true passion was “to expel, to pull away from her” as much as “every year the city is enlarging, and the waste deposits must be moved further away ... the piles rise higher, with layers, are taking a wider perimeter ... the waste of Leonia would little by little invade the world” are today reality in many cities. These news are reported through journalistic reportage or they are incised on the disturbing pages of Gomorra⁵ that reports the scandal of the waste in Naples.

It is natural to question if it would have been possible to anticipate this problem, to prevent it ahead.

It comes back to mind the actual “therapeutic” claims that Lynch suggested

2 Ibidem.

3 In his text, *Drosscape. Wasting Land in Urban America*, Alan Berger analyses the waste in urbanised areas as product of the production processes. Berger describes waste in three different ways: urban waste and material waste; he defines wasted the abandoned sites or the ones contaminated by waste, and he identifies as wasted lands the vast car parks or shopping centres. He notes the wasted sites highlighting the source of their waste: residential, of the landscape, infrastructure, obsolescence, contamination.

4 The word “scrap/waste” applied to abandoned sites, scarring the territory is used by K. Lynch in *Il tempo dello spazio*, Il Saggiatore, Milano, 1977.

Back in the '60-'70 Lynch brought attention to the waste issue. In the subtitle “Waste and abandon” almost to light the problem he was giving indications, that today are simple, on waste recycle and redevelopment of the abandoned sites. “The waste can be pressed to make construction blocks or added as landscape hills ... old gravel quarries watered become artificial lakes for swimming or rowing.” op. cit., p. 228.

5 Roberto Saviano, *Gomorra*, Strade Blu, Mondadori, 2006.

with the regard of waste and wasted sites: “If we try to look with interest to the “waste” and to the pockmarks left on the territory ... perhaps we could learn to integrate these in a continuum reusing cycle ... since it is clear that we will continue to produce “waste” we must learn to reuse it continuously and even to appreciate it”⁶.

⁷If from one side the main words, now delusive panacea, are to recycle, to biodegrade, to rationalize the waste and the scrap production (see the Zerowaste strategy of large industries) it urges to choose new places to immolate for the needs and welfare of the community, new sites to be transformed even if we still do not know how (eco-balls hills, large suburban areas for incineration plants).

It is fundamental to propose solutions that will balance the dangers with the potentials, to update the technologic-knowing tools in order to turn a problem into an opportunity, to considerate then the waste (and the scrap) for all his declinations as potential resource and its dislocation as impulse for new scenarios of the landscape.

The ideas are many and they range from the rich literature art/waste/garbage to the most technical engineering of healthcare.

Forerunning of the devastating effects on the ecosystem of the promotion of consumerism and of “use and throw away” culture, the art of the twenty century has indeed begun to be interested in waste and garbage and to its recycle with a new meaning not only as a “poetic” key but also as politic and social one.

From the provocative art made of waste, garbage, “ordinary” objects christened by Futurists and the Dadaismo of Duchamp, to the formal studies of Picasso on assembled pieces of old bikes, to the bags of Burri, “the use to contrast and mix themes and tools of a sophisticated culture and the ones of a new mass media culture is flowered and it is expanded, over the course of the last hundred years, even in others fields of artistic expression that have reused and taken waste and have used them in several technologies”⁷.

It is an example, overseas, the phenomenon of the Counter Culture of the sixties-seventies from which stem many artistic movements, philosophical and most of the Garbage Art⁸.

From the creation of the Garbage Project (Institute dedicated to the new science of garbology at the University of Arizona) to the initiatives philosophical politics of Diggers, to the sustainable architectures of Droppers (geodesic domes built with material recovery for Drop City,

6 K. Lynch, op. cit., pp. 228-229.

7 L. Vergine, *Quando i rifiuti diventano arte*, Skira Editore, Milano 2006, p. 7.

8 For a comprehensive discussion of the phenomenon of Counter Culture and the relationship art/waste refer to Alessandra Ponte, *Arte e rifiuti*, in *Reclaiming Terrain*, Lotus 128, 2008, pp. 9-21.

recycle

art

garbage

digger

landarchitecture

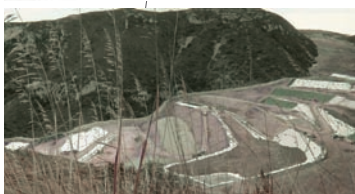
waste



Tago Park in Lisbon.

recycle

energy



The rehabilitation of Garraf's dumping area, Barcelona, Battle, Roig and Gali.

Zome system), to the latest artworks by Dumpster Divers, with the began of sixties “the recycle art is applied in various shapes by groups and currents that were involved in the challenged of life system and American society values”⁹.

The conjugation art/landart and the refuse (intended, this time as a storage site) is found in recent projects of dumping grounds on the studies of landscape architects Hargreaves that only emphasize the cultural phenomenon of Garbage, with ethic-educational intents (it is an example the project of Byxbee Park, in collaboration with the artists Michael Oppenheimer and Peter Richards, where, beside the evocative sculptures of the gone history of the site, piles of waste left in sight with bulldozer were transforming garbage into icon) but propose (in the Tago Park in Lisbon) solutions of healthcare engineering for the purification and sophisticated recycling plant and energy production. The Tago Park “becomes a place where material and energy are recycled in the environment and offers a remarkable example of engineering between technology and ecology”¹⁰.

On the same subject is the project by Battle, Roig and Gali in Barcellona, where in a dumping ground, rejected and marginalized by the community, becomes not only an opportunity to bring new energy alternatives but also a meeting place accessible to all.

The project provides the transformation of a huge unhealthy interurban area, of 60 hectares with 22milions tons of urban waste, in a place with a new identity, connected to a new economic value of energy and tourism. If on one side the storage of waste produces biogas, on the other side the location for a dumping ground, transformed, becomes for the administration, not only an urgent issue, but also the opportunity for a new tourism revival of a vast area, the one of the mountain system and coastal of Garraf, a chance then to create a new landscape.

If discarded, refused, this space becomes an excavate land, abandoned, for which a possible strategy could be the one that Trasi defines “aesthetic perspective” to be researched in the fields of earth art and land art and in the more recent landscape art¹¹.

There are possible design solutions in an excavated site, discarded, like the ones addressed to underline, or at least to maintain, the traces of its history, to maintain alive the testimony of its productive past, without any

9 Ibidem, p. 22.

10 N. Trasi, *Paesaggi rifiutati paesaggi riciclati. Prospettive e approcci contemporanei. Le aree estrattive dismesse nel paesaggio: fenomenologia di un problema progettuale*, Editrice Librerie Dedalo, Bari 2004.

11 It has been decided at this stage, to consider the projects with a direct relationship with the land, the site, often with a urban/territorial scale. However there are numeros examples of architecture in quarries: from the project of the Maison des Jounes by Le Corbusier in Firminy, to the stadium Braga by Siza, to the hotel by Matheus under construction.

illusory willing to bring back this site as before the “driven erosion”, this irreversible process.

The Landart in the sixties and the more recent landscape art work on altered excavated sites sculpting new artworks on a territorial scale. Common line is the new function that these sites will own: from discarded sites to sites accessible to the community, urban parks, thematic parks on the industrial archaeology, artworks sometimes visible only from aerial views.

Excellent examples of the above are the works of Earth Art by R. Smithson, by Heizer, or the more recent project by Martha Schwarz¹² or Shlomo Aronson¹³.

Robert Smithson describes his works as a recycle operations of the land on those “faded and fractured” areas from the anthropic action, as mines and abandoned quarry. He introduces, for these exhausted and discarded sites, the concept of entropy, emphasizing the irreversible production process and the impossibility, for the redevelopment of these areas, of any plans that will bring back the initial conditions. But this is indeed the “aesthetic” potential value of these sites: “the best sites for Earth Art are the ones destroyed by the industry, by a uncontrolled urbanization or by nature destructions. For example the spiral Jetty is made in the ‘Death Sea’ (Great Salt Lake near Rozel Point in Utah), in a sand quarry”¹⁴, and the same is for the outdoor mines in Bingham quarry, Utah (R. Smithson, 1973).

Innovative on this process are the works of Shlomo Arosen that are able to suggest design approaches on waste with different variations. Arosen remodels a discarded land, abandoned, through a project of excavation and contemporary collocation of the scrap, using as first material the waste itself. In the same context, he realises a conveyor belt, as an alternative system to the canonical road of infrastructures.

But perhaps, as Morris suggests in a digression on art morality¹⁵ and of the artist on his role to “make acceptable the former act to extract resources”, these excavated sites, changed by man even by a productive-consumerist logic and not by an aesthetic one, these sites becomes artworks to look at, to preserve, as they are, without a make-up solution, as it is for the pyramids; they are in fact “significant monuments of the twenty century”, products of the modern technology.

12 In the Geraldton Mine project Marta Schwarz designs a wasteland (abandoned mines areas) into a new landscape. This project represents non only a powerful earthwork, but also a “cultural artifact, highlighting the location and role of mining in the life of the town” (M. Schwarz).

13 A rich indexing of wasted landscapes, on disused quarries, is found in N. Trasi, *op. cit.* and in *Cave. Per un atlante storico geografico delle cave del veneto. Reinvenzioni e riusi* by S. Zanon in www.fbsr.it.

14 R. Smithson.

15 R. Morris, *Note sull'arte come/e rivendicazione della terra*, in ‘Reclaiming Terrain’, Lotus n. 128, 2008, pp. 85-89.

scrap

earth art



The Geraldton Mine Project, Ontario, by Marta Schwarz.



The “Spiral Jetty”, made in Great Salt Lake near Rozel Point in Utah, by Robert Smithson, 1970.

scrap

art



'Rock of Ages # 7', Active Granite Section, Wells-Lamson Quarry, Barre, Vermont, 1991.



Bingham copper mine, Utah.
Photo by A. Berger.

These monuments out of scale are immortalised in the shots by Ghirri Burtynsky and Berger who photograph former quarries, mines, railways, giving them a political social meaning, “metaphors of the dilemma of the modern existence,...mirrors that reflect our time”¹⁶.

These imagines of excavated lands emphasize, through the lens of the photographer, the sculptural aspect of the excavated land as it is, intact in its being excavated, evocative of its history, of its “sacrifice” in the name of production and consumption.

Images like those in Vermont quarry or in Carrara (base, however, even for Morris’s comments) highlighting the aesthetic force and the ethic of these sites, are witness of “the deep contradiction of the dependence of man to nature as source for materials to be used and the concern for the health of the planet”¹⁷.

16 E. Burtynsky, *Edward Burtynsky*, in ‘Reclaiming Terrain’, Lotus n. 128, 2008, pp. 4-7.

17 *Ibidem*.



4.2 CASE STUDY THE PORPHYRY SCRAP/WASTE: PRODUCTION AND TRANSPORT

“... If we try to look with interest the ‘waste’ and the scars on the territory maybe we can learn to incorporate them into a continuous cycle of use. The slags are excellent raw material for cement and the organic waste can be used as fertilizer. The waste can be pressed to make hills landscape, ... if we think of the remarkable advances in technology as excavation and consolidation of the soil, sowing and transplanting of trees. We see that the possibilities are endless”.

(Kevin Lynch¹)

As with every production cycle for the porphyry quarrying the last two results are last for the stone ready to be worked and the material that for its composition (a high percentage of soil especially on the covering material) and size (small debris) is discarded. In the case of porphyry, unlike other ornamental stones, the discarded percentage on material actually extract is currently 64%. Than in recent decades, thanks to a more rational method of quarrying there was a significant reduction in the percentage of scrap on the stone extracted (in 1994 was 77%). To this figure must still add an additional amount of material that it is in this report not counted, that it is discarded in the second processing often carried out at the placing site.

Most of the extracted material is then discarded. Only to better frame the extent of the problem, just think that the 30 million cubic meters of porphyry extracts in 30 years from 1971 to 2001 have been discarded - by applying the percentage above - 21 millions (cube meters corresponding to the volume of San Mauro promontory).

Scrap, waste, so as last material of the quarrying process, but that by quantity produced becomes the most important product of this production process.

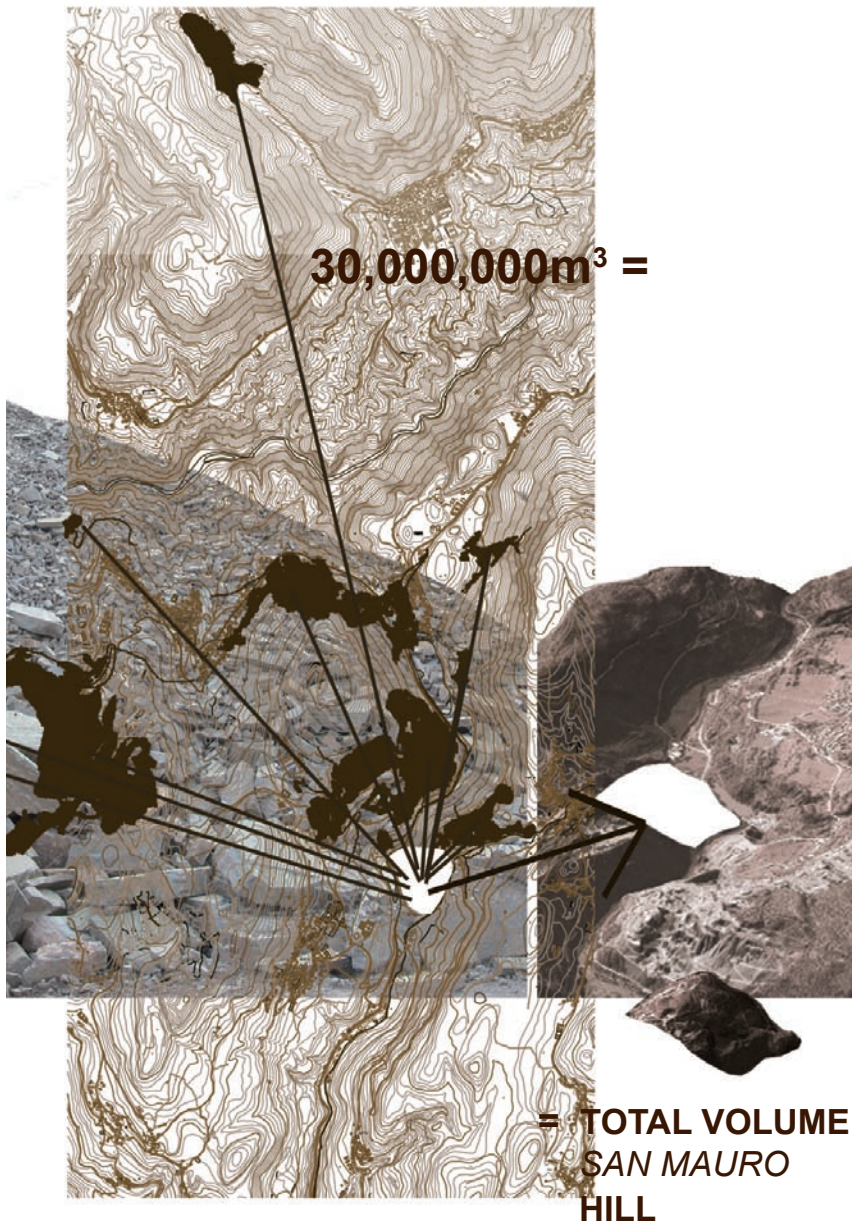
Without explore now the effective yield of the porphyry quarrying - and

Picture above:
from the scrap dumping area to the road construction where to transport this scrap.
Best practice exemple in Valcamino (Pergine Valsugana) of scrap reuse to build this infrastructure.

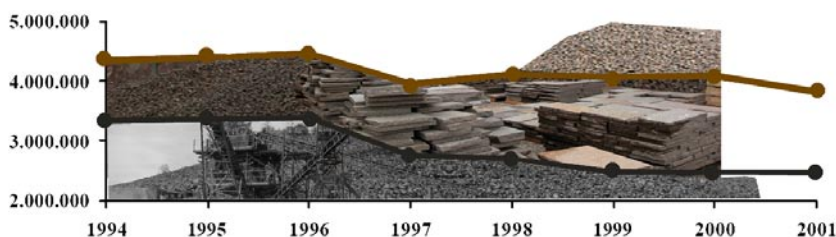
¹ K. Lynch, *Il tempo dello spazio*, Il Saggiatore, Milano 1977, p. 228.

SCRAP PRODUCTION

FROM 1971>>TO 2001



extracted rock in tons
scrap in tons



the opportunity to continue its growing- considering the high incidence of the waste, with an analysis on costs-benefits - this is not the purpose of this research - however, arises the question on whether, where and how this huge amount of material is then reused, recycled.

While in the past, large areas of land were allocated to dumping materials - there are an example San Mauro's "chipe" around Lases Lake - present research on the processing of the material for its reuse and development of technology for crushing plant near the extraction sites, has led to a decrease of dumping areas, as it emerges from the Plan provisions.²

A survey conducted over the territory in 2000 (see Table 8 of the Plan) outlines the possible use of the material as follows: on a total of 1,100,000 cubic meters of used waste (or usable) - 60% (approximately) of 1,700,000 cubic meters of extracted rock - 200,000 cubic meters become "debris detector", 250,000 cubic meters are crushed for the construction of asphalt and 470,000 for cement conglomerates and stabilized; the

² The porphyry scrap, whose disposal in the past was a major issue of both environmental and economic terms, it is subject of a constant and gradual growth; they are in fact used for filling and for the production of crushed and ground to be used in buildings and industry. For this reason, not only does not need to identify new dumping areas, but the existing ones are reduced.

remaining 180,000 are crushed and used as railway ballast.

New developments in engineering materials are exploring the possibility of recycling the “dirtier” material (sludge derived from crushing) for agricultural use³.

A best-practice example of how this occurs in this quarrying landscape, is the transformation of Val Camino. Once inert and porphyry landfill, is now project area for the construction of a new infrastructure, designed to facilitate the transportation of processed material and its waste. A cycle that ends: scrap-processing-infrastructure-matter.

Another factor to be reckoned with the scrap-waste cycle - that at this point it is considered as a real process/production chain - is the effect of scrap transport on existing roads⁴. As a direct result of waste recycling, transferring this to different production sites (not always adjacent to mining areas) and further transport of the processed material (by the mills to destinations outside the Province)⁵ led to an overload on infrastructure existing and an overlapping of different types of traffic flow: from mining-related transportation, to daily moving commuters to the capital, to the tourist flow in this context.

The consequences of this phenomenon on the context analysis are many and varied and relevant.

On one hand, there are direct impacts on the environment in terms of air pollution, greenhouse gas emissions, noise, congestion and accidents involving people who live this context.

In order to highlight the actual weight of waste transport on the territory, and to quantify the cost in economic terms, it was decided to prepare a study on external costs.

³ A thorough investigation of this aspect is addressed in the concluding chapter.

⁴ “It should be noted that often the mining operation, which began without providing the necessary adjustment of the related infrastructure, has led to a veritable overload of the existing ones, designed and produced for other purposes. . . .

The relation traffic-residential areas must be possibly resolved by the construction of roads which avoid crossing the urban areas and with other means for reducing the dangers and damage caused by traffic. It should be considered two types of roads, the main one, supposedly fixed with the appropriate technical features, and the secondary one on provisional nature, movable and disposed easily, it should be used only for site transits. It is required the cooperation between neighbouring municipalities to address the problem in its whole, as for the main traffic flow as for the temporary connection roads network, including possibly in the preparation of implementation programs”. P.P.U.S.M.

⁵ On about 1,100,000 cubic meters of waste material approx. 800,000 remains in the Province of Trento, while the remaining 300.0000 are transported outside this province.

4.3 EXCURSUS

HDV TRANSPORT: THE EXTERNAL COSTS IN THE CASE STUDY

INTRODUCTION

The aim of the following study is to quantify in monetary terms the external costs of road freight transport in particular the transport of porphyry waste.

Of particular interest in this investigation were the studies conducted by Matteo Richiardi for the association *Amici della Terra and Laboratorio R. Revelli*, Moncalieri (Turin) and Fedele Iannone one to look at for further study in depth. Starting point and premise of the study is the definition and identification of external costs as follows:

“One of the main results of the economic analysis is that the decentralized market economy, where each agent (individual, family, company ...) makes its decisions in an uncoordinated way, based on the information conveyed by prices on goods and services, generally leads to an allocation and an optimal exploitation of resources. But when the welfare of each one is also dependent variables whose value is determined by others, and this interrelationship is not considered in the individual choice because there is no market in which to treat it (and there is therefore no possibility of compensation), the individual choices usually lead to a sub-optimal situation, that could be improved with the benefit of all stakeholders. In these cases we speak of ‘market failure’, which is one of legitimacy of the public intervention. It is the case when an activity (be its consumption or production) produces pollutants emission harmful to human health or environment. In general, those who decide to pursue this activity does not take into account, unless it is compelled to, of these additional costs which fall primarily on others, on the community, and thus are meaningful called ‘external costs’”.

This is the case of the impact of road transport, as the final process of the production process of porphyry mining industry, costs that fall on the entire community in the form of damages.

In general, regarding the assessment of external costs of mobility are taken into account the following factors:

- **Air pollution**
- **Greenhouse gas emissions**
- **Noise**
- **Congestion**
- **Accidents**

Air pollutants are here considered (as usually) sulfur dioxide (SO₂), nitrogen oxides (NO_x), fine particles (diameter less than 2.5 or 10 microns, PM2.5

and PM10, respectively), carbon monoxide (CO) and volatile organic compounds (VOCs).

As for the emissions of greenhouse gases responsible for warming the Earth's atmosphere they are: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆).

Their shielding effect is very different. In order to allow comparison and aggregation, the emissions of different gases are expressed in terms of equivalent emissions of carbon dioxide (CO₂).

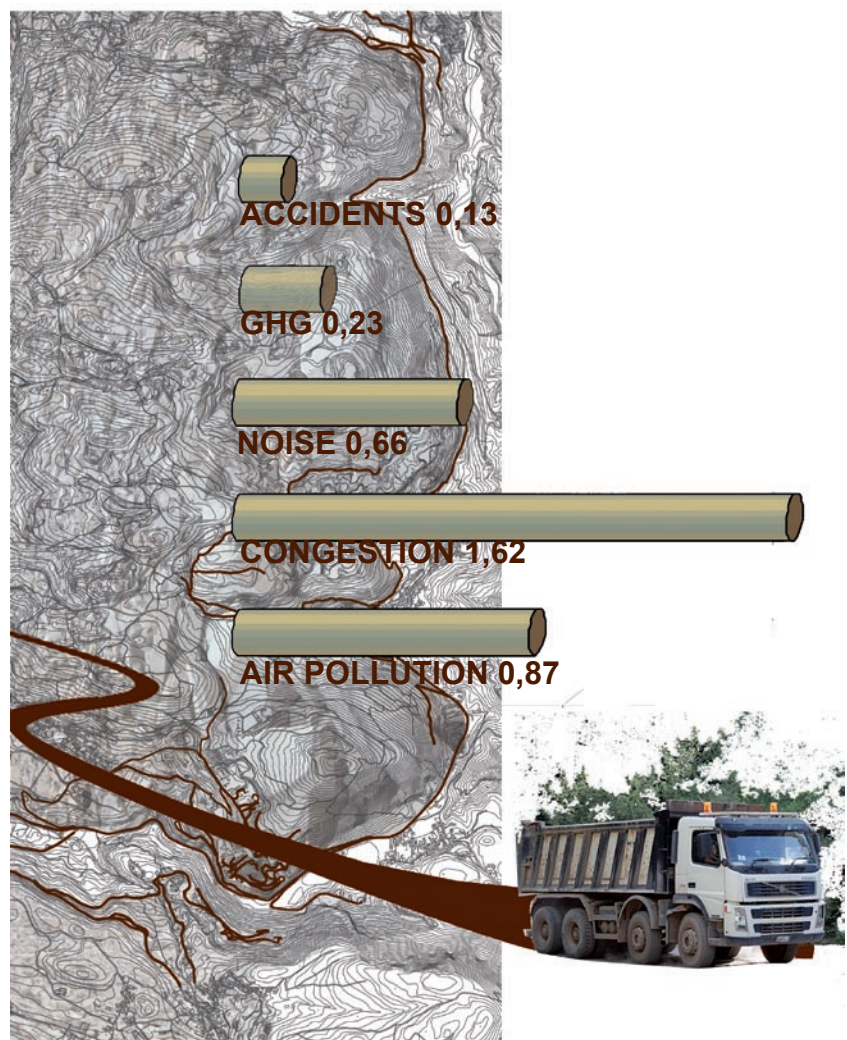
It also states that the investigation focuses on the impact of porphyry transport on two main roads: S.P. 71, which connects the mining area of Fornace to the highway and then the Valsugana and to the Interporto, and the S.P. 76, which from Albiano, through the towns of Gazzadina and Meano leads to the same destination for a total miles on both routes of 15 km. The years under reference are 2003, 2004, 2005, 2006, 2007.

DATA HELD

The data on which the analysis was conducted is as follows:

Travelled distance for each trip= 30 km (a/r)
Load transported for each trip (one way)= 30t
Vehicles= HDV 16-32t Euro II
Number of trips/day= 900
Number of working days/year= 20

Medium cost per tons/KM (€)



Travelled distance for each trip= 30 km (a/r)
Load transported for each trip (one way) = 30t
Vehicles = HDV 16-32t Euro II
No. trips/day = 900
No. working days/year = 20

METHODOLOGY/RESULTS

The assessment of external costs was conducted by examining the impacts according to the following sequence:

Factor → Physical damage → Monetary damage

The analysis of externalities in a first stage aims to identify the marginal costs, namely those produced mainly by the mere impact of heavy vehicle traffic on porphyry transport.

As regards the methodology for estimating the damage associated with each factor, reference is made to data in the “V Report Amici della Terra_FS” for each factor in specific - indicating methodological and authoritative sources of scientific literature which are reported below - determines a unit cost¹.

The data on which it was reported for the calculation of externalities are shown in the subsequent table:

¹ It is based on the identification of comparable case studies in Europe, examined in the ExternE Transport project. The common feature of these studies is the consideration of dose-response linear functions. This, if it is indeed an approximation, allows the aggregation and translation of results to other contexts. The dose-response functions used were those developed in the ExternE project (European Commission, 1999) and adopted in the UNITE project (Unification of accounts and marginal costs for Transport Efficiency) with minor changes suggested by the experts in the final phase of the ExternE Core / Transport project. The monetary values to be attributed to human life are regarded as those estimated within the European project NewExt as the continuation of ExternE, and amounted to € 1,045,000 per statistical life (VSL, ‘Value of Statistical Life’) and € 50,000 per years lost (VOLY, ‘Value of Life Year’). As for the damages resulting from greenhouse effect and noise pollution they are referred to the central values of the best available estimates in the literature, while the quantum of damages caused by congestion has looked at the value of time lost compared to a reference speed (different for each type of vehicles) derived from data available in time slots normally considered non-congested. With regard of damages associated with accidents (death, permanent disability, temporary disability, direct health costs, lost production or consumption of the victims and their families, pain and psychological suffering), reference was made to the estimates of National Study of the Amici della Terra (Lombardi and Molocchi, 2000), scaled to take into account the different road characteristics of the metropolitan area of Turin compared to the total of Italian roads, and the differing characteristics of accidents in the metropolitan area.

EXTERNALITY	Heavy vehicles carrying porphyry
Air pollution	No. vehicles*Km Medium load
GHG	
Noise	Percentage of noise exposed to different noise levels Contribution division for each vehicle type
Congestion	Distribution of traffic congestion at different times during the day
Accidents	For each vehicle type considered: No and accidents severity Typology of the involved vehicles

It is chosen to base the study comparing three different methodologies, resulting from the use of different data and different units of measurement.

The first approach is based on Richiardi's studies determining the monetization of external costs "ahead" using the coefficients already defined by the "Friends of the Earth" assigned to each external factor and relate them with the data in our possession (No km / Veic No working days / year).

Unit cost tkm (€)	Air pollution (det.)					Air pollution (total)	Gas serra
	SO2	NOX	PM	CO	CO- VNM		CO2
	0.01	0.54	1.08	0.00	0.01	0.87	0.23
Medium cost per tKM (€)							
congestion	1.62						
noise	0.66						
accidents	0.13						
Total	2.04						
Average daily cost per tKm (€)	Km (15)	t (15)	No. travels (900)				
Air pollution 0,87	176.115						
GHG 0.23	46.575						
Cong, accidents	noise,	413.100					

Obtained daily costs, estimating the annual cost of about 200 working days, it results that the annual external cost due to congestion factors, noise and accidents, are a total of Euro 1,271,480.

The second approach is inspired by Fedele Iannone and Dario Aponte⁶

studies which, limited to the calculation of external costs for pollutants emissions, NOx and PM, they refer to the actual data of emission (arising from the consumption per unit of fuel and the percentage of pollution in one kg fuel) and then relating to the “coefficients of the injuriousness of pollutants in order to obtain for these two factors some unit costs.

For other factors we will refer to data provided by the “Amici della Terra” V Report.

$$E_{pm}^s = e_{pm}^s \times (d_i^s \times c_i^s) \quad (1)$$

dove:

- E_{pm}^s rappresenta la stima dei grammi di emissione annui della sostanza inquinante p (PM_{10} o NO_x) generata dalla classe di veicoli i (autocarri pre-Euro o autoarticolati Euro II) sulla rete s (urbana e/o extraurbana);
- e rappresenta il fattore unitario di emissione espresso in grammi di inquinante per chilogrammo di carburante consumato (g/kg);
- d rappresenta i veicoli-chilometro/anno;
- c rappresenta il consumo unitario espresso in chilogrammi di carburante per chilometro (kg/km).

$$E_{pm}^{urbano} = w_{pm} \times Q \times d \quad (2)$$

Picture above:

where:

- E represents the grams estimation of emission yearly of pollution p generate from the vehicles type I (truck pre-Euro or articulated truck Euro II) on network s (urban or/and extra urban);
- e represents the unit factor of emission in grams of pollution per kg of consumed fuel (gr/kg);
- d represents the vehicles-km/year;
- c represents the unit consumption in kg of fuel per Km (kg/km).

PM10 emissions:

$$0,00089 \text{ Kg/Kg} (2.700.000 \text{ Km} \times 0,24 \text{ Kg/Km}) = 576,52 \text{ kg/a}$$

NOx emissions:

$$0,03296 \text{ Kge/Kg} (2.700.000 \text{ Km} \times 0,24 \text{ Kg/Km}) = 21.358,08 \text{ kg/a}$$

Then applying the coefficients of injuriousness

Costi legati all'emissione di un grammo di:	Millesimi di Euro - 2002
PM_{10}	104,63
NO_x	17,408

Picture above:

costs linked to the emission of 1gr of thousandth of Euro -2002

For PM:

$$576,52 \text{ Kg/a} \times 104,63 / 1000 \text{€} = 60.321,28 \text{ Euro}$$

For NOx:

$$21.358,08 \text{ kg/a} \times 0,017408 = 371.630 \text{ Euro}$$

If to these values, assuming that to be used as the main factor of air pollution, are added the economic value of the other factors derived from the “Amici

della Terra” are obtained as total annual external costs euro 1,351,301.

This value, however, does not take into account the unit costs assigned to other pollutant factors, which affect also the total air pollution of 1.23%.

The third method, more experimental, is based on using a software, COPERT III to obtain precise data on the pollutants emission. These values are then related to the “dangerousness coefficients” to get the unit costs (only for values of NOx and PM). For other factors, reference is made to the coefficients indicated by “Amici della Terra”.

See following table showing the specific pollutants emission produced by the software for a heavy-duty vehicle (HDV diesel 16-32t)

NOx				NMVOC					
Driving conditions	g/km*veh		g/kg of fuel		Driving conditions	g/km*veh		g/kg of fuel	
	Hot	Tot	Hot	Tot		Hot	Tot	Hot	Tot
Highway	0.0	3.09	0.0	12.67	Highway	0.0	0.49	0.0	2.01
Rural	3.95	3.95	17.42	17.42	Rural	0.66	0.66	2.9	2.9
Urban	6.29	6.29	17.44	17.44	Urban	1.15	1.15	3.19	3.19

CO				PM					
Driving conditions	g/km*veh		g/kg of fuel		Driving conditions	g/km*veh		g/kg of fuel	
	Hot	Tot	Hot	Tot		Hot	Tot	Hot	Tot
Highway	0.0	1.09	0.0	4.47	Highway	0.0	0.19	0.0	0.79
Rural	1.11	1.11	4.9	4.9	Rural	0.14	0.23	0.62	1.01
Urban	1.95	1.95	5.41	5.41	Urban	0.28	0.37	0.77	1.01

CO2				N2O					
Driving conditions	g/km*veh		g/kg of fuel		Driving conditions	g/km*veh		g/kg of fuel	
	Hot	Tot	Hot	Tot		Hot	Tot	Hot	Tot
Highway	0.0	765.74	0.0	3137.64	Highway	----	0.03	----	0.12
Rural	712.37	712.37	3137.64	3137.64	Rural	----	0.03	----	0.13
Urban	1130.8	1130.8	3137.64	3137.64	Urban	----	0.03	----	0.08

NH3				
Driving conditions	g/km*veh		g/kg of fuel	
	Hot	Tot	Hot	Tot
Highway	----	0.0	----	0.01
Rural	----	0.0	----	0.01
Urban	----	0.0	----	0.01

NOx: $5,12 \times 2.700.000 \text{veic/Km} = 13.824.000 \text{ g}$

$13.824.000 \text{ kg /a} \times 17,408 \text{ €} = 240.648 \text{ Euro}$

PM: $0.3 \text{g} \times 2700000 \text{Veic/km} = 810.000 \text{ g}$

$810.000 \text{ g/a} \times 104,63 = 84.750 \text{ Euro}$

The specific costs would thus be: Euro 84,750 for PM and Euro 240,648 for NOx, on a total of Euro 325,398 for external costs related to the emissions of PM and NOx.

If to these values are added the economic values of the other factors derived from ‘Friends of the Earth ‘(Euro 919,350) are obtained as total annual external costs Euros 1,244,748.

CONCLUSIONS

It is chosen to ignore the result provided by software as data on specific emissions seem widely divergent -and not properly justified- with those obtained with previous methods.

By establishing the criterion of the average of the two values gained following the first two methods, it is obtained, as external costs of porphyry waste transport on S.P. 71 and 76 Euro 1,311,390.

4.4 REFERENCE

EXCAVATION/SCRAP/RECYCLE IN THE PROJECTS BY SHLOMO ARONSON¹

Two projects by the Israeli landscape architect Shlomo Aronson are emblematic on the developing of the issues of excavation-scrap-waste in two different variations of this theme as referred to the production of waste in the activity of extraction followed by the recycling of the material, as well as the transportation of the extracted material for its use on foreign markets.

If indeed in the project for the phosphate mining the architect plans a program of excavation where the phase of relocation of the waste plays an important role in the design of a mining landscape, in the project for the conveyor belt, the objective is then to find an alternate transport of the excavated material, with minimal impact on the Negev desert territory.

If in the mines the waste, recycled, becomes material for a sculpture on a territorial scale, the conveyor belt, with its removable structures, draws a thin trace in the desert, without upsetting its delicate ecosystems.

The reading and analysis of these two projects through the interweaving of the themes excavation-scrap-waste has helped to analyse thoroughly and “test” effective methodological approaches in projects on-for mining landscapes.

As in other reference designs (“References”) treated in this research there are clear relations with other points (themes) of the matrix/system landscape, such as the conversion-process in the project.

THE TERRITORIAL SCULPTURE IN THE NEGEV DESERT, 2000

Mining in the Negev desert, characterized mainly by opencast quarry mines for the extraction of phosphates, has stunned the identity of the place: huge heaps of waste materials with a height of steps that reaches 40 meters, with a morphology out of context (too geometric) they deeply mark the territory.

Because of strong pressure from ecological movements, Nature Reserves Authority and the community, mining companies were asked to propose

¹ The description of the two projects is taken from the book by Shlomo Aronson, *Aridscapes. Proyectar en tierras ásperas y frágiles* (Designing in harsh and fragile lands), Editorial Gustavo Gili, Barcelona 2008, pp. 154-159 and from the n. 5/2002 of Lotus Navigator, Editoriale Lotus, 2002, pp. 54-63.

^{2,3} S. Aronson, *Aridscape ...*, op. cit., p. 154-156.

a development plan that assess the ecological and environmental damage caused by mining.

These were the conditions for the proposed mining plan and realised by Israel architect. The project approach was based on four design principles: preserving the *wadi* that passed through the site; contain the storage area within the extraction area; create a new morphology of the place in harmony with the natural one of the context and working towards the scale of the existing landscape.

All this was possible through a plan that alternates progressive phases of excavation, filling and storage of waste, still bound to the quality of the different layers of phosphate, to the movement of the trucks to transport the material and to the required maximum production.

The result is a sculpture on a territorial scale, a “new landscape of the region Zin, which respects the scale and natural shapes of the place (the height of the “steps” of the new morphology does not exceed 10 meters) with the additional costs of only two cents per ton”³.

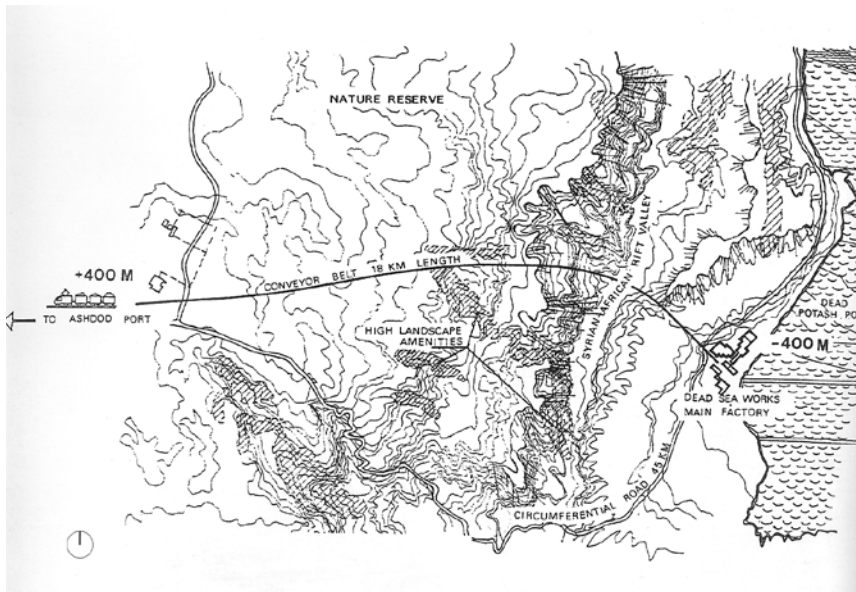


Negev Phosphate Works.

THE MATERIAL ALTERNATIVE TRANSPORT: THE CONVEYOR BELT, 1998

In order to increase the export of the industrial extraction product of potash from the Dead Sea (and thus enhance the development of this sector) it had to be thought a more suitable environmental and operational method for transporting the material from the Dead Sea to the nearest railway line, which leads to the Mediterranean port of Ashkelon (a 50 km distance with a drop of 400 meters).

The proposal to a “traditional” road infrastructure that it is difficult to realize in this context was the introduction of a conveyor belt along 18 km, the third longest in the world. In order not to impede and interfere with the passage of hikers and wildlife, to ensure a degree of reversibility and not to damage the morphology of the gorges in the desert and in the Rift Valley, it was decided to build a structure almost totally suspended on steel trusses. The yellow-ocher colour of this structure, which is complementary to the colour of the surroundings, it was also another important step in the project choice in an environment of excellence such as the Negev desert, characterized by strong variation of light (during the day and climate changes).



4.5 INTERVIEW WITH SHLOMO ARONSON¹

A further valuable contribution in reading the plans by Israel architect have been some clarifications, interesting design details that emerged during the interview here below. Some of these aspects have allowed relations with the themes of context as a priority component of the comparison in the excavation project, as well as the processing stages of the mining landscape: further demonstration of the multiple plots in the system / matrix reading and landscape design.

I have found intriguing your purpose for the design of the Negev Phosphate Works with regard of the simultaneity between the excavation phase and the reallocation of the dumped material.

I would like to know your point of view about the importance in the extraction activity of a plan that considers simultaneously the excavation and the future land-use.

Of course for any serious answer one has to know quite a lot about the site; what was found before; and make the decision about the next use or extent of the preservation effort. I believe in relating to the spirit of the site, the sense of the place. Thus there is a chance that with sensitive treatment the new interpretation, whether in the form of a new project or a re-naturalization, will look fitting. I would say that it should be essential and definitely will be most efficient to have a plan for the next use of the excavated area.

Is it possible to define your design process like a single plan by stages that includes the mining procedure as well the new morphology of the site without separating (in different processes and times) the mining plan from its rehabilitation plan?

The possibility of developing a single-stage procedure which will define the excavation, the relocation of materials as well as the tracks or movements of the heavy machinery depends completely upon the goal of the excavation, the topography, the soil and underlying geological conditions; but also the potential new use for the project. For that reason, it would be greatly advantageous to have the plan for redevelopment prior to beginning the works.

How much is the dumped material compared with the total mined material?
It is impossible to say beforehand exactly how much is the dumped material

¹ Trento-Jerusalem: 22 September 2009.

compared with the mined material. On the whole it must be assumed that the great majority of the volume of mined material will be dumped.

How and how much is the mining procedure changed in order to obtain the new rehabilitation design?

As an example, in the phosphate mines in Israel, a covering layer of unusable material had to be removed from the site. The volume of this covering layer was 3 million cube of material. This was dumped on the site in such a way that there was no double handling. Because of this more efficient process, in actuality, the one step demand was more efficient than the traditional methods in which first removal and dumping had to be followed by a second moving of all these materials. The question is, how open is the management of the mining company to a change in procedure?

In particular: is it possible to define your rehabilitation plan –changing the word- like a different land use plan of the soil, without using the term ‘rehabilitation’ or ‘restoration’ ?

The suggestion is that since in these times “rehabilitation” or “restoration” is mandatory, without using these terms, “efficiency” is the most salient motive for excavators to accept the last-use plan as being of necessity part of the initial mining plan, as well as to adopt the one-step method to reduce the number of times that the material must be moved. Usually a good project will have an open ended meaning. That is, it will include the mining project as well as the new-use project, whatever that may be. My feeling is that the more needs that can be fulfilled in any project, the better, more worthwhile that project will be.

The purpose for the conveyor belt is done considering ecological bounds, constraints and influences. This belt conveyor becomes part of an environment, as desert, adapting itself to the landscape. It modifies and draws a new sign in the Negev territory and testifies the production “history” of the site.

Which effects would have happened on the landscape if a road to the potash transport would have been realised?

Regarding the conveyor belt for the transportation of potash: if the conveyor belt had not been built, and instead a road had been made for the purpose of conveying the potash to market, the major damage would have been in touching, changing forever virgin land.

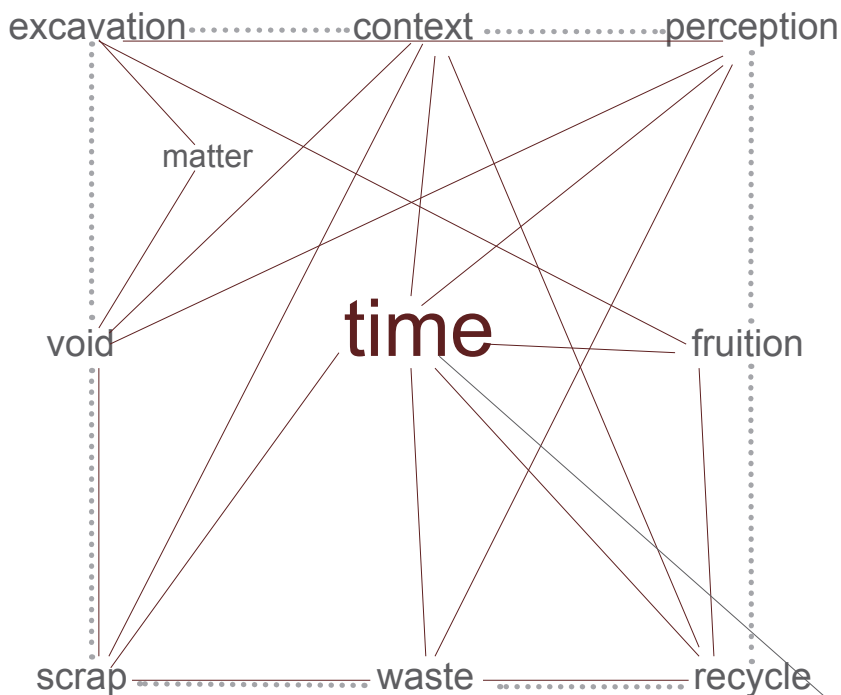
The conveyor belt floats above the land, touching ground only where the bridging supports rise. This was in percentages, much less damaging than a road would have been in that very steep topography.

What will be the function of the conveyor belt at the end of quarrying?

When the potash quarrying ends, we would recommend the dismantling of the entire structure and the reuse of any materials that could be recycled.

Unfortunately that was not built in to the program.

This solution is more than twenty years old, and it has moved a tremendous amount of materials, so it has been a robust minimalist solution. It is even a tourist attraction which people pass by with great interest.



5. EXCAVATION/TIME/TRANSFORMATION

5.1 TRANSFORMED LANDSCAPES

“Nothing is made, nothing is destroyed, and all is transformed”.
 (Antoine de Lavoisier¹)

“The change and recurrence are the very meaning of life: things past, death that is, the consciousness of the present. The world around us, most of which we ourselves have created, continually changes and often confuses us. Let us act on this world to keep it or change it, thus making the visibility of our aspirations. All the problems of planning are reduced, in essence, to control of change”.
 (Kevin Lynch²)

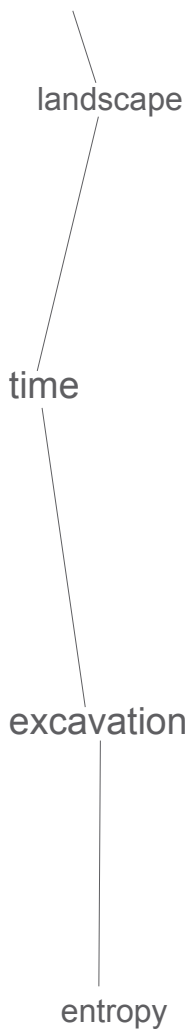
Everything is regulated, governed by this inescapable process: man, as the land on which he lives. Life is, indeed, transformation. Transformation which has always had a positive value, a sign of progress, evolution and improvement. But something has changed since the natural “traditional”

1 A. de Lavoisier, 1772.

2 K. Lynch, *Il tempo dello spazio*, Il Saggiatore, Milano 1977, p. 11.

process

transformation



“evolutionary” cycles. During the last century and in recent decades is even more obvious, it almost seems that time has increased its pace. In reality, it was the man who has accelerated the process of transformation in all areas, threatening to come overwhelmed by the unpredictable effects. In the society of throw-away, of renew at all costs and fast, when to not be marginalized or different the individual must always be in pace with each new technological development, the watchword is to change, to transform (in Internet, mirror of contemporary society, the references to the term “transformation” are 63 millions).

The landscape itself is the result of an aesthetic and cultural transformation made by the man on the territory that, as recalled by Alain Roger, becomes *paysage*³. Landscape whose mutations, as recalled Turri, “are correlated to changes in political, economic and social country”⁴.

Landscape that, as a continuous process of layering of different land uses it continues to evolve: “In recent decades significant parts of the Alpine region were hit by intense processes of change associated with new economic potential as follows: tourism, second houses, localization of particular industries and services”⁵, exploitation of natural resources.

Transformation, and consequently, time⁶, implicit in all phases of quarrying⁷, from its placement on the land and the degree of visibility (excavation-context-perception) of erosion on soil (dig-matter), to a rethinking of the site at the end of activity (excavation-waste), and to the process of transformation of matter that is extracted⁸.

Transformation, principle of Lavoisier that intertwined with the concept of entropy⁹, so dear to Smithson¹⁰, as applied to places overruled, leads us



Above: Bingham copper mine, Utah.

Below: The reclamation project by R. Smithson, 1973.



3 A. Roger, *Court traité du paysage*, Editions Gallimard, Paris 1997.

4 E. Turri, *Semiologia del Paesaggio italiano*, Longanesi, Milano 1979, p. 10.

5 C. Diamantini, B. Zanon, *Le Alpi. Immagini di un territorio in trasformazione*, Temi Editrice, Trento 1999.

6 Trasi states analysing the term “transformation” that in the morpheme “trans” there is the implication of a temporal future sphere, compared to “form” which remains anchored in the present.

7 “The aesthetics of the industrial landscape is that of the organic landscapes, machine landscapes as expression of territorial structures that function as large bodies where *tou se tient*, where all the gear involved in the movement, to their mutual relations”, E. Turri, op. cit., p. 162.

8 The theme of time and processing, implicit in every phase of mining, is also implicit in every subject covered in this research and, in the image of the matrix is the background of all keywords. It is “the microstructure that it is intertwined with all threads of the matrix fabric. And it is, therefore, also the focus of this discussion, the starting point of the pilot project.

9 The formulation of the physical concept of entropy by Rudolf Clausius - who for first introduced the term - it refers to the irreversibility of a process, it follows that if the energy loss and internal organization in closed systems is irreversible, it means that the overall trend of each process is total mess.

10 “That’s a subject that’s preoccupied me for some time. On the whole I would say entropy contradicts the usual notion of a mechanistic world view. In other words it’s a condition that’s irreversible, it’s condition that’s moving towards a gradual equilibrium and it’s suggested in many ways. Perhaps a nice succinct definition of entropy would

also to remember the great changes in the territory and the irreversibility of the mining process, to find it impossible to turn back, to restore a state *ante factum*. A case for everyone, emblematic, is the vast Bingham quarry in Utah, subject of interest by the same Smithson¹¹.

Faced with this clear in mind, we wondered whether if, in all cases in which we must deal with costly interventions of “rehabilitation” and with the outcome often ineffective, it was not possible to act (*a priori*) in advance, “riding” entropy, “controlling the change”¹² in order to give a meaning to the transformation process¹³, however inevitable. This is the key to read this research.

If attention is applied to the affected sites, excavated, that the “European Landscape Convention”¹⁴ recognizes as landscapes and so as the result of interrelations between man and nature; and if, again, in the definition of landscape, it is implicit its processing, its evolution, depending on the variable of time, the protagonists of the landscape appear to be man, nature, time.

Landscape, then, as a synonym of process, of double movement: not just for the mutability of human action on territory - “historical time”¹⁵ - but also for the transformation of nature, of natural environment, which consist

be Humpty Dumpty. Like Humpty Dumpty sat on a wall, Humpty Dumpty had a great fall, all the king’s horses and all the king’s men couldn’t put Humpty Dumpty back together again. There is a tendency to treat closed systems in such a way. One might even say that the current Watergate situation is an example of entropy”. In *Selected interviews with Robert Smithson, Entropy Made Visible* (1973), Interview with Alison Sky” (<http://www.robertsmithson.com/essays/entropy.htm>).

Text excerpted from Robert Smithson: The collected writings, 2nd Edition, edited by Jack Flam, The University of California Press, Berkeley and Los Angeles, California 1996

Originally published: *The Writings of Robert Smithson*, edited by Nancy Holt, New York, New York University Press, 1979.

11“ ... It seems that when they made up the laws for mining reclamation they wanted to put back the mines the way they were before they mined them. Now that’s a real Humpty Dumpty way of doing things. You can imagine the result when they try to deal with the Bingham pit in Utah which is a pit one mile deep and three miles across. Now the idea of the law being so general and not really dealing with a specific site like that seems unfortunate. One person at Kennecott Mining Company told me that they were supposed to fill that pit in; now of course one would wonder where they were going to get the material to fill that pit in ... it would take something like 30 years and they’d have to get the dirt from another mountain”. Ibidem.

12 K. Lynch, *Il tempo dello spazio*, Il Saggiatore, Milano 1977, p. 11.

13 “It is possible to build landscapes that return tension and balance (equilibrium in the tension) to the society-environment relationship, while respecting the continuity” E. Turri, op.cit., p. 10.

14 “Landscape designates a portion of territory, as perceived by people, whose character derive from the action of natural factors and/or humans and their interrelationships ... relation to both the landscapes that can be considered outstanding as well as landscapes of everyday life, or degraded landscapes”. European Landscape Convention, Firenze 20 ottobre 2000.

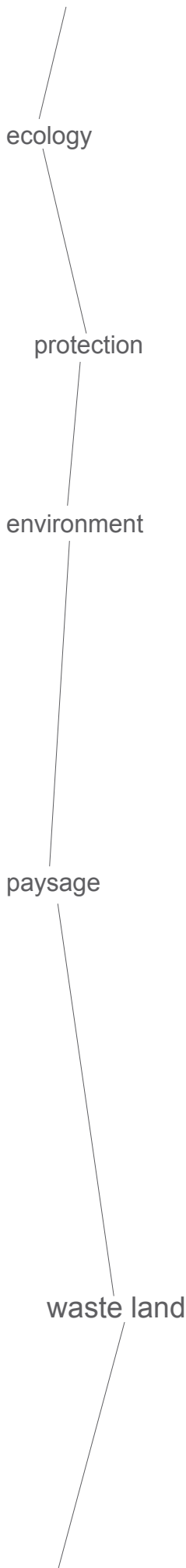
15 N. Trasi, *Paesaggi rifiutati paesaggi riciclati. Prospettive e approcci contemporanei. Le aree estrattive dismesse nel paesaggio: fenomenologia di un problema progettuale*, Editrice Librerie Dedalo, Bari 2004, p. 22.

reclamation

landscape

process

environment



of - “ecological time”¹⁶. The man changes, his always-innovative ways of relating to the territory, but also changes the nature, according to their processes, more or less conditioned and accelerated by man¹⁷.

So it is up to the man who defines, lives and inhabits the landscape, the opportunity to interact with other players in the landscape in a balanced manner. This is neither to impede the natural process nor to disrupt the temporal phases, but, as McHarg¹⁸ said to slow the rush of entropy, thereby increasing the degree of order which he calls “negentropy”.

This does not mean, as confirmed Alain Roger¹⁹, to consider the landscape (only) as the environment, to transfer those values of the landscape that is purely aimed at mere ecological environment protection, at all costs: the man would come out in isolation, ousted from that system to which it belongs²⁰.

“If the landscape is a cultural concept - as Trasi again states - still it is not clear with which right we should speak of landscape to be protected or endangered because they are places created - or processed - by man”²¹. As reiterated Turri, “the discovery of the values to be defended must pass through the awareness that allows participation, direct or delegated, a ‘different’ plan as control of change as continuous updating of the territory to the changing needs of society and economy (the economy as ecology) without actually breaking the threads that bind society to the environment, culture to nature”²².

Emphasizing the risk - in the name of ecological “conservatism” - of “environmentalisation” the landscape by strangling the artistic origin (or component), cultural and perceptual, Roger dissociated and analyses the two words “paysage” and “environment” and cites the enlightening position and mediator of Chemetoff about the “plans de paysage”²³: “The question to consider the landscape leads us to believe that the transformation of the landscape is an evolution and not just something to keep and protect. Instead of talking about protection, it would be desirable to understand the phenomena that will evolve the landscape and found - starting from this knowledge - another way to intervene on sites, to manage and protect

16 Ibidem.

17 “The more men are released from external natural cycles and are based on social cycles changing and artificially created, the more likely the internal disintegration”. K. Lynch, op. cit., p. 145.

18 I. L. Mc Harg, *Design with nature*, New York, 1969. (trad. It. “Progettare con la natura”, F. Muzzio Editore, Padova 1989).

19 A. Roger, *Court traité du paysage*, Editions Gallimard, Paris 2001.

20 Ibidem.

21 N. Trasi, op. cit., p. 24.

22 E. Turri, op.cit., p. 165.

23 A. Chemetoff, *La feuille du paysage*, décembre 1992, pag. 2 cit. in A. Roger, *Court traité du paysage*, Editions Gallimard, Paris 2001.

them as all the phenomena that constitute the identity of a territory”²⁴.

The goal that we are put in the processing of the degraded sites - often because they are abandoned - is to preserve, maintain the continuity of the “interrelationship” man and nature, which constitute the identity of a landscape, without one prevailing and eliminating the other.

“Protecting” a rejected landscape, degraded, may mean understanding the evolution even after a heavy processing initiated for the exploitation of natural resources in the name of productivity.

It is indeed “in the injured, sterile places, where it was made a clean sweep of pre-existing empty sites (see reference to another chapter) that the greater the potential, the energies of transformation, the possible, the energies of transformations, the possible rewrites on the context. The actors are, again, man and nature, the protagonists of the landscape. The man, trying to join the movement of transformation always in place in a territory, he can support, through what Lassus calls “creative analysis” - that is, able to interpret those reports where the landscape itself is constituted, to identify the processes of evolution and use of the identity - to incorporate new elements that work together, interweaving with the existing landscape of the project, “adding to a process what is already there”²⁵.

Maybe there are still works, projects that involve direct action with earth and ground, and acting on a urban and territorial scale (land art, land architecture, landform architecture) which, because of their inherent ability to work, can collaborate with earth, nature and which often are confronted with degraded sites, are better able to interpret the transformation of a carved landscape. One example is the project for the Schümel quarry, where human intervention is inserted in the natural processes already in place, confirming them.

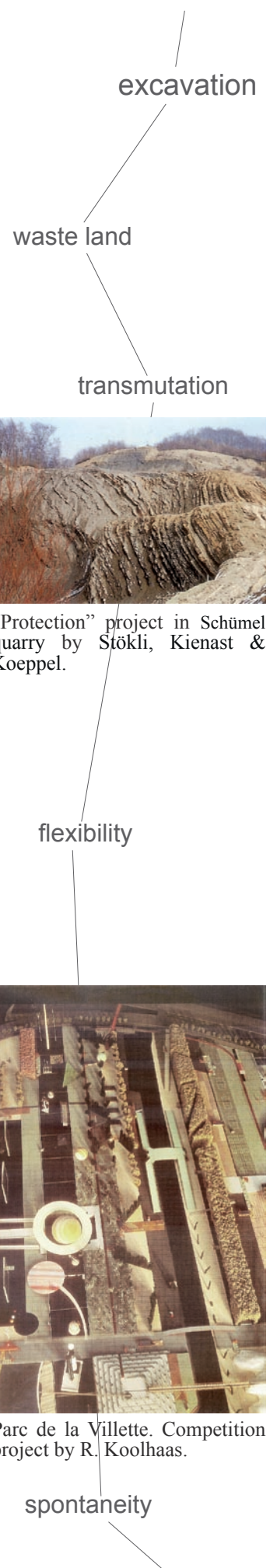
A special microclimate that developed in the concavity of the site (strong wind, temperature changes, long periods of frost in winter) on one side caused erosion and runoff, it also created new habitat in favour of new spontaneous plant colonization. The project (built in 1988 by Stökli, Kienast & Koeppel) emphasizes this natural spontaneous process merely consolidating the artificial morphology of the site and protecting the new vegetation through bioengineering and drainage techniques²⁶.

Transforming following and favouring the evolution of a place, it means also to interact with the site without interference with other possible future

24 Emphasizing the position of Chemetoff says Roger: “J’irai jusqu’à dire qu’il faut protéger le paysage contre ses « protecteurs », en soustraire la gestion, comme la création, à tous ceux qui s’arc-boutent à une conception conservatrice, voire réactionnaire, de l’aménagement du territoire. Combien d’écologiste n’ont qu’une vision bucolique et archaïque du paysage français!” Ibidem, p. 138.

25 N. Trasi, op. cit., p. 30.

26 The natural recovery of the Musital quarry, again in Svizzera, work by the same designers, it is further example.



transformation



Parc André Citroën, Paris, designed by Gilles Clément.



movement

development

processes.

The transformation in this case is synonymous of vagueness “opening and unfolding of the potential”²⁷, to plan many changes, as it confirmed the plan for the Villette park by Rem Koolhaas.

Target for “Social Condenser” is the programmatic vagueness that Koolhaas is able to implement by the stratification of different layers (grid-point-folies-line routes, zone-bands): “(the program) will be constantly revised and adapted during the very life of the park”²⁸. But it is mainly the parallel bands of east-west orientation that draw the entire park, where it focuses its main equipment (theme gardens, play areas, gardens-outdoor): “The solution by bands allows to get ‘frontiers’ among the highest number of different components, and ensures, through the permeability of each band compared to all others, future changes”²⁹.

It is again in these bands that is drawn the “third dimension”, the natural component of this park. The vegetation, which is itself part of the program is being “channelled” in certain areas, changing following the program, its degree of “artificiality,” and vegetal “composition”: from large areas (thematic gardens, gardens, educational, lawns for fun ...) to the outskirts of vegetation, to the ‘image’ of forest. If the keyword is flexibility of the program, and the plant component, it must however be subject to the rule set, through the bands of its border. Gardens in bands, but still gardens that, as recalled by the etymology of the term, are horti enclosed, fenced, “in cage”.

If in the first category, the transformation of plant component of the project is determined by the program, controlled even in stages of growth and development, in the third category, the forest, the amount of processing increases as the indeterminacy of the plant element: “the totality of trees, bushes and vines that it is composed by, it generates a continuous mass, water-resistant with a free arrangement, almost spontaneous³⁰. But the highest degree of “spontaneity” is located in the “islands” of virgin forest, patches of vegetation from the three independent systems that grow in nature “free”, scattered around the area, exception to the rules, following the rhythm of the seasons, “ephemeral as mirages”³¹, as if to reinforce, highlight by contrast, the precision of the bands.

From the islands by Koolhaas, “free” transformation of nature, the direct link is the Jardin en mouvement³² by Gilles Clément, evolution,

27 “Indeterminat in this way it gets the meaning of possible, not driven from above, self organized, spontaneous”. G. Corbellini, *Ex libris. Parole chiave dell'architettura contemporanea*, 22publishing, Milano 2007.

28 R. Koolhaas, *Il parco del XX secolo*, in Casabella, n. 492, 1983 pp. 14-18.

29 Ibidem.

30 Ibidem.

31 Ibidem.

32 “The garden in motion interprets and develops the energy on site and try as much

and movement of nature that occurs “in the process of transmutation of elementary bodies described by alchemy”³³.

Clement experienced his innovative thesis in the André Citroën Park in Paris, “a vast area that looks like a wasteland ... paradise of weeds”. Promoting the dynamism and diversity of natural vegetation, the Jardin en mouvement promotes the “movement, physical, of species prone to wandering”³⁴.

Transformation as a physical movement in which man and nature work together: man, as a gardener - who chooses which items to keep or delete - but also as a recipient of the garden, which, with the choice of the “easier” path leaves a trace on the ground, and nature that has its own preferred paths through the physical movement as wandering. “Since its creation it can be identify a series of surprises with double matrix: one is precisely due to the intervention of the public, the other by the dramatic development of the garden over time”³⁵.

The man then as a gardener who “tames the wilderness” through minimal interventions, able to accommodate the nature, to work with it without impeding its “natural” transformation to “give a framework of stability to the garden on the go ... the ideal would be to obtain a fence at the desired height without the use of heavy machinery and noisy. Simply by correcting the existing vital energy. Striving to understand it in order to convert it to our purposes. But also by respecting the tensions”³⁶.

To support the processing plant, then, to work with nature.

What does happen, however, in those places that are abandoned, marginal, where man is not cooperation, but even after he modified and obstructed the natural process, by “subtraction” of vital energy, he moves apart and

as possible to work together, and as little as possible against nature. It owes its name to the physical movement of plant species on the ground, that the gardener interprets in his own way. Some flowers settle in the middle of a path and require the gardener to choose whether to keep the passage or the flowers. The garden in motion recommend to respect the species that are setting up independently”, in A. Rocca (a cura di), *Gilles Clément. Nove giardini planetari*, 22publishing, Milano 2007.

33 G. Clément, *Le jardin en mouvement*, Sens & Tonka, Paris, 1994 cit. in Lotus Navigator, n. 2, 2001.

34 A. Roger, *Dal giardino in movimento al giardino planetario*, in Lotus Navigator, n. 2001, pp. 72-89.

“The plants travels. Herbs especially. They move in silence, as the winds. Nothing can be done against the wind. If the clouds would be claimed, it would be almost surprise to collect seeds mixed with unpredictable *loess*, fertile dust. Already in the sky are drawn unthinkable landscapes ... they move in silence, as the winds and as appropriate, who arranges the details and use all possible vectors, from ocean currents to the soles of shoes. Let’s consider the variety of meetings and the diversity of living beings like so many reasons of wealth. Let’s observe life in its dynamic evolution .. I support those energies can invent new situations that they will be probably at the expense of diversity.” in A. Rocca (a cura di), *Gilles Clément. Nove giardini planetari*, 22publishing, Milano 2007.

35 A. Roger, op. cit., pp. 72-89.

36 A. Rocca (a cura di), *Gilles Clément. Nove giardini planetari*, 22publishing, Milano 2007.

process

third landscape



Photomontages of the Matisse Park project.



Derborence island in Matisse Park located in Lille. Gilles Clément.

waste-land

biodiversity

he lets nature to take its course?

This is the theme of the *Manifeste du Tiers paysage* by Gilles Clément³⁷. ‘Third landscape’ that identifies “all the abandoned spaces, ... the remaining territory, both rural or urban, or uncultivated: the sides of the roads and fields, the margins of industrial areas and nature reserves. It is the space of indecision, and living beings that occupy it they act in freedom”³⁸, they are places where nature experiences its own processes of transformation, its ability to adapt and colonize new sites.

Places where transformation is synonymous of diversity and evolution, growth and “stronger biological breadth”.

Third landscape is the Derborence island in Matisse Park located in Lille³⁹, where nature freely takes its course, as a reception territory for biological diversity.

In the ‘Third Landscape’ “lies our biological future”⁴⁰. Clément’s appeal is to “consider the third landscape a biological necessity, which affects the future of living things and changes the way to perceive the territory and enhances places usually neglected”⁴¹.

Third landscape is therefore also places “as result of the abandonment of an activity”⁴², places that are excavated and then rejected, abandoned by man. Desired locations, created by man, but where man was consciously ousted, excluded. In these places the transformation, as transmutation, growth, biodiversity, is made only naturally. Almost as absurd, the total exclusion even of man - also as a perceptive type - from these places, the total absence of the cultural matrix, human, from the landscape, he turns them back from *paysages* to *pays*⁴³.

The interaction, man-nature in the transformation of the landscape, is therefore, by definition, always implied. There are many times and ways in which it occurs, by varying the degree of involvement of these two protagonists above.

Perhaps, in the name of economy made of effort and resources - not just economics - and in line with the principles of sustainability today so praised (claimed), the man should not only cooperate with nature by promoting the development and sometimes speeding the transformation

37 G. Clément, *Manifeste du Tiers paysage*, Sujet/Objet Edition, Paris 2007.

38 Ibidem.

39 Raised Island of 3,500 m² in a park of eight hectares, where there is not human being. On the top of this island, after an initial planting the vegetation is developed in a spontaneous way.

40 A. Roger, *op. cit.*, pp. 72-89.

41 G. Clément, *op. cit.*.

42 Ibidem.

43 A. Roger, in A. Berque, M. Conan, P. Donadieu, B. Lassus, A. Roger (a cura di) *La Mouvance. Cinquante mots pour le paysage. Cinquante mots et références bibliographiques pour le paysage*, Editions de la Villette, Paris 1999, p. 78: “Le pays est une portion de territoire, esthétiquement neutre, avant son artialisation en *paysage*”.

of the landscape, but he should take the initiative, planning future and possible situations⁴⁴, new and different uses of a territory spread over time. It would be desirable a project that can anticipate already in the planning stage, the stage (or stages) directly that follow, a program that can then pre-see new scenery of a landscape in transformation, “when the goal is the future tense, the project can be developed through strategies that govern the construction deferred”⁴⁵.

Hence the need and opportunity in landscape design to develop future scenarios, visions of transformations of a planning by stages, separate phases, processes.

Different situations may be the ones caused by tides, and the transformations that this natural process can, in cyclical phases, determined on a landscape: this is the theme of the project by Desvigne and Piano for the former quarry in the Bay of Sistiana near Trieste, where the design of a sequence of basins with a rising level from sea to the inlet of the inner bay, works with the cycles and processes/natural phenomena⁴⁶ and create a landscape that changes constantly depending on the tide, and that in somewhat it is a recollection of the waterfront and the pool of Leça da Palmeira where Siza relates land and sea.

And if, even in the planning of quarrying, it could be possible to act in advance, to work with time, by fitting in the process before, in the conception stage of the process? Pre-seen, pre-act, without separating the production process from the followed one, to be able, in the exploitation of natural resources in a full way by monitoring in advance on paper, the change, the tendency of the process and its subsequent stages?

The objective of any choice on the territory should always be the one to not hinder, not preclude the possibility of multiple, different transformations, which can, nonetheless, include the presence of humans.

This is considered the planning of mining activity at the same time with its future implications, in order to plan the flexibility, and predict the possible

44 This was a dear principle, indeed, to the Situationists that since the 50s they experimented, in contrast with the functionality at the time dominant, against the “living machine”, projects of new cities where man, freed from slavery of the capitalism and labour, become homo ludens, he would organized his own free time seeking satisfaction on his needs. New Babylon - emblematic project of their research - designed by Constant was a megastructure ipertechnological designed for a bright and nomad humanity: “Our main idea is the design of temporary rooms of life, and their transformation in a better passionate quality We must try to build situations, as collective spaces, an ensemble of impressions defined by a temporary quality Our situations will be without a future, they will be transitional places” Guy Debord, Relation on the building by situations (1957) in L. Lippolis, *Urbanismo Unitario. Antologia situazionista*, Testo & Immagine, Torino 2002.

45 N. Trasi, op. cit., p. 68.

46 “Every day fresh water will be freed to eliminate the flood deposits brought by the tide and that lets to establish in the pools the salinity gradient right for the development of the specific lagoon flora” in N. Trasi, op. cit., p. 109.

situation

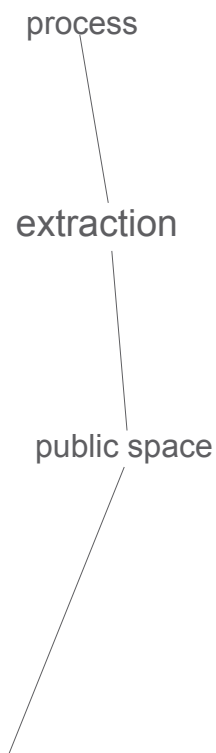
flexibility

excavation

scrap



The earthwork in Negev Desert, by S. Aronson.



different situations that can be created in a location depending on time and type of need-user. Operation this above, that it is similar to the one-cycle or re-cycles, phases present in nature.

Transformation of an extractive landscape contemporary to the exploitation of natural resources is the sense of the project for the mining of phosphates in the Negev desert by Shlomo Aronson⁴⁷.

Within a cycle production the landscape architect above re-cycle the waste, in the same site from which it was extracted, and he plans the timing and procedures for the relocation of the discarded material.

Processing and design of a place, there are planned ahead in the phases of mining, and the result, a sculpture on a territorial scale, it creates a new identity of a mining site. Transformation of a place in phases: during - the collocation of the waste is contemporary - and then post-mining, a change of the use of the place, but also the transformation of matter itself, which is recycled: waste becomes art work.

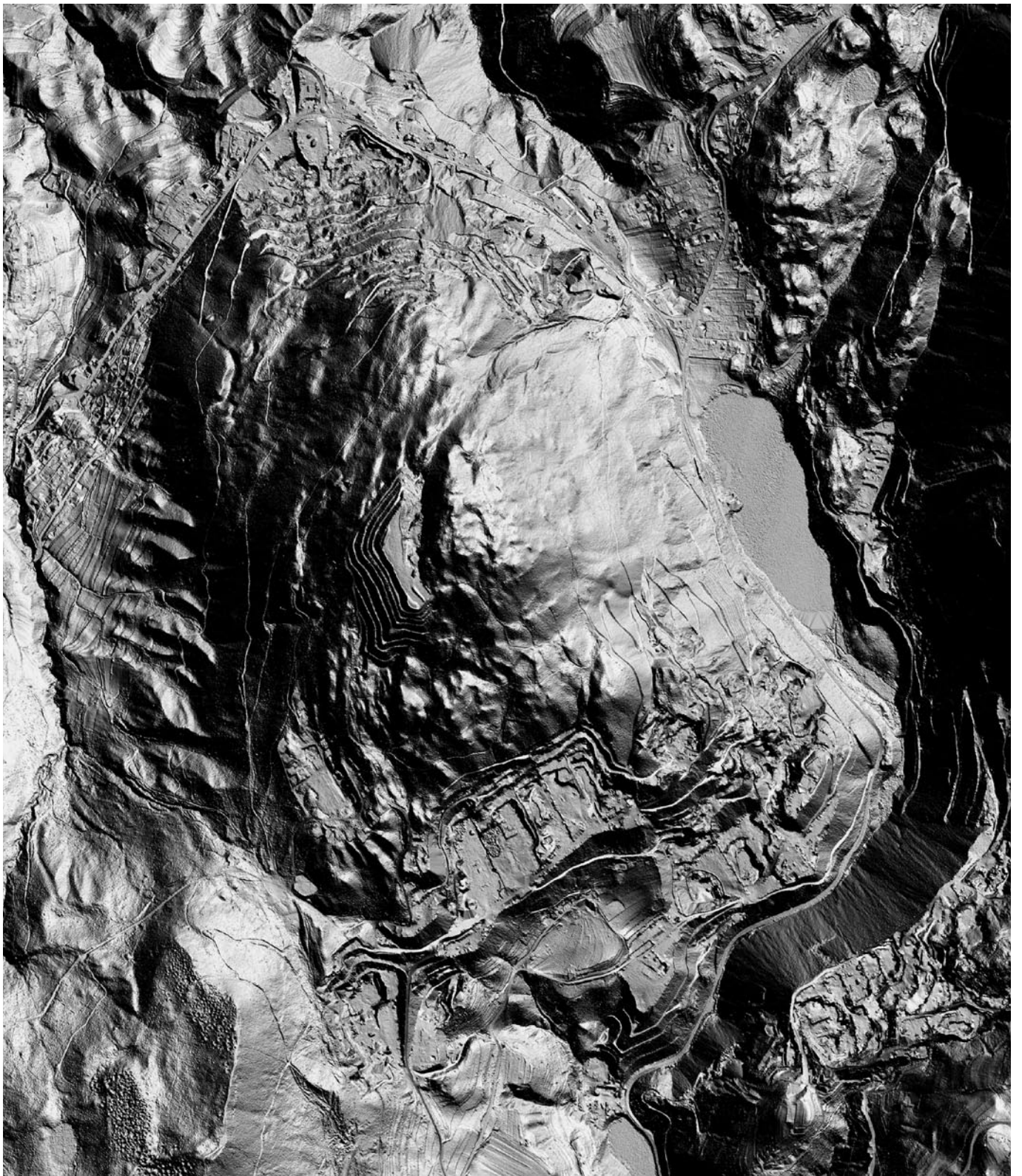
To pilot the processing by planning the type of excavation for an extractive activity, reversing its meaning, with the aim of the excavation, in a way that becomes almost more important because of the 'effect', the phase of excavation in relation to the final product, the material: this was the project by Chillida⁴⁸ for a public space, "meeting place for men of all races and colours, a large sculpture of tolerance"⁴⁹, within the Tindaya mountain in Fuerteventura.

Excavate to extract does become to create, to sculpture an useful space. The planning phase of production, corresponding - or even below - to the planning phase of a new feature when its activity has ended. The modality, the type of excavation to extract material is bound to the subsequent use of the site. It becomes more important the final phase than the initial one.

47 "I would say that it should be essential and definitely will be most efficient to have a plan for the next use of the excavated area", interview with Shlomo Aronson. Aronson S. interview. For a more detailed treatment of the projects by Aronson please refer to chapter 4 Excavation/waste/recycle, p. 77.

48 The project by Chillida sun Tindaya is taken more widely in the chapter Excavation/matter/void.

49 Declaration from E. Chillida to press on July 1996, in Kosme de Barañano, *Integrating art and nature*, in 'Montaña Tindaya, Eduardo Chillida', Gobierno de Canarias, Fuerteventura 1997, p. 83.



3D model of the landscape transformed by the extraction activity.

5.2 CASE STUDY

THE EXCAVATED LANDSCAPE EVOLUTION: QUARRYING PHASES IN THE LOCAL REGULATION

“Building means to collaborate with land, to imprint the sign of man on a landscape that will be changed forever, also to contribute to the slow transformation that is the very life of the city”.

(Marguerite Yourcenar¹)

Transformation, collaboration, land, landscape, man. These are keywords that highlight today the need to seek a balance, often delicate, between human action, design and landscape. Pressured times with which the territory continues to evolve are threaten to foreclose the many possibilities of development of the processing itself. The question is then to mend that alliance man and nature, man-land for a balanced development, sustainable, it is about to “collaborate”².

“Collaboration” is even more urgent for those sites where the transformation of a place for its productive use, especially for mining, after a use/consumption of the soil, they have not yet received their fair “reclamation”³. Even more delicate balance in a context such as the alpine one, characterized by landscapes of exceptional value, in which the land consumption and transformation/alteration of the area related to the extraction, by contrast, are even more highlighted⁴.

Transformation of the territory that requires two readings: one on the territorial scale, highlighting the changes in large-scale that mining activity has produced in the Trentino region, and processing related to redevelopment “in stages” of single parts of extraction site. A time difference between the two: the first is a transformation at a constant speed of the mining landscape that is shaped, eroded from the production excavation, and the piles of discarded material, and the second, much slower, is the transformation of a single mining site, once at the end of the activity, into something else.

1 M. Yourcenar, *Memorie di Adriano. Seguite dai taccuini di appunti*, Einaudi Torino 2002.

2 Describing the transformation of the Italian landscape Turri talks about a ‘new landscape’: “Is that of participation, the organic landscape, ... territories as large organisms crammed with signs and human functions (there will be no reason to live away from such involvement: shut themselves up in the natural spaces will be like false hermits, like men who exclude themselves falsely, because even nature is now functional space for the man in his own respect.)”, E. Turri, *Semiologia del paesaggio italiano*, Longanesi 1990, p. 163.

3 A. Berger, *Reclaiming the american west*, Princeton Architectural Press, New York 2004.

4 “In recent decades significant parts of the Alpine region were hit by intense processes of change associated with new economic potential as follows (tourism, second houses, localization of particular industries and services) ...”, in C. Diamantini, B. Zanon, *Le Alpi. Immagini di un territorio in trasformazione*, Temi Editrice, Trento 1999, p. 26.

collaboration

soil reclamation

process

Fast changing landscape and waiting landscape for ... a new identity or a new extension of the excavation boundaries.

If the first one above is clearly evident from the zenith images of aerial photos taken over the years, and with data in hand, easily confirmed by the development of the sector, post-processing activities often appears as a quarry without miners, whose alien presence seems only some ruins of abandoned machinery.

Different looks of those areas selected to receive a new identity.

It is indeed a new transformation, re-meaning, of these degraded areas, refused, the key to restore the balance with the landscape.

More than re-meaning or “transform” the chosen strategy (by the regulation) for these sites has been to “re-form”⁵, the search that is to restore the “naturalness” of the place before its transformation as productive key.

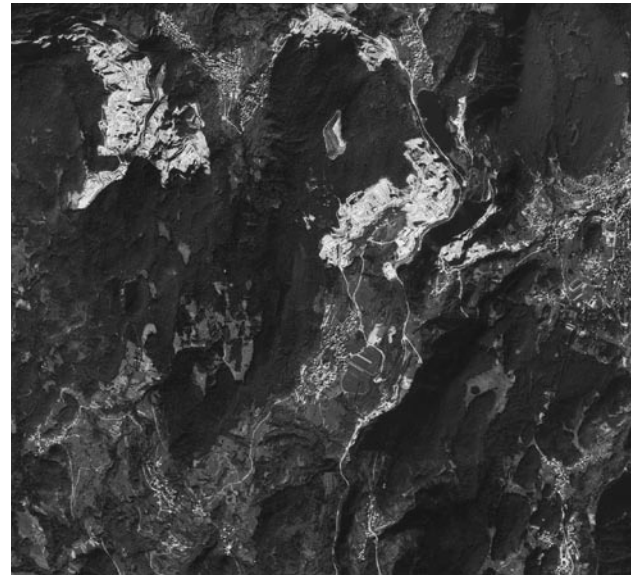
Transformation as a new identity, transformation often understood by legal instruments such as rehabilitation, re-form what has been drastically changed.

And it is in this way that also acts

⁵ “The act of re-form involves rendering present the past, looting and recycle it again. The memory is recollected in fragments and distorted by the limited capacity to remember.” Taken from N. Trasi, *Paesaggi rifiutati paesaggi riciclati. Prospettive e approcci contemporanei. Le aree estrattive dismesse nel paesaggio: fenomenologia di un problema progettuale*, Editrice Librerie Dedalo, Bari 2004, p. 41.

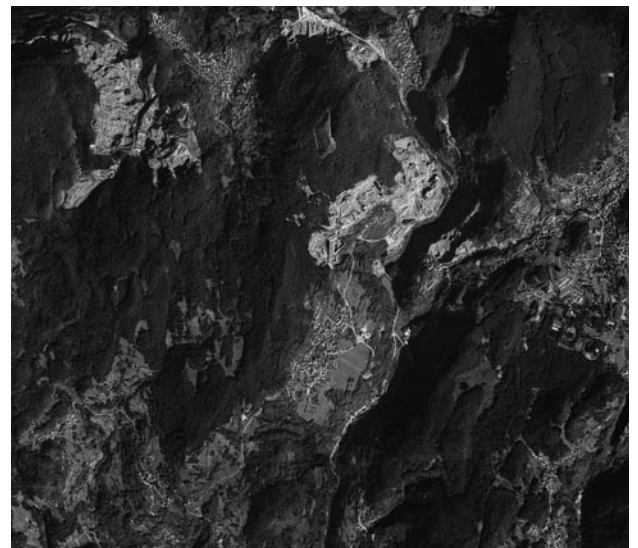
The transformation of the context during time: excavated areas and matter ‘consumption’.
The fast changing landscape.

1996



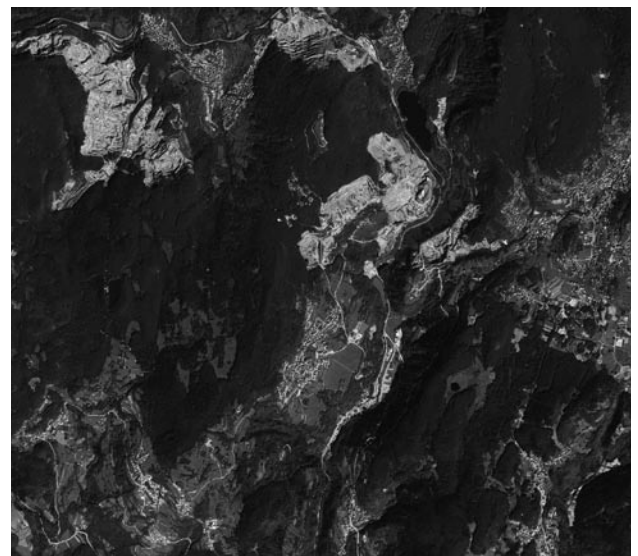
1,759,053 cubic meters extracted matter

2000



8,132,372 cubic meters extracted matter

2006



17,000,000 cubic meters extracted matter*

rehabilitation

re-form

renaturalization

as the law of the *Provincia Autonoma di Trento* for the District of porphyry in Cembra Valley. Through the Provincial Plan for the Use of minerals there are in fact provided detailed information on the perimeter of the mining and dumping areas and it is determined the amount of probable reserves for each mining area⁶.

We can deduce a particular attention, with accurate and timely data, with regard to surface areas of cultivation, cubic meters of material in reserve, to the “rational” utilization of mining areas, suggesting as criteria some implementation tools, a mining surface increase of 40%, the standardization with a greater extension of areas, of neighbors plots. The overall objective is to focus on specific areas at most (hence on continuous expansion) all the resources (excavation equipment, processing, dumping) in order to avoid the phenomenon of “dispersion”, spreading not only the economic resources but also of areas subjected to quarrying. The saying is “big and concentrated” versus small and widespread.

Fixing the limit of time for each quarrying project (18-20 years) and are given prescriptions about arrangements to be implemented on mining site at the end of its activity.

There are early indications in the “criteria for protection of the landscape” in which, in order to restore an ecological balance is suggested a renaturalization of the site through an “environmental camouflage”⁷. And again, suggesting an agricultural reuse of abandoned sites it is pointed out the goal: “a harmonious integration of this activity in the territory”⁸ emphasizing the risk of a “vigorous artificialisation the territory.”

It is assumed with regard of abandoned sites even the addition of sport and recreational equipment, confirming again the following: “The phase of strictly design will have to harmonize the structures and equipment with the morphology and signs that characterize scenically the context,

6 In Cembra Valley there are eighty extraction sites (quarries), about one million tonnes of material is extracted every year, 3,572,328 square meters of surface “to erode” and 40,250,000 cubic meters of probable material reserve, of which 64% is discarded.

7 “The re-naturalisation of the site seems an appropriate choice when the mining or dumping activity involves interest into contexts of environmental and ecological value. In these situations, there is therefore necessary interventions of redevelopment based on camouflage criteria, able to recreate as soon as possible the morphological features and of vegetable topsoil modified by mining. It is therefore necessary to provide the reconstruction of the site geomorphology adopting configurations that are in keeping with the existing as possible, avoiding excessively regular or geometric shapes, even allowing the introduction of morphological accidents in order to recreate a sense of natural”. Taken from: *Piano Provinciale di utilizzazione delle sostanze minerali*, Ottobre 2003, p. 24

8 “It is then to look for continuity in the morphological processes as in the linear elements; among them there will be brought back and reassembled those ones typical of the agricultural landscape such as trees, plants in rows, irrigation canals, retaining walls and boundary, the minor road network, too often abruptly interrupted by damage that, as well as functional, it is mainly figurative and loss of historical memory”. Ibidem p. 24.

avoiding forcible insertion of elements”⁹.

Important aspect is the obligation, sustainability index, to act on the exhausted quarries ahead: before their disposal. Already in cultivation projects, in fact, it is required the development of the restoration project¹⁰, and there where it is possible it is required to begin the recovery at the same time of the excavation phase even if, for the typical quarrying of porphyry, with contemporaries terraces, this process is - by definition - impossible¹¹.

However, even for this type of excavation is reaffirmed the principle guiding the redevelopment of the site: “In general, in the case of quarries in terraces, the environmental

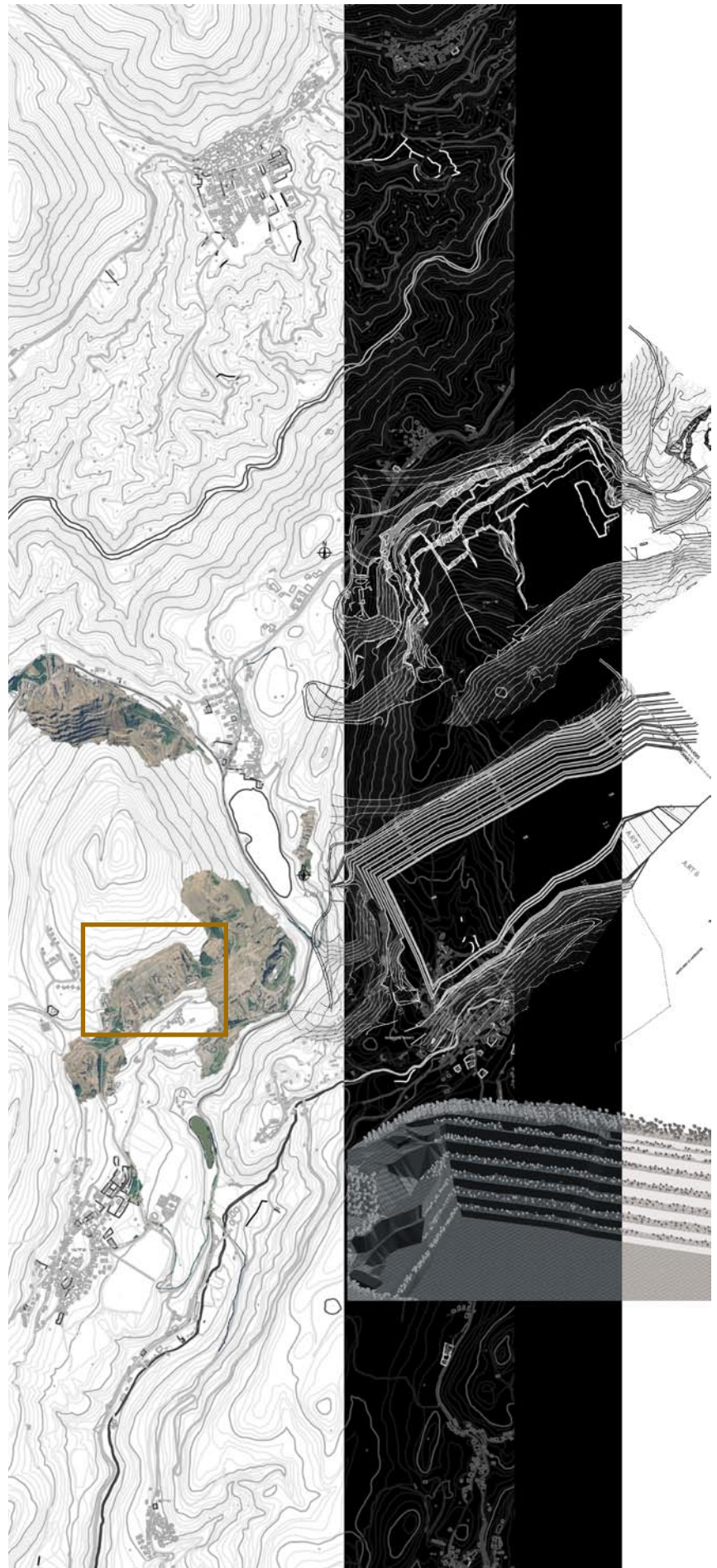
9 Ibidem, p. 25.

10 The application for authorization or concession to the cultivation of the quarry, must be accompanied by the cultivation and environment arrangement project, complete with geological expertise and with the documentation required as per art. 8 of this law.

11 “Given that the Plan provides a rational and progressive quarrying activity and environmental recovery, with some prolonged time, it seems clear that the project should provide the operational stages well integrated in time, in order to prefigure a constant feedback on the activity itself, aiming where possible, mitigating the visual and environmental impacts that typically accompany mining ...

This quarrying method (contemporaries terraces), that are generally used in all porphyry quarries, allows the simultaneous cultivation at various altitudes, and then the extraction of materials with different qualities, but it doesn't allow an environmental recovery simultaneous to the quarrying”. Ibidem p. 24.

Quarry site transformation: Fornace area. From the existing, to 2001 quarry plan, to the restoration design.



reconfiguration

re-functionalization

recovery of areas needs to be done, if possible, not following the strict geometry of the steps but trying to give naturalness. ... Upon completion of the quarrying the restoration operations should ensure the rehabilitation of the environment through appropriate reconfiguration of fronts and terraces and the planting of plant species”¹².

The plan still leaves open other possibilities for transformation of an exhausted site, delegating to the interested municipalities the responsibility to provide for and promote new uses for the sites affected: “Sometimes the morphological features of the site, or other special circumstances do not allow or make it not advantageous on the environment profile, the research of the conditions existing before mining, and can then appear interesting to see different solutions that need to be compatible with the predictions of the Town-Planning Scheme”.

Often, however, the lack of this “compatibility” directs the choice towards the most “traditional”, more “comfortable” solutions ¹³.

The indications of the plan often seem to glimpse the fear, the “ghost” of the drawing of a man-made landscape, a landscape in which the cultural aspect is by definition implicit. The objective of the regeneration of the mining landscape is, according to the Plan, to mask or even deny the previous use of land, almost to refuse, deny the economy and manufacturing decisions that have changed it.

The memory of the site, which marked its previous use and collaborated in some way to create the landscape itself, should be the schedule on which to design new spaces, new functions. As noted by Trasi confirming a Lynch’s concept, it is important that in the context of the landscape constantly changing, “the witness of history remains embedded in, understood as a reference of an evolution which, while continuing to increase the thickness of the critical landscape, not lose thread of this growth and safeguard the

12 Ibidem, p. 44. The average cost for standard “re-naturalisation” operations is of 30 Euro/square meter.

13 In Fornace P.R.G., see Art. 53 “Quarry area”.

(2) Within these areas the destination use and the types of intervention will regulated by the directions of the Provincial Plan for the use of minerals substances (P.P.U.S.M.).

(6) The mining area (*) in order to maintain free the visual analysis of the Santo Stefano Church and not to alter the conditions of the surrounding environment, it is subjected to the “ban of construction and manumission of the land”, imposed by the restraint measure. Any intervention on this area, which is oriented to the general tidying and putting sites in pristine, it is subjected to formal approval of the Superintendence for Architectural Heritage.

Art. 55 “Area of primary redevelopment”.

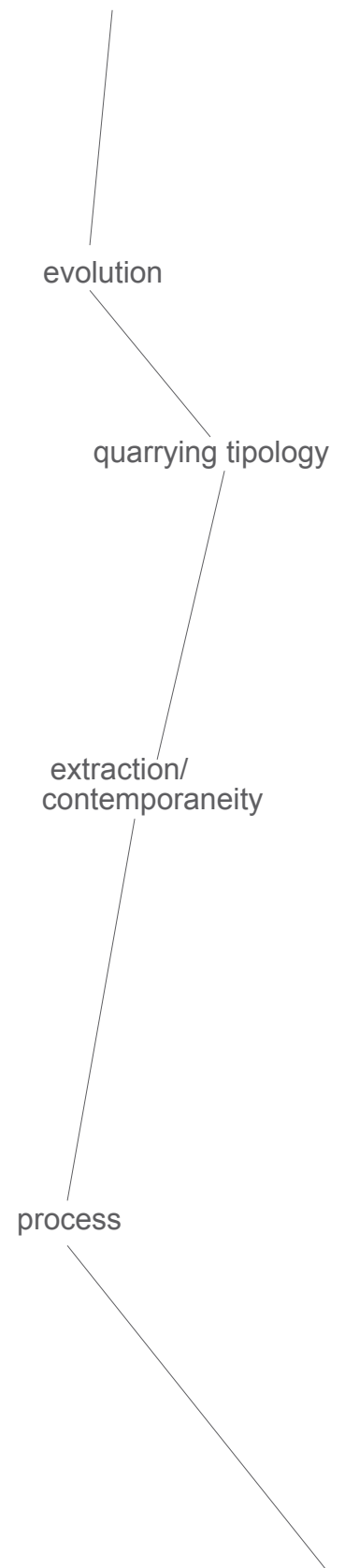
(1) The P.R.G. indicates, with special symbols, areas of priority redevelopment.

(3) These are areas affected by mining activity, whose environmental recovery will be through specific environmental restoration projects. These projects will consider all the design possibilities for a smooth integration in the existing landscape context with the seam of current injuries and visual recovery of the visual cones, consistently with the specific destinations of the surrounding urban areas.

special features”¹⁴.

Another aspect is still to be considered in the transformation of the mining landscape in Trentino: quarrying in contemporary descendants terraces on one hand it does not allow a redevelopment of the site contemporary to mining, on the other hand - especially the upper part of the excavation front - it lets the divestiture of certain portions of the plots. These are sites, often areas that are not too extensive, but with great potential for a rethinking of the mining landscape.

New use, with a single constraint, the contemporary with the mining activity. The location of the areas, their accessibility, compatibility of the new use with the adjacent excavation area will be constraints but also opportunities for landscape design of quarrying in stages, different phases. The fringe areas, cut between the plots still occupied by extraction activity, for a domino effect they start a process that in time and space involves the entire mining district. Perhaps these are precisely the sites where it is played the fate of the extraction landscape in transformation; in which transformation becomes synonymous with being a process, which requires a new definition of redevelopment or rehabilitation, no longer linked only to the memory of a bucolic natural nature, and points of arrival of a transformation, but also temporary stages of a project, an ongoing process as that of the quarry landscape.



5.3 EXCURSUS THE REGULATION ABOUT THE EXCAVATION TYPOLOGY IN TRENTINO

FROM THE ANALYSIS OF ZONING REGULATION TO THE RECOGNITION OF CRITICAL SITUATIONS.

Two normative instruments are important in order to analyse the porphyry quarrying activity: “Piano urbanistico provinciale (P.U.P.)” (province urban plan) and the provincial plan for the use of quarrying materials: “Piano provinciale di utilizzazione delle sostanze minerali”. The “Quarry Plan” (“Piano Cave”) main object is to harmonise the quarrying activity with economical goals, prescriptive rules and environmental safeguarding.

We can take into account three different keys of analysis as far as the relationship between the two regulations in the context of the Fornace-Lases-Albiano porphyry’s area is concerned.

1. A horizontal analysis regarding the different layer of the P.U.P.’s zoning (Landscape map, Invariants, Landscape protection) in the context of the quarrying activities, as defined in the “Piano Cave”. The final goal is to find the most important relationships among the areas where quarries are located, main “landmarks” and the restricted areas identified by regulations maps.

In fact, the presence of natural parks (Natura 2000), biotopics, valuable agricultural areas, historical mines near the quarrying activity and network of the Argentario Ecomuseum’s trails highlights the particular relevance of the site, and this represents a potential chance to set up a new design for the landscape extraction.

2. A vertical analysis of the different levels of territory regulations (the provincial urban plan - P.U.P., the territorial district plan - P.T.C.P., the town-planning scheme - P.R.G.).

3. Identification and specific definition of the following topics and their relationships in the “Quarry Plan”:

- typology of quarrying and prevision of the excavated product volume;
- waste and its transport;
- restoration of abandoned sites.

The new methodology of quarrying is to concentrate the quarries in few great and specific areas in order to better exploit them and to control the environmental damage caused by the extractives spread. As a matter of fact, the dimension of quarry areas has recently increased by 40% for economical and ecological reasons.

The typology of excavation has changed: in the past the dimension of the quarry steps were (30 x30) m, nowadays regulations establish (10-12 x 10-12) m. This change has determined a new image of excavated sites, therefore the design restoration has to invent new and different approaches.

For each area it is necessary to define the precise perimeter of the quarry and specify the amount of the quarry material available.

The scrap has fallen from 77% in 1994 to 64-68% in 2001. Nevertheless, the issue about the effective economic benefits related to its reuse and transport (70% of the total excavated product) to the crushing plant through the “public roads” remains still unsolved.

The provincial regulation prevision is to enhance and increase the roads network, and its main purpose is to diversify/distinguish the “production roads” from the tourist and residential roads.

In this case it is crucial to take into account the effective benefits of this proposal, according with ecological, social and economical aspects.

The importance of a rational balance between quarrying activity and environmental restoration is underlined in the subtopics “landscape environmental protection criteria” of the Piano Cave. The outcome of this process is the environmental equalization requirement of injured/spoiled areas and the simultaneous rehabilitation project during the quarrying activities.

The quarry plan does not give any precise definition with regard of the abandoned sites restoration (quarrying methods and environmental reclamations). Usually, the main goal for an environmental restoration is the re-naturalization of sites by means of a mimetic design or geomorphic regeneration finalized to recreate a “natural feeling”.

Little attention is paid to the opportunities related to different rehabilitations oriented to specific functions such as agricultural, industrial, sport or hobbies reuse. Anyway, the main issue, which still remains pivotal, is to relate the general (too general) indications about the functional reuse of the provincial urban plan with the particular rules of the town-planning scheme.

THE REGGIO EMILIA SITUATION

A COMPARISON CASE: RESTORATION OF ABANDONED SITES/ MULTIDISCIPLINARY ANALYSIS AND PLANS

The situation in Reggio Emilia province represents a different and useful approach that has to be considered. The morphological features of the quarries in Emilia Romagna is totally different from the ones in Trentino, but some indications can be taken from this example.

An important part of the “quarrying activity over regional plan” regards the “quality restorations of quarrying activity guidelines”.

A preliminary remark that has to be done is to admit the impossibility of any restoration design capable of re-establishing the initial conditions (before the quarrying activities).

The goals that need to be pursued through the rehabilitation design are the following:

- the creation of quarries compatible with the landscape;
- the creation of quarries sustainable by the natural system;
- the creation of quarries bearable by humans.

The inner meaning of these guidelines is to recognize the rehabilitation and reuse design as a new chance for the following:

- ecological safeguard and environmental “equalization”;
- economical benefits;
- public function.

In a multi-criteria analysis all these issues, with their related sub-issues, should be simultaneously analysed by a multidisciplinary group of designers in a survey for a quality plan. Ecological factors (climate, morphology, geology, hydrology, pedology, flora, vegetation, fauna, landscape) and human factors (landscape, soil use, urban planning, economy, quarry activity, reuse expectancy, property) are analysed and related in order to develop a design of quality, that is also effective, applicable and repeatable in other and different contexts.

In order to obtain the best results from this design it is necessary to plan the quarry plan and also its reuse design.

Rehabilitation design can also become an ecological, social and economical self-sustainable system if it is capable of bringing together multifunctional reuses: eco-museums, subject-parks, sport-areas...

Moreover, precise indications/specifications about the actions to be taken in order to refill empty soils and methods borrowed from the reuse design domain are given as attachments/recommendations in this plan.

In order to check the quarrying activities and assure the quality of the redevelopment plan, the “quarry territorial district plan” founded the

following:

- the provincial quarrying activity observatory;
- the provincial check-list system;
- the provincial funding for abandoned quarries.

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- the provincial check-list system;
- the provincial fund for the abandoned quarries.

SCHEDA RIASSUNTIVA DELLA LEGISLAZIONE IN MATERIA DI CAVE DI PORFIDO

Normativa di riferimento:

- L.P. 24 ottobre 2006, n. 7 “Disciplina dell’attività di cava” (*entrata in vigore in data 15 novembre 2006*)
- L.P. 4 marzo 1980, n. 6 “Disciplina dell’attività di ricerca e di coltivazione delle cave e torbiere nella provincia autonoma di Trento” e successive modificazioni - Testo coordinato (*abrogata in data 15 novembre 2006*)
- L.P. 18 febbraio 1988, n. 6 “Interventi per il settore minerario nel Trentino”
- Piano provinciale di utilizzazione delle sostanze minerali (art. 2 L.P. 4 marzo 1980 n. 6)
- Testo coordinato a seguito del 4° aggiornamento approvato con deliberazione della Giunta provinciale n. 2533 di data 10 ottobre 2003

PIANO PROVINCIALE DI UTILIZZAZIONE DELLE SOSTANZE MINERALI STATUS QUO

L’inquadramento geologico e l’evoluzione dell’attività estrattiva introducono al Piano. Il porfido, roccia vulcanica, appartiene alla piattaforma porfirica atesina che si estende nel Trentino per circa 7.500 kmq con spessori che raggiungono i 2000 metri. L’attività estrattiva nell’area della Val di Cembra accresce il proprio sviluppo dopo la seconda guerra mondiale, fino a raggiungere, negli anni ‘70, i cento siti di estrazione. Le innovative tecniche di lavorazione, ormai meccanica e non più manuale, e il continuo aumento di richiesta, sia sul territorio nazionale che a livello internazionale, hanno contribuito ad aumentare l’occupazione in questo settore (nella terza parte, quella propriamente del Piano, nelle previsioni dei consumi, si elencano alcuni dati sull’occupazione attuale: totale di 2300 addetti di cui: 1300 unità lavorative, impiegati e titolari inclusi; 200 ditte solo per la lavorazione con 600 addetti).

L’analisi degli aspetti idrogeologici (punto 1.2.2) evidenzia i possibili rischi connessi all’attività di cava. “L’attività estrattiva, unitamente agli interventi artificiali ad essa connessi (fabbricati, infrastrutture, ecc.) ha comportato profonde modificazioni al territorio anche per la parte forestale e, conseguentemente, al regime delle acque”. Ne consegue che tali rischi siano da considerare con riferimento ad esigenze e finalità di tutela e prevenzione di carattere generale e relativamente a tutto il bacino idrografico interessato. Un caso limite è quello dell’Avisio (Valle di Cembra), in cui l’equilibrio idrogeologico è molto vicino al livello di massima tollerabilità. Ne consegue che: “Ogni nuovo intervento deve essere oculatamente e scrupolosamente soppesato in relazione alle dirette influenze che potrebbe esercitare sulla regimentazione idrica delle acque. In quest’ottica un aumento eccessivo del territorio adibito all’attività estrattiva potrebbe avere immediate ed intollerabili ripercussioni negative”.

Di ordine negativo sono ancora i risultati delle analisi sugli aspetti urbanistici e paesaggistici.

La mancanza di regolamentazione in questo settore fino agli anni ‘80, anni in cui parallelamente si è assistito ad un’evoluzione delle tecniche di escavazione, la trasformazione dell’attività estrattiva da artigianale ad industriale e la conseguente espansione dell’attività ha prodotto “effetti negativi di carattere ambientale con l’immediata conseguenza della modificazione morfologica del suolo e del paesaggio”. Questo diventa ancor più evidente nell’area sinistra Avisio in cui un progressivo degrado ambientale è oggi visibile nei “vistosi squarci sui versanti delle valli, con la sottrazione di vasti territori boscati, accentuata soprattutto dalla crescente attività di discarica degli scarti di porfido”.

Un’altra conseguenza dell’espansione dell’attività estrattiva è l’avvicinarsi delle aree di estrazione e discarica fino quasi a ridosso dei nuclei urbani, con i conseguenti rischi di sicurezza e problemi di impatto ambientale, come pure degrado paesaggistico rappresentato dalle molte discariche con sviluppi superficiali molto estesi.

Di non secondaria importanza è, dal punto di vista delle infrastrutture, il sovraccarico di quelle esistenti, utilizzate per scopi altri da quelli legati a questa attività.

Una seconda parte del Piano è costituita da un’analisi storica della precedente normativa, fino alle concrete conseguenze dell’applicazione del Piano.

Dal Piano stralcio per il porfido da taglio e da pavimentazione del 1982, un piano per tutte le tipologie di materiali è stato approvato nel 1987 e, dopo vari aggiornamenti, si è giunti all’adozione definitiva del 2003.

Il Piano che nasce per “regolamentare in definitiva tutta l’attività estrattiva relativa alle cave” determina i seguenti effetti:

“consentire che le attività di cava possano essere effettuate solo all’interno delle aree estrattive individuate”;

“dettare i criteri per la redazione degli atti di competenza comunale, e per la predisposizione dei progetti esecutivi di coltivazione”;

produrre effetti sulla pianificazione comunale (P.R.G.) che per legge deve adeguarsi alle sue previsioni.

Un ulteriore strumento che ha contribuito all’applicazione concreta del Piano è stato, a partire dagli anni ‘90, la normativa sulla Valutazione di Impatto ambientale (V.I.A.)

Le conseguenze sono state una “più razionale e sicura coltivazione e la realizzazione sempre più frequente di interventi di recupero ambientale, ... e gli utilizzi alternativi di gran parte delle cave dismesse in quanto non individuate dal Piano”.

Una **Valutazione Strategica**, strumento di valutazione generale sulla sostenibilità dei programmi e dei piani, che include non solo i temi ambientali, ma anche gli aspetti di sviluppo economico, sociale, la difesa del patrimonio culturale e paesistico, è stata richiesta dal Programma di Sviluppo Provinciale (P.S.P.) - 24 aprile 2002 - insieme ad una **Relazione ambientale strategica**, sono state compiute negli aggiornamenti del Piano.

Dalla valutazione strategica sono emersi degli indicatori numerici per la valutazione del piano a scala provinciale; dalla relazione ambientale sono invece emersi esclusivamente gli aspetti ambientali relativamente anche a singole aree con situazioni problematiche.

LA STRUTTURA DEL PIANO

Nella terza parte si evidenziano i caratteri più specifici del Piano.

I criteri di formazione del Piano:

di carattere urbanistico: la delimitazione cartografica delle aree estrattive in fieri, tenendo conto del fattore economico e del fabbisogno di materiale per i prossimi 20 anni, tutelando i nuclei abitati vicini alle aree estrattive, controllando e contenendo gli effetti negativi sull'ambiente;

di carattere socio-economico: garantendo, "compatibilmente con i vincoli ambientali, il proseguimento dell'attività delle imprese ed il mantenimento dei relativi livelli occupazionali".

In particolare, per il settore porfido, l'indicazione del Piano è "orientare le imprese verso investimenti che migliorino sia l'organizzazione del lavoro sia la qualità del prodotto".

Ne conseguono alcuni aspetti **di ordine economico**:

diminuzione volume complessivo di materiale;

diminuzione del rapporto scarto-materiale estratto: da 77% del 1994 al 64% nel 2001;

aumento della richiesta di nuove aree per insediamenti produttivi in prossimità delle zone di estrazione ("E' opportuno infatti che l'attività di lavorazione sia effettuata in apposite strutture distinte dalla cava e ubicate in aree a ciò specificamente distinte");

incremento della valorizzazione degli scarti di materiale: vengono impiegati per riempimenti e per la produzione di frantumati e macinati da utilizzare nell'edilizia e nell'industria.

Gli effetti sono:

diminuiscono le aree di discarica riducendo già quelle esistenti;

aumenta la richiesta di miglioramento della viabilità con la realizzazione di nuove infrastrutture consone all'attività ("due tipi di viabilità: principale, fissa, con caratteristiche tecniche adeguate, secondaria, provvisoria, per i soli transiti di cantiere").

I "**criteri di tutela idrogeologica**" evidenziano, per le aree di estrazione del porfido, la necessità di ripristinare, in termini forestali, le aree boscate soppresse.

Nei "**criteri di tutela del paesaggio**" emergono le indicazioni del Piano per i siti dismessi: la premessa è che il piano riguarderà tutte le fasi dell'attività estrattiva - aree in corso di sfruttamento, quelle non ancora intaccate e le aree da recuperare - per ripristinare l'equilibrio ambientale.

Si definiscono, nella progettazione di aree estrattive, i criteri paesaggistico-ambientali derivanti da un'analisi degli elementi che caratterizzano l'area e il suo contesto (vegetazione, morfologia, emergenze naturalistiche, storiche e paesaggistiche) anche in relazione alle possibilità di destinazione successiva.

La scelta per ripristinare l'equilibrio ecologico si traduce in un mimetismo "ambientale" come criterio per una rinaturalizzazione del sito:

"In tali situazioni si rendono quindi necessari interventi di sistemazione ispirati a criteri di mimetismo, tali comunque da ricreare nel più breve tempo possibile i caratteri morfologici e di soprassuolo vegetale modificati dall'attività estrattiva".

E ancora: "La rinaturalizzazione del sito appare scelta appropriata quando l'attività estrattiva o di discarica vada ad interessare contesti di valore ambientale ed ecologico. In tali situazioni si rendono quindi necessari interventi di sistemazione ispirati a criteri di mimetismo, tali comunque da ricreare nel più breve tempo possibile i caratteri morfologici e di soprassuolo vegetale modificati dall'attività estrattiva. E' quindi necessario prevedere la ricostruzione della geomorfologia del sito adottando configurazioni che si armonizzino il più possibile con l'esistente, evitando forme eccessivamente regolari o geometrizzanti, prevedendo anzi l'introduzione di accidenti morfologici tali da ricreare una sensazione di naturalità" (pag. 24).

Si prevedono, in certi casi, altri metodi di ripristino compatibili con le previsioni dei P.R.G. quali:

un uso agricolo delle aree abbandonate purchè si consenta "un armonico inserimento di questa attività nel territorio" pur essendo caratterizzata come elemento di artificiaizzazione del territorio;

un uso legato alle attività sportive e allo svago;

un uso produttivo industriale o artigianale;

il mantenimento di impianti di lavorazione nelle cave dimesse;

un utilizzo della cava come discarica di inerti per ripristinare la morfologia preesistente.

E' a cura delle amministrazioni comunali il carico di un'apposita zonizzazione per la programmazione degli interventi.

Un altro aspetto da non trascurare è, nella previsione della trasformazione del territorio, la durata del vincolo di estrazione, di circa 20 anni per ogni giacimento, sfruttando le riserve di materiale probabili previste: su 4.140.494 mq di 44.250.000 mc con una resa presunta in prodotto grezzo del 39%, e l'estensione delle aree di discarica, stimate al 31.12.2002 di 343.325 mq.

na sezione importante del Piano riguarda la **delimitazione cartografica** delle aree estrattive e di discarica, a cui fanno riferimento elaborati grafici e tabelle con dati numerici - relativi alla superficie delle aree estrattive suddivise per comuni - allegati.

L'ATTUAZIONE DEL PIANO

La parte attuativa del Piano riguarda i programmi di attuazione (definiscono le modalità di coltivazione e della realizzazione di infrastrutture) a cui sono soggetti praticamente tutti i comuni in cui si estrae porfido, prescrizioni particolari per l'attuazione del

piano (in cui ricadono i casi di Albiano, Fornace, Lona-Lases), i criteri per la suddivisione in lotti e le dimensioni “ottimali” del lotto “tipo” per una coltivazione razionale (larghezza fronte cava, 82 m; altezza massima fronte cava 30-35 m; operai addetti n.10; volume annuo estratto per operaio 2000-2500 mc; distanza dalla discarica 0-2 km) con un aumento delle dimensioni delle cave pari al 40% e quindi della larghezza del fronte cava, a beneficio di una maggior ampiezza dei piazzali per la lavorazione, aumento dei lotti per le nuove aree estrattive (per una coltivazione “economicamente” più razionale), iniziative per accorpate i lotti esistenti.

Vengono elencate successivamente le modalità per la presentazione di un progetto di coltivazione che un tecnico abilitato deve presentare al sindaco del comune interessato, corredato di opportuni elaborati “idonei” per “quanto attiene alle discipline del paesaggio e della tutela ambientale”.

Il progetto dovrà inoltre prevedere il **ripristino** della copertura **vegetale** e le sequenze operative degli interventi previsti per la copertura erbacea sia di quella arbustivo-arborea.

La parte attuativa del Piano dà inoltre precise indicazioni sui “**Metodi di coltivazione e di recupero ambientale**”: “il progettista deve avere cura di introdurre le modifiche più opportune allo scopo di ottenere un integrale, corretto e sicuro sfruttamento della cava, con particolare riguardo alla sicurezza del personale, alla salvaguardia ambientale ed all’esigenza di provvedere ad un’idonea sistemazione finale del suolo da iniziarsi possibilmente già durante la coltivazione”.

Per il porfido, il metodo di coltivazione più usato e più idoneo è quello della coltivazione a gradoni discendenti e contemporanei (il gradone sottostante può essere iniziato anche prima dell’esaurimento di quello soprastante) per cui risulta molto difficile iniziare il ripristino contestualmente all’attività di coltivazione: “Tale metodo di coltivazione (a gradoni contemporanei), che risulta essere generalmente utilizzato in tutte le cave di porfido, consente la coltivazione contemporanea a varie quote e quindi l’estrazione di materiali con qualità diverse, ma non permette invece un recupero ambientale contemporaneo alla coltivazione.

Per le nuove coltivazioni si definisce come dimensione dei gradoni quella dei 10-12 metri di altezza. Le pedate devono avere una larghezza proporzionale alle alzate.

“Ove possibile” deve essere prevista la collocazione in cava degli scarti per riempimento “consentendo così un ideale recupero ambientale”.

I ripristini si attuano attraverso l’individuazione di aree da rinverdire anche esternamente alle aree di cava.

PIANO URBANISTICO PROVINCIALE: CAVE E ATTIVITA’ MINERARIA

Il nuovo P.U.P. la cui adozione definitiva è del 7 settembre 2007 rivoluziona in un certo senso la “gerarchia” degli strumenti di pianificazione del territorio prevedendo, quale suo principio ispiratore quello della sussidiarietà.

In base a questo principio il PUP diventa principalmente uno strumento di coordinamento generale fra i diversi livelli di gestione del territorio: I P.R.G. degli enti locali e i P.T.C. delle Comunità territoriali. L’accordo di programma quadro è lo strumento organizzativo che relaziona i tre livelli.

Nella cartografia del P.U.P. si trovano rappresentate le tematiche dell’Inquadramento strutturale che riporta le invarianti del territorio e il territorio consolidato a scala 1: 50.000, la Carta del paesaggio che riporta gli elementi complessi ed elementari che strutturano il paesaggio-scala 1:25000, le Reti ecologiche ed ambientali, il sistema insediativo e le reti infrastrutturali, la carta delle tutele paesistiche. Se il P.U.P. inquadra e individua i temi e la loro localizzazione, sono poi i Piani Territoriali delle Comunità che, ad una scala più appropriata inquadrono il tema e proporranno strategie, sempre in conformità con il P.U.P. Scendendo ad un maggiore approfondimento, i Piani Regolatori Generali attraverso strumenti normativi più consoni gestiranno, attraverso zonizzazioni, lo sviluppo delle singole attività.

E’ con queste premesse sulla metodologia per la gestione del territorio che si è data lettura, in questo contesto normativo, alla normativa sull’attività di cava.

Le chiavi di lettura sono due e concettualmente differenti:

-orizzontale di relazione: normativa del P.U.P. e degli altri strumenti in riferimento al contesto territoriale dei siti estrattivi (in particolare a quelli oggetto di studio). Si procede ad una identificazione del contesto e dei suoi caratteri (presenza di invarianti, di parchi provinciali, aree ad elevata naturalità da vincolare ...)

-verticale a differenti livelli di gestione territoriale: normativa del P.U.P. e degli altri strumenti (Piano Cave, P.R.G.) in riferimento ai siti estrattivi e all’attività di cava. Per valutare una compatibilità delle indicazioni ai vari livelli di pianificazione.

LETTURA ORIZZONTALE:

DALLE CARTE TEMATICHE DEL P.U.P ALL’INDIVIDUAZIONE DELLE “CRITICITA’”

La prima lettura presuppone un’attenta analisi del Piano e delle carte tematiche ad esso relazionate.

La cartografia di Piano riporta gli stessi tematismi su differenti carte tematiche.

Nell’Inquadramento Strutturale si trova, accanto alla definizione delle aree di cave di pietra in zona Fornace e Lases, la presenza di Cave storiche di pietre ornamentali, di Miniere storiche, sistemi di faglie che tracciano la vallata fra Fornace e Pinè, la presenza di sistemi dei beni religiosi a Fornace e San Mauro, un sito della rete europea Natura 2000, la presenza di un sito archeologico, oltre a ricadere, quasi tutta l’area rurale di Fornace, in area agricola di pregio.

Nella Carta del paesaggio è rappresentata la delimitazione delle aree di cave, accanto ad un limite netto di espansione dell’abitato, la vicinanza di riserve naturali e la lettura di sistemi complessi di paesaggio di interesse rurale e di interesse edificato tradizionale. L’area di Fornace sembra essere un’isola “scoperta” dalla retinatura.

Nelle reti ecologiche ed ambientali compare, in modo più precisato, la delimitazione delle aree siti della rete Natura 2000, riserve naturali provinciali e aree di rispetto dei laghi (Lases) che costituiscono le invarianti del territorio, quegli elementi d'eccezione che costituiscono i caratteri identitari del territorio stesso. (numerati e riportati più precisamente in documenti allegati).

Nel Sistema Insediativo e Reti Infrastrutturali, anche se con perimetrazioni differenti rispetto ad altre carte tematiche, le aree estrattive, compaiono in alcuni casi adiacenti a zone agricole di pregio e a zone di rispetto dei laghi.

LETTURA VERTICALE:

P.U.P.-PIANO CAVE

Premessa per questa analisi è l'Art. 36 delle Norme di attuazione del P.U.P. relativo alle Aree estrattive che nel capo 2 ribadisce la coerenza fra il piano provinciale di utilizzazione delle sostanze minerali e i principi e le norme del piano urbanistico provinciale, rispondendo ai seguenti criteri:

- a) limitare l'interferenza delle nuove aree per attività estrattive con le reti ecologiche e ambientali e con gli elementi paesistici rilevanti, evidenziati nella carta del paesaggio, privilegiando, ove possibile, tecniche di coltivazione in sottosuolo;
- b) razionalizzare l'organizzazione complessiva delle attività, considerando congiuntamente, gli impianti estrattivi, le aree di stoccaggio, gli accessi e i trasporti del materiale;
- c) coordinare organicamente le operazioni di estrazione con quelle di ripristino ambientale, assicurando il recupero dei siti minerari esauriti attraverso la rimozione degli impianti, la bonifica e la ricomposizione morfologica dei suoli;
- d) consentire il riuso per attività produttive dei siti minerari esauriti sulla base della verifica di coerenza con la carta del paesaggio e con le relative linee guida di cui all'articolo 6, comma 3.

Per i casi di sovrapposizione delle aree estrattive con i vincoli del P.U.P. si valuta la criticità di alcune aree per determinarne la propensione o meno all'attività estrattiva, e il grado di vincolo. I gradi di limitazione vanno dal divieto di insediare aree per la lavorazione e discarica (aree ad elevata pericolosità geologica, idrologica e valanghiva) e di protezione dell'area attraverso lo scavo, ad adeguate modalità di scavo per le aree di tutela ambientale (la maggior parte delle aree estrattive e di discarica ricade in "Aree di tutela ambientale": "Di norma l'esame sui progetti di cava relativi a tali aree potrà intervenire sulle modalità estrattive ma non sulla possibilità o meno di realizzare la cava"), a limitazioni specifiche nella tipologia di scavo nelle aree a parco naturale, alle prescrizioni di ripristino agricolo nelle aree agricole di interesse primario ("l'attività estrattiva può essere autorizzata ai sensi della L.P. 4 marzo 1980, n. 6 e s.m., solo qualora il progetto di coltivazione preveda modalità di ripristino delle aree tali da consentire il progressivo riutilizzo delle stesse all'uso agricolo originario").

Per quanto riguarda la viabilità: "La coltivazione delle cave interferenti con le "Strade" di cui all'art. 24 delle "Norme di attuazione" del P.U.P., deve essere tale da determinare un miglioramento della situazione viaria o comunque non costituire aggravii alle nuove realizzazioni o ai potenziamenti previsti dal P.U.P. e non deve inoltre costituire problemi di sicurezza per la circolazione dei veicoli".

PIANO CAVE-P.R.G.

Un aspetto rilevante in cui il Piano Cave rimanda alla normativa a scala locale (PRG) è nella proposta di interventi di ripristino differenti dalla "rinaturalizzazione" per i siti dismessi menzionati nei Criteri di tutela del paesaggio, -indicazioni che peraltro rientrano nella redazione del Programma di Attuazione¹ da parte dei Comuni dove questo è richiesto.

"A volte le caratteristiche morfologiche del sito, od altre circostanze particolari, non consentono o rendono poco vantaggiosa il profilo ambientale la ricerca del ripristino delle condizioni preesistenti all'attività estrattiva; può allora apparire interessante verificare soluzioni diverse che devono necessariamente risultare compatibili con le previsioni dei Piani Regolatori Generali".

Ed è appunto in questo grado di compatibilità che sono da ricercare ulteriori possibilità di sviluppo di un sito esaurito. Andando tuttavia a verificare queste "compatibilità" si riscontra ad esempio che nel Comune di Fornace per le aree estrattive si prevede secondo l'Art. 55 per la "Area di bonifica prioritaria": "Il recupero ambientale avverrà attraverso specifici progetti di ripristino ambientale. I progetti prevederanno tutte le possibilità progettuali per una integrazione omogenea dell'area nel contesto paesaggistico esistente con la cucitura delle attuali ferite visive e ripristino dei con visuali, compatibilmente con le specifiche destinazioni delle zone urbanistiche limitrofe".

5.4 REFERENCE/INTERVIEW

TRANSFORMING LANDSCAPE: THE “CAVA NORD” IN MILANO, PROJECT BY E. CERASI ARCH., 1985-...

North Park Quarry in Paderno Dugnano was created through an agreement between Local Government and the private entrepreneur. With this agreement, in the early eighties after laborious negotiations, it was granted the continuation of mining activity accompanied by the contextual transformation into a public park areas already available, since the required rehabilitation of the environment.

The first part of the park, built according to the Cerasi draft, was delivered to the public in 1993 during a concert held in the open air theater.

The multi-phases plan (that regards simultaneously the quarry activity and the reuse of disused site) is the principle adopted for the restoration project. The quarrying and the simultaneous restoration plan began in 1985 and it is still now in progress. Two service towers, an open theatre, sport and enjoyment facilities are integrated in a geometrical composition. The particularity of this project is the co-presence of extraction active machineries as an integral part.

In this case the project restoration is a “global” and harmonious plan that incorporates all the extraction phases: from the identification of the quarry sites, to a dumping area definition, to a re-thinking of inactive areas. This is a very interesting approach applied to an extraction ongoing landscape transformation.

An interview with the designer has highlighted some important aspects of the excavation-restoration process.

During the planning phase, was the requalification of the area as a public park already foreseen?

Yes. Both the fact that the destination of the area would be a public park, and that the communal administration would finance this project, had already been planned.

Did you encounter any objective obstacles due to the coexistence of the functions, cultivation and public park, from an operational point of view?

No, we did not. For this kind of cave it was the only reasonable way of obtaining pleasing results.

In the initial phases of the environmental rehabilitation the cave worker had some reservations regarding some of the morphological choices. These reservations were linked to the prejudice concerning the more economic methods of rehabilitation.

The coexistence actually allowed us more freedom in dealing with the morphological arrangement and permitted some of the formal choices to have a lighter economical weight.

For a better understanding of the process I must point out that this type of quarry works in two ways; for the extraction of inert (sand, gravel), and their disposal (inert is extracted and the area is refilled with quality material coming from elsewhere)

This allows us to arrange the refilling in a way that the project is followed without great expenditure. This wouldn't be possible if the rehabilitation were to take place at a later point. The project is much more flexible and the range of possibilities is wider. The coexistence is also an economic resource as the equipment belonging to the excavation company that allows us to remodel may not be available if the excavation has already been concluded. In that case, the service would constitute another expenditure for the population or for whoever has this role. So this way we have more liberty with the morphology and with the equipment that otherwise might not be available.

What was the procedure for the transformation project, did it interfere with the extraction process and if so, how?



Co-presence with quarrying and public function in Paderno-Dugnano extraction landscape.



The great lake with the artificial fall.

Actually there were some interferences. We have a general project which dates back to 1985 and projects of later variations, developed for the various authorizations for the excavation.

The project for the cultivation is not a rigid fact determined once and for all. There have been various phases of authorization, of which a recent one was unblocked last year.

So there is a general project which guided the executive projects of the single subsequent elements. Additionally, there were some unexpected delays in the authorization of sections of the later excavations which conditioned part of the executive project. For example, at one point, an old communal disposal site was discovered, and this strongly conditioned the design of the north-east area. This was one of the causes for a variation to the project in the year 2000-2001.

Often, regarding the excavation, some authorizational procedures intervene. For instance, the excavation of the whole area at once was not permitted.

Some trading of areas between the excavator and the municipality, who is proprietor of some of these areas, determined some of the conditions of the rehabilitation phases. From these phases, new physical conditions of the asset emerged.

There is a stable element according to which the executive projects of the single parts had to adapt themselves consequently. It's as though there were a rule which the local projects subsequently followed.

How was this type of innovative intervention considered by the various commissioners and how important was the collaboration with the public administration?

Assessing the experience, we recognize that although initially the rehabilitation project seemed to be quite a commitment for the excavation company, given that it involved great movements of earth, it actually in time provoked higher credibility for the authorization committee (Region, Province, Municipality), and guaranteed results.

This is an innovative element. In Lombardy, this kind of project remains a singular experience for gravel pits, so we ask ourselves why this was not more closely followed.

I, as a designer and work manager, recognize that the administrators who inaugurated this virtuous project showed themselves to be much more far-seeing than their predecessors.

There was a long term trust that I found hard to find again. Although today we can see the results (the modeling of the lake is coming to a conclusion) of twenty years of work, there isn't the same enthusiasm and investment of energy from the administrator as there was in the past. Actually there are



Geometric design in the park.



Masterplan of the 'Quarry Park'.

some economic setbacks regarding the municipal administrations.

How would you describe the fundamental moments of the project in terms of the commitment and responsibility, also financial, of the various subjects?

I intervened in two successive phases with different competences: the modeling design of the ground and the design of the final elements and furnishings that complete the project.

The cave-worker carried out two ground models according to a general project, after which many of the architectural project works that were carried out, for example the theatre, the pavilions, the facilities, the piazzas, the furnishings were all were financed either by means of excavation rights or by the contract managed by the municipal administration, which however only takes over once the cave-worker has finished the remodeled areas.

The cave-worker is conventionally expected to carry out forest or plant replacements less delicate than those carried out by the municipality, which are usually more similar to acts of gardening.

This process with two consecutive moments, given the honesty and kindness of the excavation company and the initiative of the work director, has always been completed but hasn't always been coded well in terms of the procedural structure. When it comes to the contract, the relationship regarding the three subjects (society, municipality and designer) is very difficult.

Which were the most important milestones of transformation in the project?

There were many and they can be divided into geographic areas. One of the first steps was the project for a waterfall and for a stream that flowed into the first lake (which came from a secondary canal of the Ticino river), to prevent evaporation.

Once the first lake and its dams were completed, we proceeded from west to east. In each of these phases there was one linked to the modeling of the ground and then the realization of the buildings, the retaining walls for the soil and the walking paths.

In terms of extracts of this phase, there must have been at least ten determined by the progress of the rehabilitation work, by the availability of the administration and by yet other elements. There were various milestones and for each geographic area there were the two phases of modeling of the ground and of the finishing constructions.

How many milestones a year?

Never more than one. By this we mean the combination of the two moments of modeling and completion. The modeling of the ground has a very long

timescale, after which come the finishing constructions, which were never more than one a year.

At what point is the project of the park?

Now we are at a point in which the areas opened and used by the public are about 60-70% of the entire area, whereas the modeling of the ground covers another 20-30%. The next openings are expected within the coming 4-5 years, in which we believe to conclude the entire circuit around the big lake.

So in total it has had a twenty year span

The project was started in 1985 and will probably be finished by 2014-15, but it's a project that continuously grows as there are still many things under discussion that could lengthen the time span.

Is the public use compatible with the excavation? Does it act as a disturbance for the public?

No, for two reasons. Firstly because the excavation is being carried out in an area far from those that are public. Basically, there is a treatment plant for inert which has remained in the same position, but the supply for this plant was made up of transporting conveyor belts which circulated around the plant, going to various zones to collect, and this has undergone a fan-like movement in an anticlockwise direction. So the first aspect is that of different zones which are far from the areas of public use.

Secondly because many of the constructions and many of the areas have the objective of acting as screens which mean the construction sites are visually and acoustically isolated from the areas that have been opened to the public. For example there is a structure covered in plants that screens the area in which the supplies for the park have been located.

As a variation to the original project, it was decided to move a 400-500 metre long conveyor belt to a new position in order to screen the public areas more. In addition, the cave worker accepted to build a tunnel that further conceals the conveyor belt. So the answer is that there is no disturbance because of the distance between the areas and because some considerations were made that allow further separation, elements which actually became strong components of the design of the park.

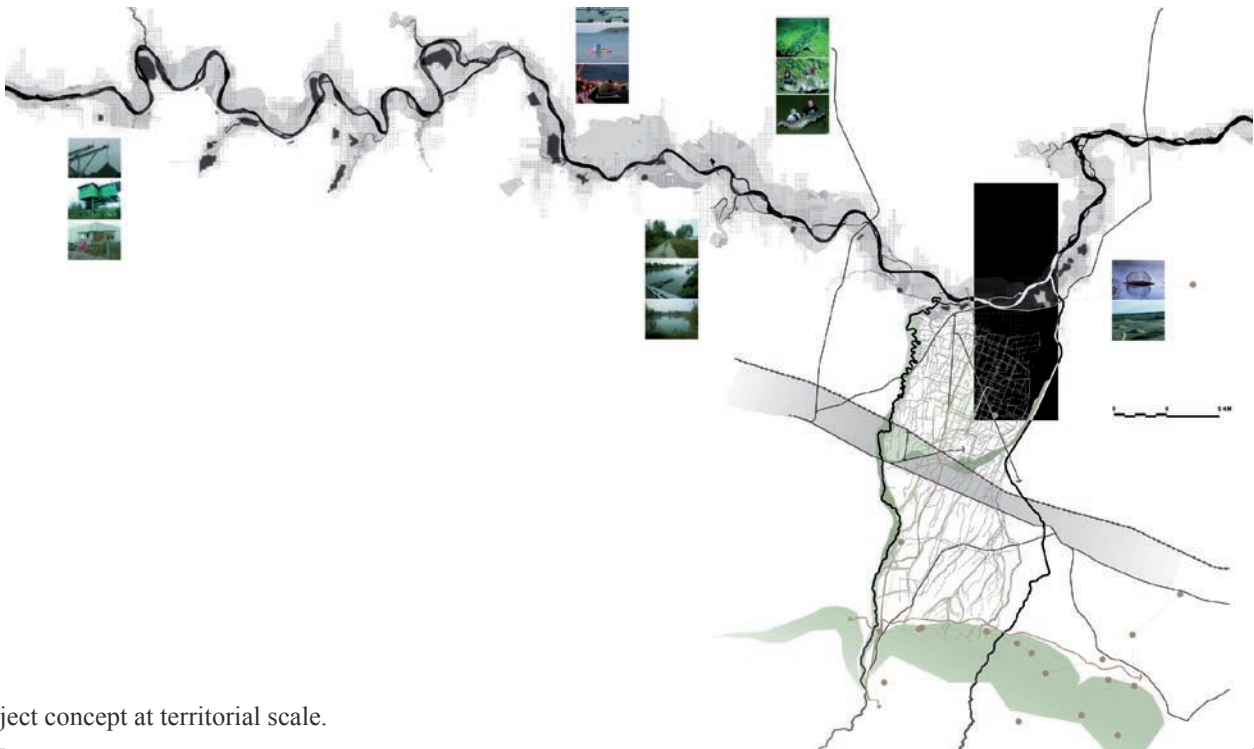
Is it possible, in your opinion, to hypothesise a project of excavation in which the excavation, as a preventative project, becomes a means of designing the landscape, that is, the requalification project?

This is not the case of the north quarry. The economic drive for the whole

process definitely comes from the extraction process, and this could never have been different. If there weren't an activity that produced an income, the rehabilitation would not be possible. The rehabilitation is ensured in part by the excavation rights and in part by the responsibility taken on by the cave worker, which can only be supported in virtue of the main activity. These were kept separate.

I think that this would be more suitable in mountain quarries in which the morphology of the excavation determines the form.

Yes, in fact they are two very different typologies. In addition there are very precise constraints (for example one cannot excavate further than a certain depth due to possible contamination of the ground water). In the other case the limits of excavation are predefined, yet both have the objective of maximising the volumes of excavation.



Project concept at territorial scale.



Gravel production along the Po River.

5.5 EXPERIMENTAL PROJECT “PAESAGGI LIQUIDI” COMPETITION PROJECT, 2008¹

The transformation of a disused mine, the search for a new identity, new functions in parallel to a redevelopment of the landscape was the goal of the contest promoted by the Province of Reggio Emilia for the disused mining sites along the Po River.

Transformation as a synonym for flexibility, different uses at different times was the theme pilot that wanted to be experimented in the competition.

An archipelago of quarries deep mark the landscape of the river Po.

Concavity as result of the extraction and machinery for the gravel works, they dot the riverbank and the peri-fluvial area. Subtraction and bordering areas with the urban area. It is in this land of margin, timeless realm of the quarry, where the regular alternating planted poplar trees and wetlands, and where the brave venture fishermen, who play “the states” for the redevelopment of the River Po.

¹ Research group “Cave Valle di Cembra”: prof. arch. C. Battaino, arch. E. Schir, arch. L. Zecchin with the collaboration of the ing. F. Cavaliere, arch. R. Nicchia.

The question that we wanted to answer was how these places affected by the quarrying of gravel pits often inaccessible to the community could be transformed into usable space. How to combine extraction and river restoration, production activity and sports-recreational functions? Soil consumption and sustainability?

People have realised that this might be possible creating a dialogue in the transform of the site the real protagonist of this landscape, the great river. Transformation of quarries, then, but in relation to water, water basins formed in the concavity of the ground after excavation, but also the river water flowing and moving. River transformed in cycles, and changes its course during the seasons, which grows and becomes dry during the winter and summer months, and it sees around also the transformation of its enjoyment.

And it is on a process of transformation in different phases and cycles that it was decided to work for the rethinking of this extraordinary context. Processing related to the use, the possible functions that can redevelop these altered sites. Transformation bound to the use, the possible functions that can redevelop this altered sites. Transformation that takes life from the water itself, the River.

The opportunity, in fact, arises from the presence in the collective



Revalued pit.



Gravel machineries along the Po River.

[AUTO]COSTRUZIONE
COSTRUZIONI MOBILI



CORRIDOIO FLUVIALE | ZONA PERIFLUVIALE ? / ZONA DI MARGINE | AREA URBANA

Project schematic sections.



Project photomontage at the area.



imagination of the local coastal communities and in reality, from the Silurus issue. Allochthonous fish, from north, not appreciated on the tables of the Italians, the Siluro is a monstrous predator in the river Po. Into the embankments of the great river, from the Ligabue's songs to the associations battles pro and against the Siluro, this fish is a true hero. Promoter of alternative tourism that comes from northern Europe - where the fish is estimated if not protected - the Siluro proliferate thanks to the high temperature of the water - 20 degrees - and it even represents the 27% of the total fish fauna of the river. Feeding mainly on native fish, already threatened by eutrophication, the Siluro is a serious threat to biodiversity. Hence the proposal to transform the former and active quarries, large basins formed by the soil removal, in landscape basins that interact with the river. The landscape of new siluripedi. Around them it develops a new life, that of the sturgeon, an antagonist of the Siluro, which will be reared in ponds artificially oxygenated by a dense grid of Limni: first phase of transformation. Limni fueled with solar energy produced by the "brush" rooted between water and land. The Po will be oxygenated and regenerated by the extension of the wetlands inhabited with halophyte vegetation and human activity centred around the new

siluripedi. Generating basins of sport and entertainment activities. Activators of events. The general strategy provides for the DIY structures/cells for the regenerated landscape.

Like nocturnal bodies, points of a constellation, lanterns/nocturnal moths that illuminates the dark, modular cells, repeatable, modular, mobile, they mark the peri-fluvial area. Belvedere, cabins for fishing, recreational rafts, centres for teaching about the River Po, nomadic and temporary residences are located on water, along the river and in basins.

They rely directly on the ground or on stilts or float in the air, suspended. Cranes and conveyor belts, used exclusively to the quarry active or abandoned, they become instrumental in the construction and moving of “regeneration” cells. Compact and numerous, as “generated” continuously in river landscapes in transformation, they fluctuate widely and scattered throughout the peri-fluvial area. And what about the Siluro?

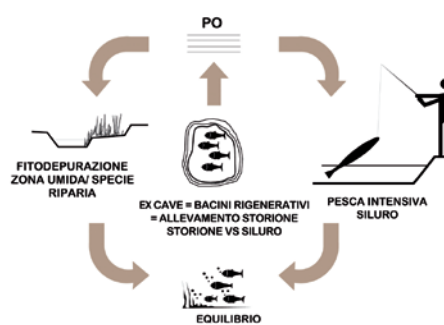
Among the sports and recreational activities promoted in the territory, there will be sponsored races and fishing trips of the torpedo. Siluro wanted: second phase.

The Siluro measures, with its size as a wanted criminal, the transformation/innovation of landscape. Thus the circle get closed: from the depopulation of the Siluro, from the Po, to the reintroduction of sturgeon in the

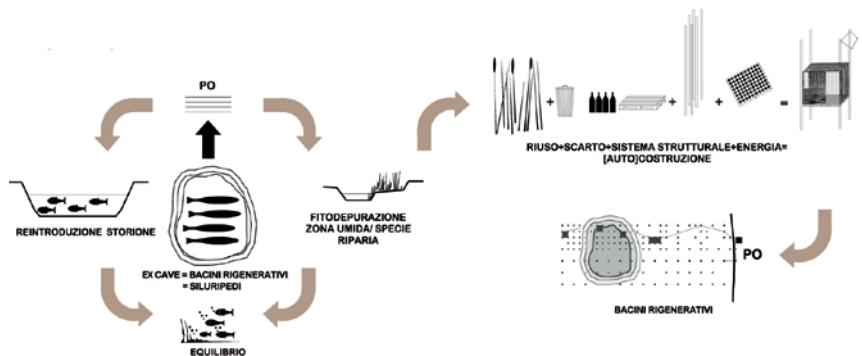
EXISTING



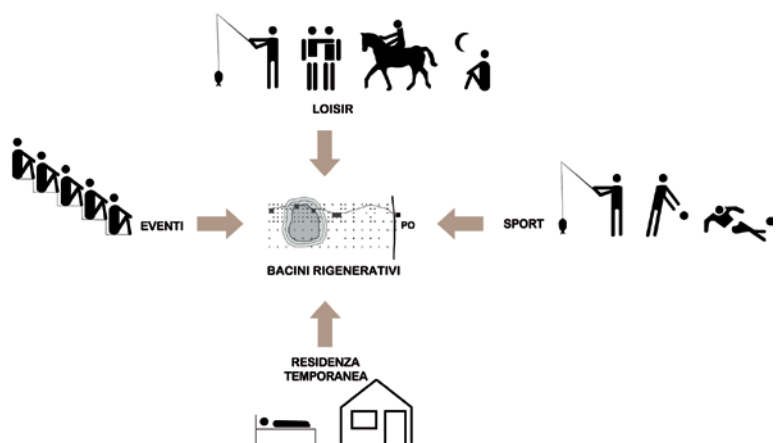
PHASE 1



PHASE 2



PHASE 3



Transformation phases of the mining landscape.



The *Siluro* fish.

great river: third phase of an ecological/functional cycle.

At the end of the process the transformation of the regenerative basins in “new siluripedi” for farming and fishing for *Siluro*, for sport, tourism, educational: fourth phase.

As natural cycles, the transformation of the mining landscape along the River Po is activated through its own water by calling into question the ecological problems which, exponentially, are generating a dense network of cultural-recreational-sports activities for the community that like this recovers its river.

Ecological and cultural redevelopment of a site, then, as paradigm of a mining landscape in transformation.



Project masterplan.

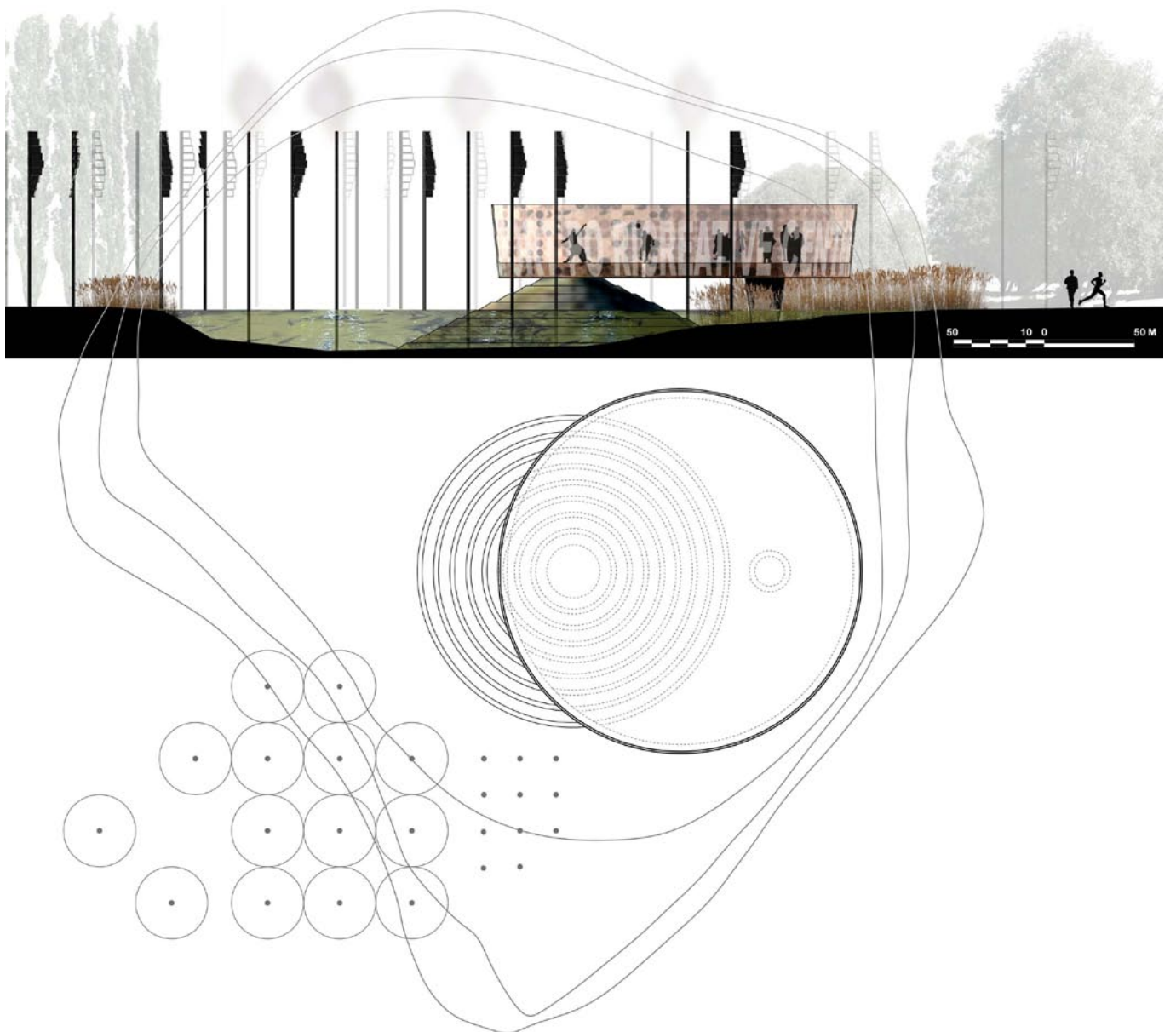
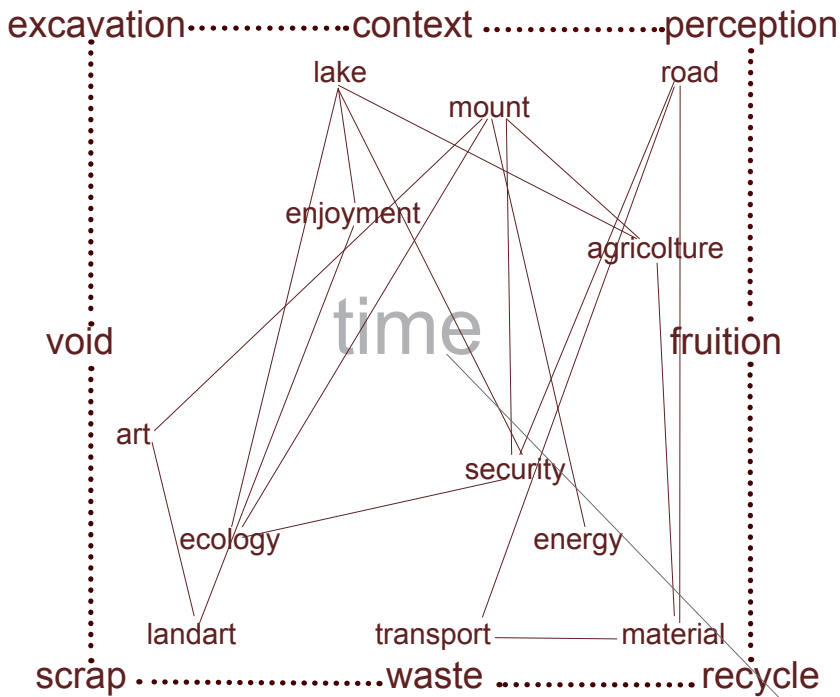


Image of a landscape generator basin. Belvedere, cabins for fishing, recreational rafts, centres for teaching about the River Po, nomadic and temporary residences are located on water, along the river and in basins.



6. CONCLUSIONS

6.1 TRANSFORMING LANDSCAPES

“... if there are people working in the mountain, why wasn't I going to do it? There are lots of people who work in the mountain extracting the rock without knowing that when they take the rock out, they are putting space into the mountain. Why shouldn't we be able to direct them and carry out a sculptural work?”
 (Eduardo Chillida¹)

These are the words that best summarise the importance of a “prior act” of planning that as a project² is able to anticipate and predict the transformation of a landscape whose evolution is as rapid as that related to mining activity, and that is able to produce new scenarios and implement them.

So which are the scenarios for the extracted landscape?

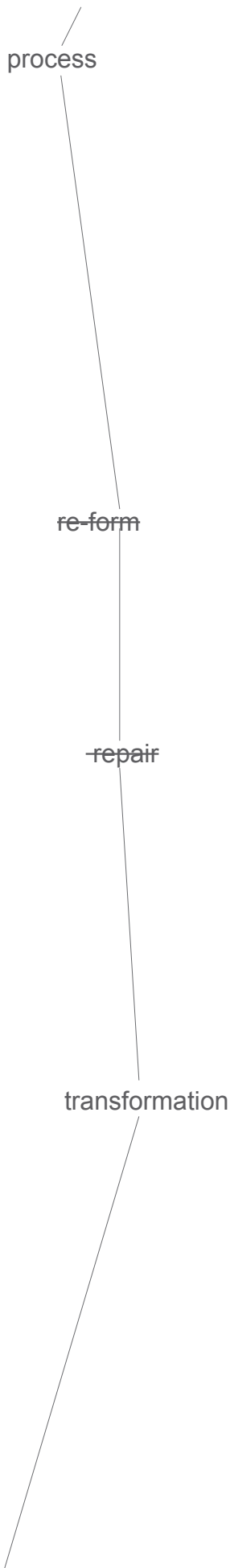
Some preliminary remarks are a necessary for the interpretation and design of this landscape.

It is important to recognise the irreversibility of the mining process. That

transformation

¹ E. Chillida in Kosme de Barañano, *Integrating art and nature*, in AA.VV., ‘Montaña Tindaya, Eduardo Chillida’, Gobierno de Canarias, Fuerteventura, 1997, p. 83.

² From Latin *proiectus* = forward thrown.



is, to recognise that the marks that mining leaves on a territory are not only indelible but, as a result of an entropic process that transforms the landscape's definition, should not be hidden nor camouflaged.

These signs are regarded as traces that have stratified the landscape, as evidence of history and use of a place³. This means - from an operational point of view for the site redevelopment - recognising the impossibility of restoring the area's topography to the way it was before its transformation, and so attempting to maintain, and not hide or set in place signs and wounds that define its identity⁴.

This is in order to consider the landscape - which is subject to an activity that exploits the natural resources, so all the more reason - as subject to continuous transformation and thus evaluate the project for the landscape as an intervention that could interfere and interact with this process (Lassus): therefore planning a mining landscape through a project of processing that is divided in distinct phases, where words like restore and redevelopment are no longer linked to a nostalgic image of a pre-existing "bucolic" landscape.

Following this view stated above the disused mining site becomes a stage, albeit important, for the transformation of the mining landscape. The very meaning of the terms redevelopment and restoration take on a different qualities, more linked to the phases of the process than to its conclusion. Again, this is to replace the terms re-form and repair with the term transform.

The scenarios, the transformation provisions of the mining landscape, must be generated due to a prior knowledge of the place. In order to read this place and its context - intended as specific part of a landscape - it requires knowing how to interpret it as a system consisted of elements and connections between these elements (physical and not). It means tracing the weft that it is made of, in order to weave seamless new threads, new elements with new uses.

The interpretation of the landscape then takes on value useful for a project: the landscape already has written in its code the terms "con-text", "future", transformation.

This landscape design should be able to be part of the transformation without creating breaks or discontinuity in time.

It is not, thus, to award the landscape of mere aesthetic value, but to heal those synaptic connections that often a heavy processing of/on the territory have interrupted.

3 K. Lynch, *Il tempo dello spazio*, Il Saggiatore, Milano 1977.

4 This realization leads inevitably to a "rereading" of the regulatory apparatus there where it defines restoration modalities - related when possible to the previous site morphology - or where it promotes the recovery through the re-naturalisation of the site as the most appropriate action for a redevelopment of these abandoned sites.

Hence the importance of a methodology capable of coherently reading and interpreting this type of landscape in order to avoid misunderstanding.

The methodological tool of the matrix, such as text, system and representation of the landscape, may facilitate this interpretation, highlighting the characters but also the potential.

This potential can be looked for in various fields and disciplines such as art, land art, as well as agronomy, ecology, architecture, bioengineering, etc..

If time and processing underlie the very concept of landscape –forming the microstructure of the matrix - to act in advance can mean to be able to deepen the study in text and narration, to be able to anticipate its continuation and development, to control it and work with it and with its transformations. The more evidence is collected on the field through the analysis of the place, the more “connected” the transformation project will be.

Also, the higher the knowledge of the process, its timing and rhythm, the better the insertion of a new sign, a new word in the context of the mining landscape.

There may also be multiple reading layers and interpretations of the landscape-matrix system: it is again a way to “relate to ...” in a context and a precise time that determines the consistency and effectiveness.

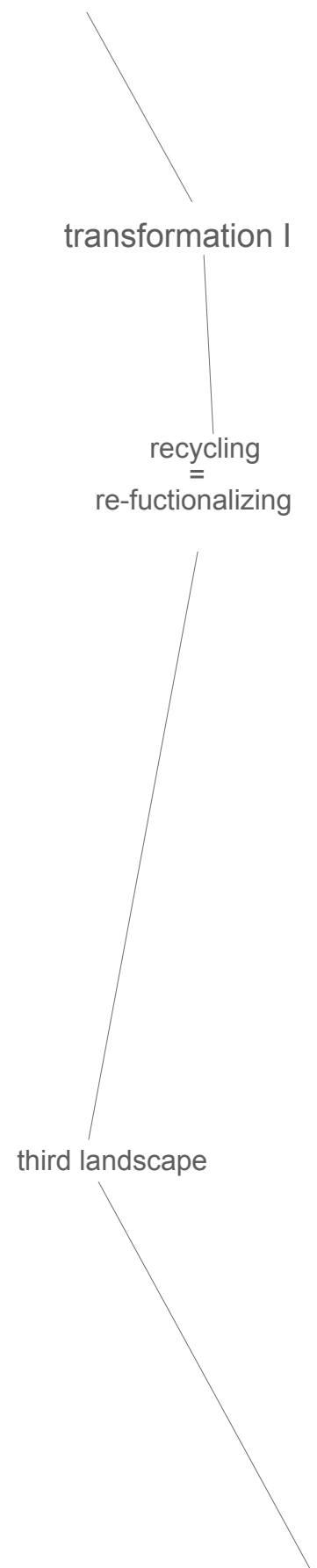
Different readings produce different scenarios of transformation for the mining landscape. The transformation can only apply to a different land use at the end of the activity - a project of recycling - or can come to constrain the entire mining process to a new use.

The differences are determined by the manner and the extent to which they operate on place and time or the phase in which they occur in the mining process. Procedure and timing that are gradual, if the work on the quarrying and regeneration project increases, as a Matryoshka system - inserting and overlapping each other – manage to involve the entire mining process.

THE RECYCLING LANDSCAPE PROJECT

A first scenario for the mining landscape perhaps, unfortunately, the more “traditional” one is bound to the possibility of intervening on the mining process only after the total redundancy of its business. In this case the project - working “afterwards” - is aimed to recycling the degraded site. This project aims primarily at containing the damage caused by an activity that is often planned with the sole objective of a maximum yield. The regulations at a national level, sensitised by the risks of ecological and environmental damage, are currently working in this direction⁵.

5 G. Gisotti, *Le cave. Recupero e pianificazione ambientale*, Dario Flaccovio Editore, Milano 2008.



transformation II

in progress

contemporaneity
of excavation

in transition

It is mostly with this logic that the regulations in Trentino operate: ecology and environment are the watchwords for the redevelopment of abandoned sites. The ecology, which is often translated into an environmental rehabilitation in the true sense of the word, promotes a re-naturalization of the altered sites by planting and greening without often predicting and encouraging public use. The risk is that of “*ambientalizzare*” the landscape, expelling man who, together with nature, is actually part of it. A new scenario in this context could mean to verify the possibilities and compatibility of the context with a public use of the “recovered” site, different or at least contextual to the “re-naturalization of the site”. It would mean to reclaim⁶ and to recycle those sites owned by municipalities for the community, that were for a long time precluded from any type of public use, except, perhaps, simple visual perception. The reading and consistent interpretation⁷ of the characters and the potential of the site could determine its design and function.

It may also fall into this scenario the transformation of some abandoned areas where human intervention is limited to securing an excavated site, leaving nature to take its course, transforming and creating new ecosystems, favoured by the high degree of entropy that has developed in the “degraded” area. This is Clément’s *Tiers paysage*, whose degree of human use, if any, is by definition only visual. But even if this “wasteland” becomes an object to gaze at, and if its wounds and engravings on rock and soil are laden with aesthetic and “artialisé”⁸ value, the scenery of this transformation represents the landscape as it appears, ‘embellished’ without any need for further intervention.

THE LANDSCAPE IN PROGRESSION

A second scenario is possible if the planning binds the redevelopment of the excavated landscape to the mining activity in progress.

These restricted areas will be subjected to and involved in this and, in consideration of the type of excavation (e.g. simultaneously descending terraces), they will be the first to be released from mining activity (most often the areas located at the summit of the mountain quarries where the quarrying has started) which continues in adjacent areas⁹. In this context, the new transformation - partially relative to the entire plot - will simultaneously involve the mining activity and a different use of the

6 A. Berger, *Reclaiming the American west*, Princeton Architectural Press, New York 2004.

7 The keys of an interpretation can range from the art world to the one of renewable energy.

8 A. Roger.

9 The goal of redevelopment simultaneous to the excavation activity also appears in Trentino regulations, even if it is difficult considering the type of excavation by simultaneously descending terraces.

redeveloped areas.

The present scenario is that of an evolution by stages that expands and progressively covers the entire landscape. The image is that of a landscape in progression, which develops between things (the activity in place) and at different times (landscapes in transition). The project will then have to anticipate already while planning the mining activity, the phase (or phases) that follows, therefore the progressive stages that assess the timing and modalities of redevelopment during the mining process; “when the goal is the future, the project can be developed through strategies that govern the deferred construction”¹⁰.

Transformations for places and for different time intervals, which otherwise fail to intertwine with the cycles of the mining process, employ the essential method of close cooperation and harmony between designer, contractor and government (client in the design for a new use).

An example to everyone in the national context is the project by the Cerasi Office that, since 1985, has been transforming the mining landscape in Paderno-Dugnano (Milano)¹¹ into a large public park.

The new destination of the abandoned areas is tied, again - invoking the procedure for recovering the first scenario - to the topographical features (accessibility) and use (linked to the context of “vocation”), as well as to the compatibility with a new contemporary use of mining activity.

THE PREVENTIVE LANDSCAPE PROJECT

If the project succeeds to interact with the initial planning phase of the mining activity on the quarrying procedure (site selection, digging plots limits, etc..), it will be able to constrain the type and morphology of the excavation; in this way it will be possible, *à la manière de Chillida* - in Chillida’s way - to act effectively in advance in order to prevent. Returning to Chillida’s words, they speak about how to foresee a subsequent different use of the context and to invert the logic of the excavation, so that it is no longer the ultimate goal but the means to transformation while creating a place¹². In this way the project of the mining landscape becomes an preventive project, as it anticipates and prepares a future plan for the site. Preventive and also capable of not precluding or impeding the future transformation of the landscape.

The idea is that of a landscape “under construction”, meant as a construction site, that has undergone extractive treatment and is “for ... awaiting” and

10 N. Trasi, *Paesaggi rifiutati paesaggi riciclati. Prospettive e approcci contemporanei. Le aree estrattive dismesse nel paesaggio: fenomenologia di un problema progettuale*, Editrice Librerie Dedalo, Bari 2004.

11 Refer to the interview chapter fifth..

12 This procedure and opportunity of action is feasible in those contexts (mountain quarries) where the type of excavation strongly determines the site morphology.

transformation III

preventive

under construction



preventive project

instrumental to a new site design.

The “site timing” is dictated and calculated from the material reserves to be extracted and the rhythms of the mining process. This waiting is in sight of a future change in favour of a new usable landscape.

These phases are those of the progress of the given landscape in distinct stages, but in this particular case the processing is faster and less costly in terms of resources and energy, and may be limited to a single change of intended use.

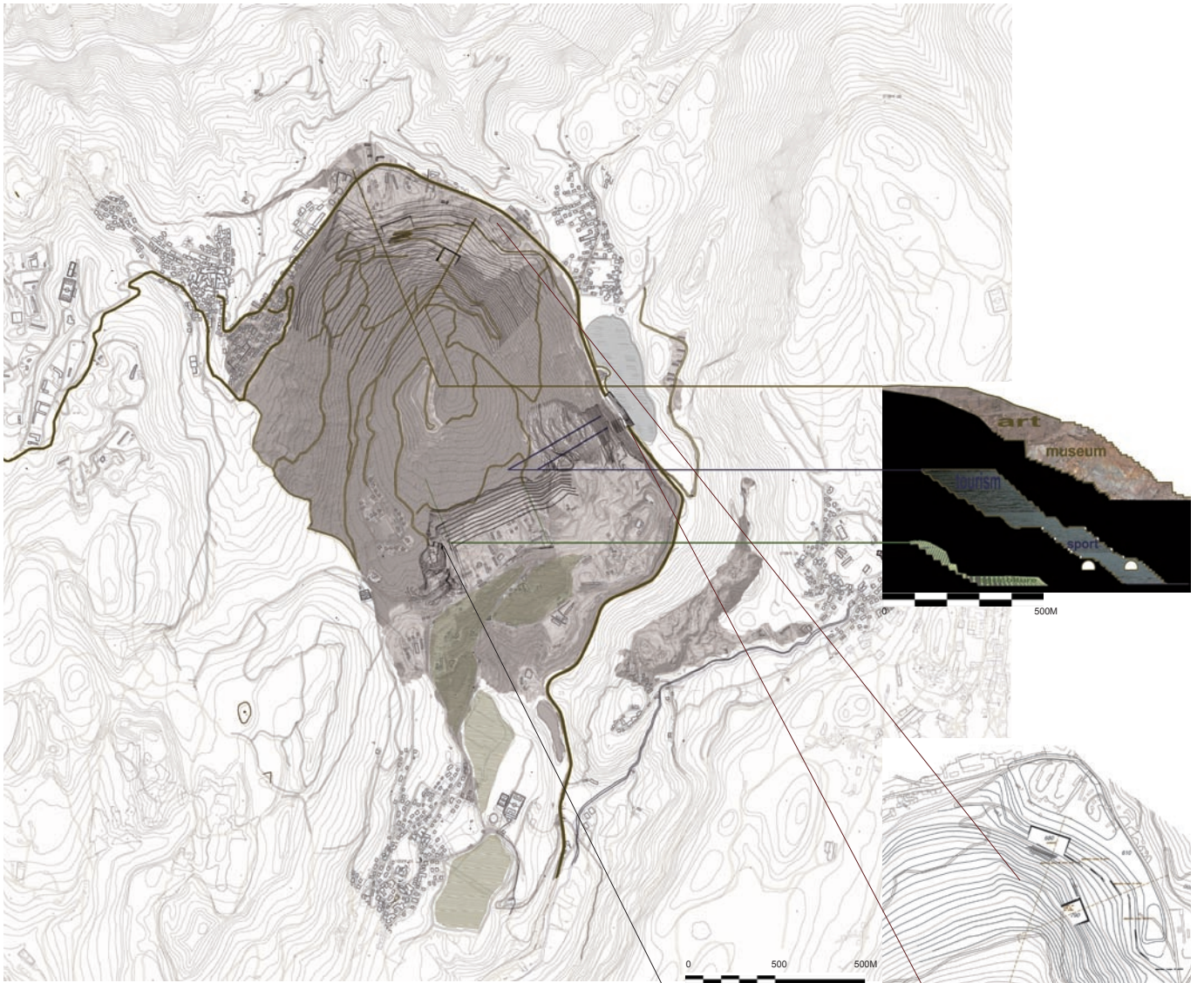
Excavation has to create and not destroy. In overturning the “logic”¹³ of the excavation the result, the “removed” material that must be taken away from site (you can define “discarded” as non-functional to the construction of the new site identity), becomes an additional “value” for the subtraction operation of material. In this logic - and perhaps exclusively - the enormous impact of the discarded material on the extracted volume (for the porphyry it corresponds to 70%) assumes a different burden: the ultimate goal is no longer linked only to the exploitation of natural resources.

How to excavate, carve and build?

If safety and greater yield of material are the watchwords - and perhaps the second, in the name of other values, allows the possibility of further “play”- it is still up to the subjectivity of the planner/designer to decide how to excavate.

Again, it will be the interpretation of the landscape and the reading of the context that guides the choice: topographical features and potentials of the context (usability) will shape the new profile of the mining landscape. The mining landscape then becomes a preventive landscape.

13 The different logic of the excavation also changes the cost-benefit valuation from the concessions to the restoration costs, changing the “value” of each element in the supply chain mining production.



6.2 PILOT PROJECT FUTURE SCENARIOS OF THE PORPHYRY TERRITORY IN TRENTINO

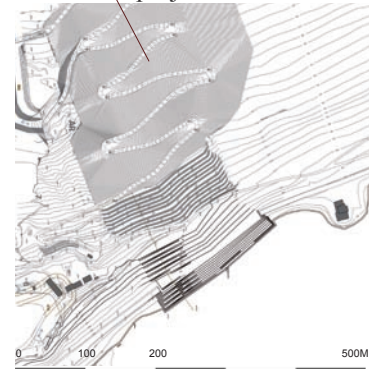
From these considerations derive some scenarios for the porphyry landscape in Trentino in the context of the three quarry areas of Albiano, Lases and Fornace. These mining areas, thought of as a system, can become an opportunity for a re-meaning that can cover the whole territory of the porphyry in Trentino.

The idea constitutes a system of areas physically connected by a single mining mount, the *Gorsa*, and infrastructure that unites them, the S.P. 76 and its continuation towards east, the S.P. 71.

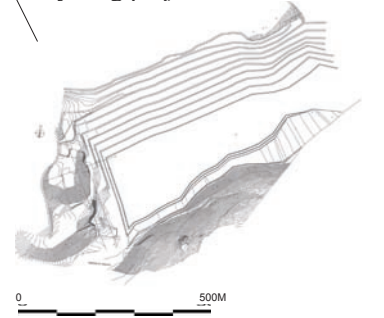
What are the readings and the interpretations of this context?

The words that translate it are related to signs, characters, uses of context and their interrelationships.

Preventive project in Albiano.



Recycling project in Lases.



Preventive project in Fornace.

LASES:

R E C Y C L I N G
LANDSCAPE PROJECT.

Lases has a known reputation for tourism. Especially in the summer the lake is a popular destination for tourists and locals. The lake, however, has a downfall which is the lack of beaches, free space around the sides for better enjoyment and reduced exposure to the sun in the afternoon.

The regulation of the surroundings of this lake confirms and protects the presence of a biotope¹.

This lake is enclosed between the slopes shaped by historical porphyry processes (*le chipe*) on which lush vegetation is engaged (third landscape) and represents an environment full of aesthetic value (*artialisé*).

The Lases area shows, however, also to be critical. That is, the creation of a system of reinforced land on the northern slope of Gorsa Mount. The goal is to

From the quarry site to the new reuse morphology: the extraction landscape transformation. 3D model views.



Existing



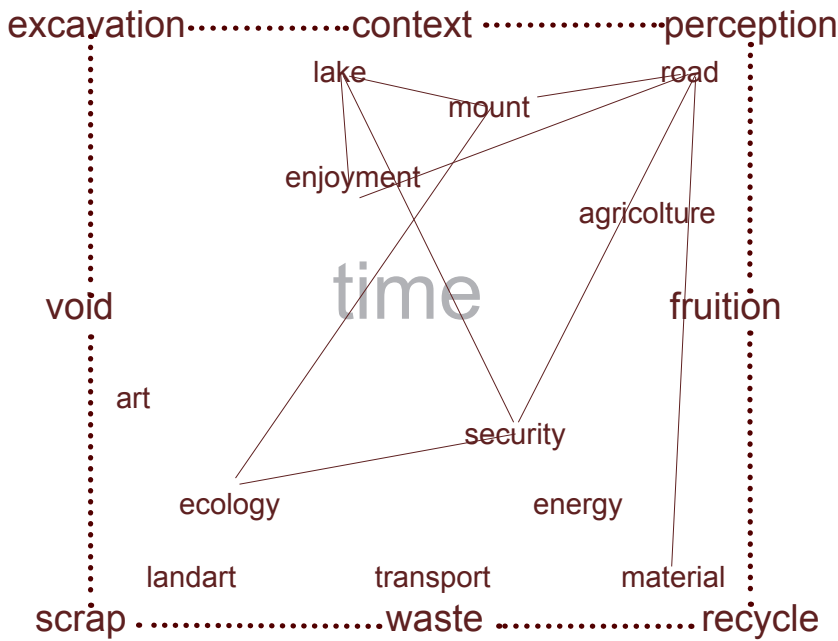
Prevision of the quarrying plan (2004)



Prevision of the 'preventive project'

¹ The biotope Lona Lases includes three areas spatially separate and very different considering their environments. These three areas that form the biotope are the marsh of Lases, Val Fredda - with ice holes - and Palù Redont.

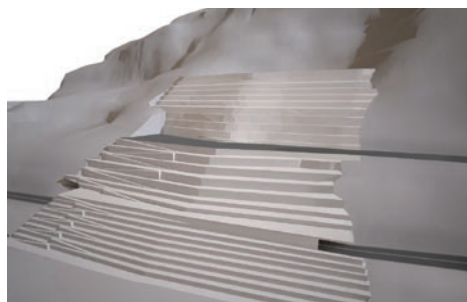
Lases quarry area



recycled landscape



existing



recycling project



Monte Gorsa-Lases.

Re-functionalization of the site: ecocorridor/security work/tourist equipment. Scrap reuse as building material.

assure safety from landslide danger, but a sophisticated tool for monitoring eventual ground movements intimidates people that are concerned about a “new Vajont” disaster.

Perhaps an “adequate” pre-excavation planning would have avoided this problem. An intervention/recycling project of the site could include the construction of a tunnel at the base of the reinforced land. If such can contribute to the security of a portion of road from landslides, it becomes a “device” for better lake enjoyment and the construction of recreation facilities.

Terraces descending towards the lake with areas for free time will mark the lake front (security-tourism).

These tunnel-terraces would function as the single ecological corridor linking the Gorsa Mount to the lake biotope (tourism-ecology). It becomes a recycled landscape which recycles the discarded material from the first elaboration of the porphyry for the construction of terraces. (Lases as a place for recycling and tourism, ecology, safety, Lases as recycled material through

the reuse of waste).

One hypothesis of a preventive project, thus acting on how to excavate, could interest the continued removal of the summit (already begun) of the Mount Gorsa along the north-east profile to increase the amount of daylight on the lake and attracting more tourist use (in duration).

ALBIANO
R E C Y C L I N G /
P R O G R E S S I V E /
P R E V E N T I V E
LANDSCAPE PROJECT.

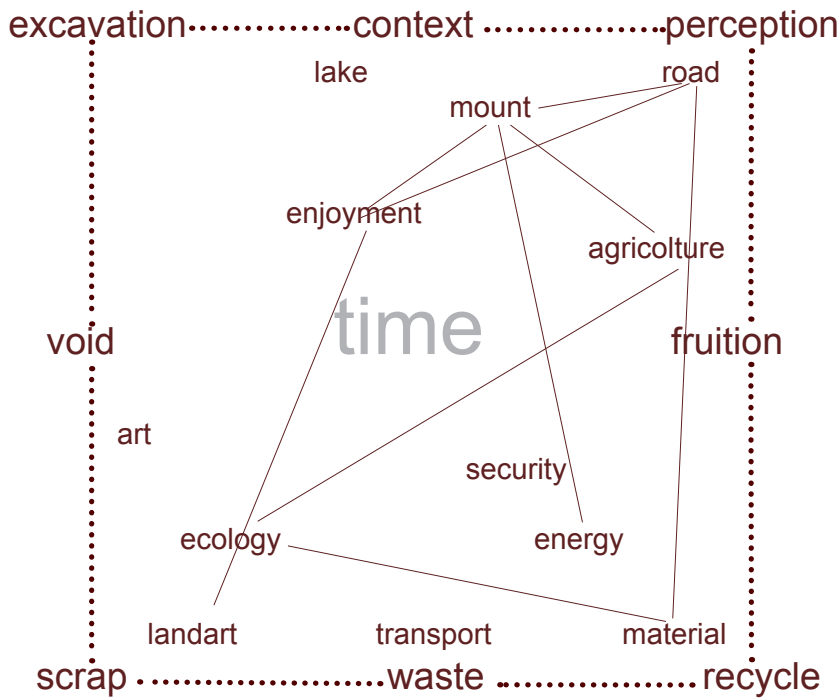
In reference to the mining area in Albiano a keyword to designate to the potentials is eco-museum, and therefore nature, art, culture and history that physically materialise into a dense network of trails, paths that branch into the quarry areas (where, they are interrupted). Another keyword is visual perception. Indeed, the mining area in Albiano, which acts as a logistic hinge area between Cembra, Adige and Valsugana Valleys, presents in the mining site of the Gorsa Mount its focal vantage point, that is, an exceptional viewpoint.

The connection between the eco-museum pathways - one of which is the thematic path

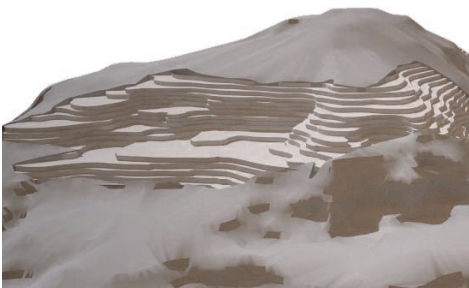


Lases: the transformed landscape.

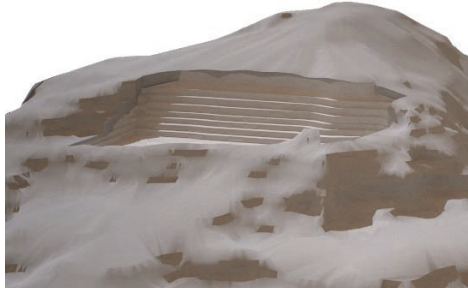
Fornace quarry area



progressive landscape
 recycled landscape



Existing



recycle project



Fornace: photovoltaic system in the upper desused steps contemporary with the quarrying as per 2004 plan.

through the historical mines and porphyry quarries - and the points of observation/outlook on the valley are clearly perceptible. A new use for the excavated area, managing to tie in the manner and type of excavation - preventive project - is conceivable by modelling the shape and size of the steps that achieve a panoramic terrace and result in the continuity of the eco-museum's thematic paths. Ramps and paths between the terraces favour the descent from the Gorsa Mount towards Lases Lake and connect with other thematic paths of the eco-museum (visit paths to the biotope).

FORNACE RECYCLING / PROGRESSIVE / PREVENTIVE LANDSCAPE PROJECT.

The area facing the *Valsugana*, Fornace, has a topography unlike other areas, that makes it a suitable place for planting and viticulture. The valuable farmland surrounding these quarry areas and the excellent exposure to the south east are witnesses of this condition. The position, easily visible from the road that leads to the Pinè plateau (tourist destination), is a showcase of these areas

in the Trentino landscape (indirect tourism).

In this context, a preventive intervention could act on the morphology of the site by changing the proportion of the steps (enlarging them) and facilitating vine cultivation.

An agronomic survey² has confirmed the potential and vocation of this area for the cultivation of two particular types of wine varieties: Müller Thurgau and Chardonnay. The altitude (700 meters) and the excellent exposure (south-east) appear to be compatible with the plant of these varieties above.

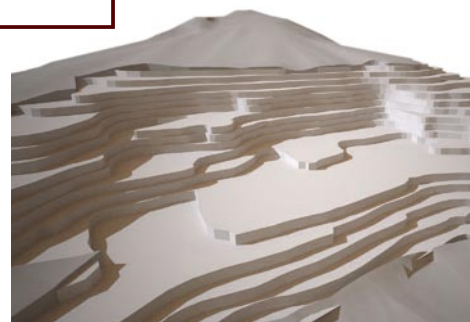
If we add the ability to reuse the grounded waste residues (sand and silt)³ and a mixture obtained by the recycling of household compost as soil conditioner and/or inert or active substrate (waste of the scrap), not only will the soil characteristics be improved, but also the development cost of the plant⁴ in the name of ecology and sustainability will be

2 The survey was conducted with the help of the agronomist M. Bottura from the Agricultural Institute in San Michele.

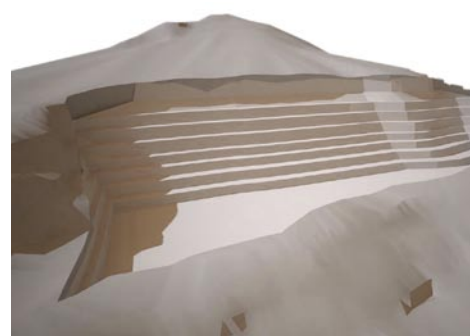
3 A study conducted by ing G. Sglavo from the University of Trento is moving in this direction.

4 Approx. 15,000 Euro/Ha.
146

Fornace quarry area



Existing



Preventive project in Fornace quarry area.

New quarrying typology (new step dimension) with the goal to create viticulture terraces.

phase 1: 0 year



phase 2: 6 years

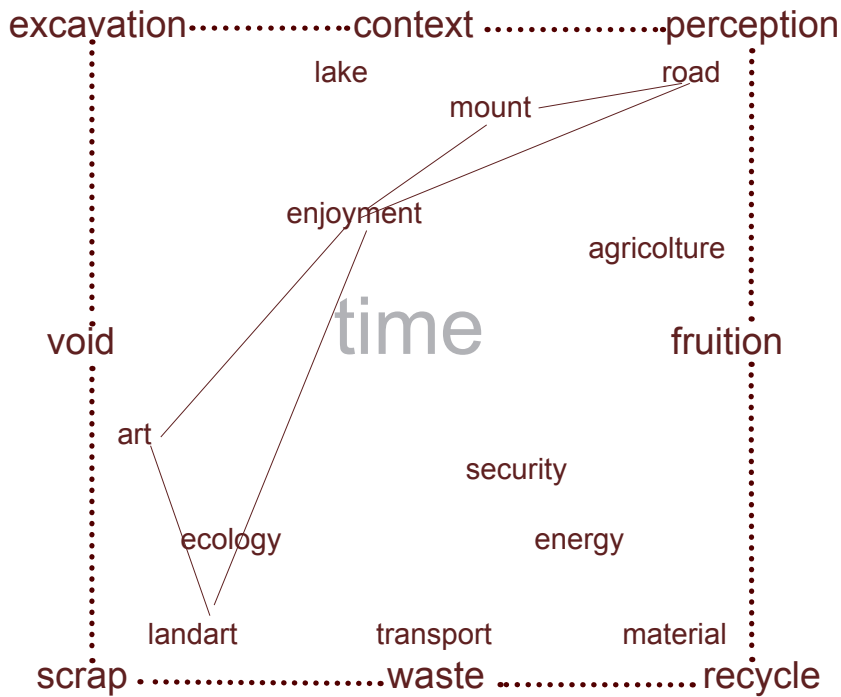


phase 3: 9 years



Progressive phases in a preventive project. The site morphology is determined by a previous plan that considers the progression of excavation/reuse.

Albiano quarry area



phase 4: 15 years

phase 5: 18 years



substantially reduced.

In fact, the physical and chemical characteristics of porphyritic rock (which allows to warm up quickly), granular porphyry (which improves soil porosity and permeability) and trace elements present in the quartz porphyry (silica which corresponds to 74% in mass) favour the plants growth and appear to be optimal conditions for the vine cultivation⁵.

Another scenario for the area in Fornace, assuming the interaction with the mining process in progress - landscape design in progress - may be to take advantage of the wonderful sunny climate and so include a photovoltaic system⁶ that is able to “compensate” the inhabitants of Fornace for the mining “noise” (this act

5 The type of land for the plant requires a medium mixture with 30% sand, 30% silt and 40% clay. To enrich the soil it can be expected the growing of legumes. (which promotes the transformation processes of organic matter and could promote the development of subsequent crops)

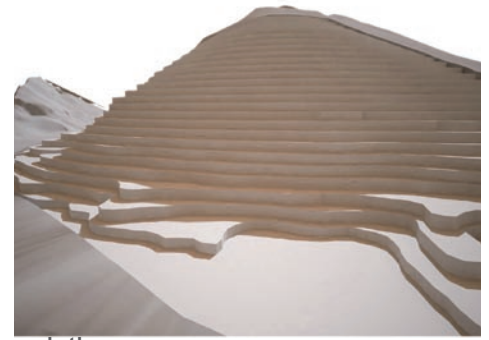
6 The recycling cases of an excavated site for the production of renewable energy are numerous and with well-established efficacy. The first installation in disused quarries in Trentino was made in Carano (Valle di Fiemme).

could be compatible with the vine cultivation). This indirect usability of the site, therefore, is linked to the energy that it produces.

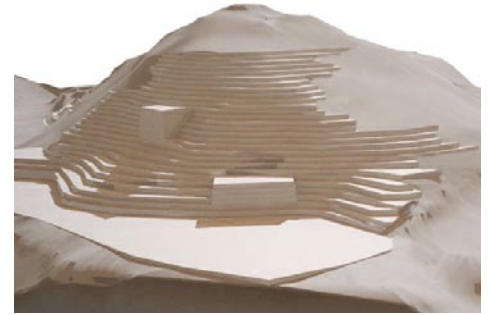
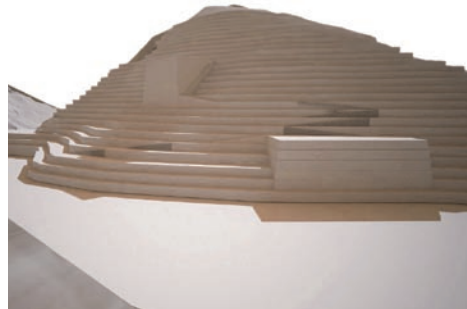
Albiano/Gorsa Mount quarry

Preventive project in Albiano quarry area.

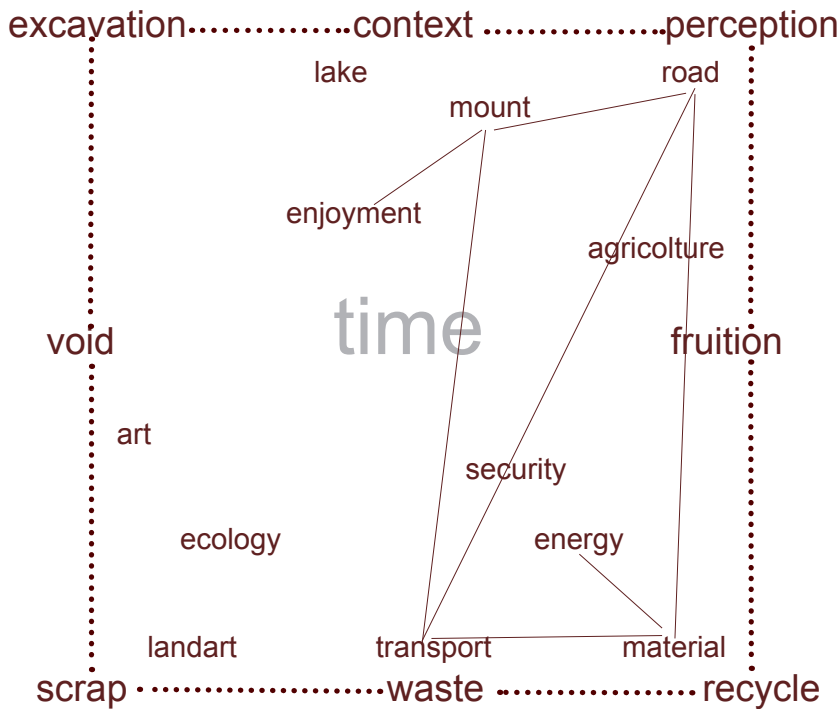
New quarrying ty-pology (new step dimension) with the goal to create terraces-belvedere as continuity of the ecomuseum network.



existing



Future scenario of the Albiano-Monte Gorsa quarry site.



THE ALTERNATIVE SCRAP TRANSPORT.

A further survey on the mining landscape in Trentino highlighted another criticism: the damage caused by the waste transport, calculated as extra costs of 1,311,390 Euro per year. While the administration is moving to contain the damage with the construction of new infrastructure (Torchio variant), which is however inconclusive for traffic congestion on the S.P. 76, one wonders whether it would be more advantageous from an economic and ecological point of view, the creation of an alternative structure, such as a conveyor belt⁷ whose effectiveness has already been tested for long periods of activity and in various regional contexts (with articulate morphologies): from the Negev desert to the Jamaica forest, to the closer contexts of Austria and Switzerland and in Italy, although for lower stretches. The wide use of this alternative transport system has seen a continuous evolution and development over the years.

In the mining context of Trentino, we could hypothesise the realization of a conveyor belt that transports material towards the infrastructure in the valley. This would leave from Albiano and have intermediate collectors

⁷ A precise study on alternatives to road transport of waste was conducted by SOGECA from Albiano. A direct comparison with the creators of this proposal led to consider this solution as a new sign of the mining landscape in transformation, analysing the external costs of conventional road haulage and examples of projects made in similar contexts (Shlomo Aronson). It was not conducted within this research - this was not the goal - a study on the inclusion of infrastructure into the Trentino landscape, but rather to bring the attention on the hypothesis of development for a mining process that certainly deserves a careful analysis.

which connect to the main belt other extraction points in different locations along the route.

This waste - exposed to an initial crushing of larger pieces - would be moved for a distance of about ten kilometres along the Cembra valley to the goods yard in the Lavis industrial area, or in the Avisio zone right of the *Interporto* (road-rail distribution hub), where a material processing plant could be placed. We can imagine a new type of light structure, replacing the traditional steel roller with a novel and silent structure supported by robust steel cables with spans up to 500-1000 meters, which can reduce the support points on the ground. This thin structure also enables, once the activity is completed, a removal and reuse of the entire structure.

The construction costs and plant operation can be compensated by the energy produced by the conveyer belt while going down into the valley.

The creation of a conveyer belt would mean that 70% of the handling of the extracted material would remain within the mining context by eliminating the transport of waste from public transit, reducing the cost of trucking - highest in the mountains- but especially by reducing the damage to the territory in terms of traffic congestion, noise, accidents and air pollution.



Conveyor belt realized in Jamaica.



Proposed paths of the conveyor belt.

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“External” images

- p.8: elaborated image with LiDar data and Ortho Photogrammetric image 2006 provided by PAT
- pp.18, 20, 21, 23 elaboration by “Ex Cave” research group (E.Schir, L. Siviero, L. Zecchin)
- p.19: elaborated image with photos from in <http://www.edwardburtynsky.com/>; Aronson S., Shlomo Aronson, in ‘Lotus Navigator’, n. 5, 2002,
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- p.41: Lassus B., in *Nuove Infrastrutture per nuovi paesaggi*, (a cura di) C. Micheletti, L. Ponticelli, ed Skira, Milano 2003
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- p.43: elaborated images from Ortho Photogrammetric image 2006 and Rilievo LiDAR (Laser Scanner) provided by PAT
- p.50: elaboration by Vettorato D., the basic data are: Rilievo LiDAR (Laser Scanner) provided by PAT (2008), DTM 10 meter provided by PAT (2000)
- p.51-53: images provided by Luigi Centola and extracted by: www.biovallo.it
- p.55: from http://www.thais.it/citta_italiane/firenze/index/galleria_accademia/pag_01.htm
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- pp.60-63: photos and elaborated images from AA.VV, *Montaña Tindaya*, Eduardo Chillida, Gobierno de Canarias, Fuerteventura 1997
- pp.70-72: images extracted from Palerm Salazar J. M., *Proyectar el Paisaje. Territorios en transformación: barranco de Badajoz/Güímar*, Ed. Saquiro, Tenerife 2007

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- p.80: ‘Rock of Ages#7’ in <http://www.edwardburtynsky.com/>; photo extracted from Berger A., Reclaiming the American west, Princeton Architectural Press, N.Y., 2004.
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- p.105: photo tratta da Aronson S., Shlomo Aronson, in ‘Lotus Navigator’, n. 5, 2002.
- p.107: image elaborated from LiDar data provided by PAT.
- p.109: Ortho Photogrammetric images 1996, 2000, 2006 provided by PAT
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- pp.128-133: elaborazioni gruppo concorso “Paesaggi Liquidi” (C. Battaino, E.Schir, L. Zecchin)
- p.150: images extracted by Doppelmayr transport technology: Ropecon© system realized in Jamaica

