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LE DOMAINE DE LA TERRE – THE DOMAIN OF THE EARTH

On November 25, 1985 in Villefontaine, the Domaine de la Terre, a unique residential area in the world was officially opened. About 600 people moved into 65 social flats, housed in twelve apartment islands designed by 10 teams of architects to experiment with various earth-building techniques.

The idea of a earth settlement was born in 1980 in Paris. The aim of the experiment was an international exhibition devoted to the history, current events and the future of clay architecture and other local materials. The project has become a testing ground and a place to put new technical solutions into practice.

Keywords: Domaine de la Terre, clay vernacular architecture, town planning, urban planning, housing estate, experiment, adobe dried brick, landscape architecture

1. EXPERIMENTAL HOUSING

After the Great Oil Crisis in the 1970s, attention was drawn to the need to save energy and use inexpensive building materials. The land traditionally used for building houses has been excavated. Ten design teams were selected through a competition to build 65 social premises on 1.6 hectares in the new Fougères district of Villefontaine.

Designers confronted with the unusual place created a very diverse architecture, which requires quite a lot of time to visit on foot. Land, a traditional material local-

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Fig. 1. Street of the Fougères district where it was built a social housing estate built of clay

ly abandoned for decades, has become the building blocks of diverse, experimental projects. Compacted, stabilized and reinforced soil are implemented around these bioclimatic implementations.

In early 1981, the Real Estate Agency OPAC de l'Isère and the public entity Etablissement Public de l'Isle d'Abeau (EPIDA) began building a village from land approximately fifty kilometers south-east of Lyon. The "Domaine de la Terre"



Fig. 2. A satellite image from the Google Earth application showing irregular, plenty of the characteristic urban interiors inside the habitat's urban structure

in Villefontaine is a unique operation known as a site for experimenting with various earth-building techniques in the early 1980s.

The exhibition was presented in autumn 1981 at the Center Georges Pompidou in Paris, and in 150 cities of the province. Then the exhibition was presented outside the country.

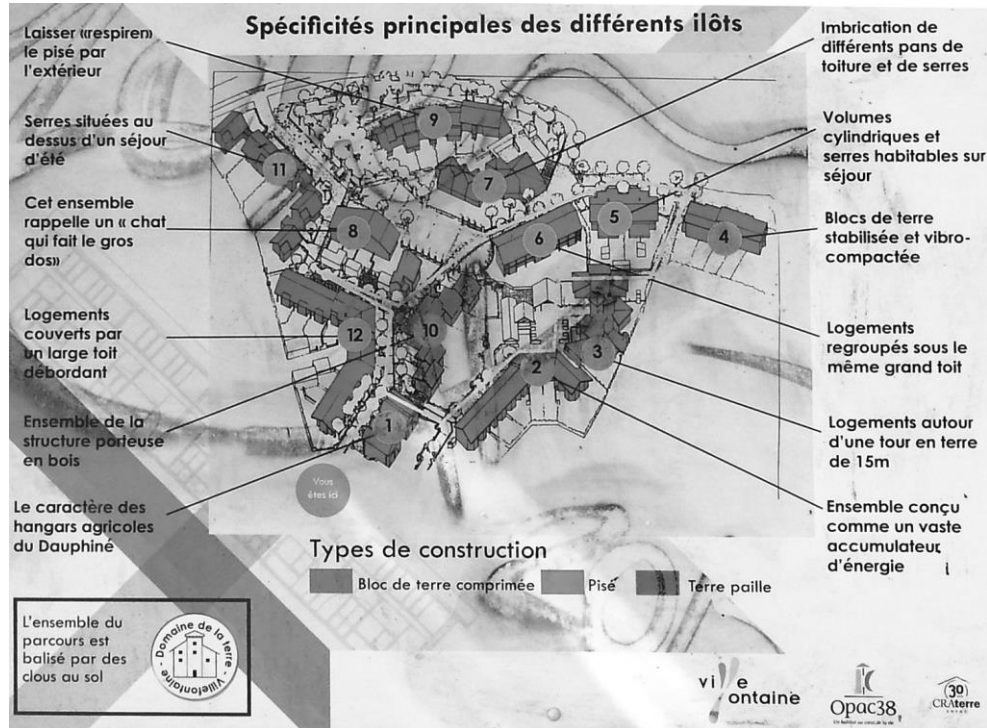


Fig. 3. The welcome board at the entrance to the Domaine de la Terre experimental estate

1.1. Heritage axis

1980 was the turning point for Domaine de la Terre. CRAterre is given the responsibility to develop the materials sector and launch an experimental program to build housing from the ground. CRAterre is the Earth Research and Application Center – laboratory of the University of Grenoble, and is the technical support of the Domaine de la Terre project.

CRAterre was accredited as a research laboratory in 1986. Since 2010, CRAterre Laboratory (CRAterre-ENSAG) has joined forces with the “Constructive Cultures” Laboratory to form the research unit AE&CC – Architecture, Environment and Constructive Culture. The AE&CC program assumes development on three levels.

The first is heritage. It draws upon historical and cultural diversity. Heritage is studied in material aspects such as: materials, building, landscape and intangible aspects such as: knowledge, know-how, organization-management in relation to the specific features of the places where it was built. The aim is to recognize and

understand the architectural features and values of heritage, and then to define its potential useful in many areas, also in the process of creating and implementing architectural projects, and in this case also urban, rural, etc.



Fig. 4. Îlot 8 – Islet 8, architects: Jean-Michel SAVIGNAT, Odile PERREAU HAMBURGER, M. MUNTEANU. The property consists of two parts with 6 apartments. Covered with a gable roof, it is a synthesis of vernacular architecture and contemporary form. The silhouette of the building resembles a cat's back. The object is made of dried adobe bricks forming a 45 cm wall

1.1.1. Materials axis

Another aim of CRAterre is under the term “materials”, scientists working for AE&CC consider the entire process of their production and application in building the living environment. Accordingly, research begins with the analysis of the potential of the territory where the raw material can be extracted, and with the subsequent stages of material production, creating structures, buildings, cities and extending the scale to spatial planning.

Raw earth is a material consisting of gravel, sand, clay and clay. As a composite material, it consists of ore or straw and clay as a binder. The material is harvested from under the layer of agricultural land.

There are many techniques for using raw earth around the world. In the earthen village, 3 methods were used:

- Pressed earth blocks – The earth extracted from the earth, moistened and stabilized by cement is placed in a wooden form, pressed and compressed. Then the blocks are mounted with mortar or lime that come out of the wooden forms.
- Compacted soil – moistened soil is poured into formwork, formerly wooden, today made of steel, then it is strongly compacted. One face consists of a superposition of forms in different directions.
- Walls made of adobe dried brick are installed in the steel formwork, the earth is compacted mechanically, the width of the wall is limited to 40 cm due to the installation of internal thermal insulation.



Fig. 5. Îlot 5 – Islet 5, architect: Jean-Vincent BERLOTTIER. A house with four apartments built of compacted earth imitating dried adobe bricks. Wall thickness from 50 cm to 40 cm on the upper floors. The northern facade with cylindrical blocks housing pantries and cellars, the southern facade with glazing in the living room ensuring passive recovery of solar energy. In houses, thermoregulation is carried out by the inertia of earthen floors

After almost 40 years, you can observe good aging of the earth walls. Material deterioration was not observed. The thermal performance remains unchanged from the outset.

The low energy demand that was the aim of the experiment has been achieved – the average energy expenditure of La Domaine de la Earth is the equivalent of the average high energy efficiency of 2005. In addition, building a wall of earth itself consumes very little energy. The local material does not require much logistics and transport, and proper preparation of the material does not require large amounts of energy and time.

1.1.2. Habitat axis

In line with the basic postulates of CRAterre research, the concept of habitat covers all scales of the living environment, e.g. building, neighborhood, city. Observing the interactions between these development elements and their natural environment, such as topography, vegetation, climate, etc., can help discover how they contribute or not to the “good life” in a given territory.

The earth estate is located in the Rhône-Alpes region. A characteristic feature of the centers in this region is the horizon line drawn with the peaks of the mountain ranges surrounding the Lyon agglomeration.



Fig. 6. The architecture of the estate is consistent with the mountainous landscape of the region



Fig. 7. Masses of earth buildings imitate in their form traditional forms practiced by generations since the times of the first habitats in the region



Fig. 8. Architecture and greenery merge with each other throughout the estate

The hill on which Le Domaine de la Terre is situated in the Fougères district of Villefontaine is the highest point of the village and dominates the area. The city is covered with a network of suburban housing estates, which is the extreme bedroom of the Lyon agglomeration. The silhouette of the vernacular buildings of the habitat is set in the panorama of the mountainous landscape.

The observer can admire the harmonious synthesis of architecture and nature. Usually, what we see in the city is the result of many centuries of tissue formation. Domaine de la Terre looks like it has been here for a long time thanks to its natural-looking layout.

The geographic and topographic location makes the estate unique. Natural factors to which a person has to adapt influence the rich, varied architectural and urban shape of the space. Diverse architecture in the spirit of postmodernism, built from native materials, in its form imitates the local solutions from the Dauphinoise region, where 80% of houses built before 1950 were in adobe technology (the name of adobe technology is common to languages derived from Latin), i.e. dried brick also known as “raw earth”. It is therefore a great reference to the tradition of the region.



Fig. 9. Îlot 1 – Islet 1, architects: Françoise JOURDA and Gilles PERRAUDIN. This characteristic building contains 4 apartments in a compact block, which, together with insulation from compacted earth, ensures a minimum level of energy losses. The resulting lumps, fastened with steel frames, adopt the features of the surrounding agricultural sheds through their weight and architectural expression. The principle of a thick, double-skinned façade allows for the organization of buffer spaces and terrace structures adapted to the conditions of sunlight and air conditioning

2. ELEMENTS OF URBAN COMPOSITION

The nature of the estate is spatial diversity. Residents move freely around a well-known, seemingly complex layout of buildings. It gives them a feel of safety, while it allows the watchful observer to orientate himself in the irregular network of streets.

This naturalistic network of residential buildings has many features in common with the centers that develop under construction arbitrariness. The streets meander between houses, thereby overcoming considerable differences in the height of the terrain. The numerous guiding elements put the passer-by in a walking mood, the journey becomes a free walk among this specific architecture of the earth village.



Fig. 10. The neighborhood pedestrian and driving routes are characterized by introductory, guiding and stopping elements. This proves the rich urban structure of this place

The interiors of the streets are a space where the garden meets the pavement and the road. Compositional greenery lushly covers the estate. It covers expressive forms and at the same time reveals strong accents of architectural detail. The spaces between the buildings are often occupied by gardens, clearings, green passages, numerous benches and recreational facilities.



Fig. 11. The characteristic light-constructed peaks of Islet 1 are visible from many places of the complex. They are an excellent landmark that gives way only to a dominant with an unobtrusive form



Fig. 12. Green spaces are themselves Domaine de la Terre – the domain of the earth

The most recognizable elements of the estate's space composition are the dominant and characteristic gables of the roofs crowning the houses. The location of these elements in relation to the street determines its impact on the observer. When they are on the top of the guide axle, they are a specific target. The dominant works like a magnet. It catches the eye and makes a stronger impression than the surroundings.

The dominant feature is the tower, the place of exhibition and cultural animation. This is a village earth tower designed on the central island by architect Jean-Vincent Berlottier to show the possibilities of the material. The fifth floor is open on all four sides and thus offers a small vantage point. It allows for a breathtaking view of the panorama of the city and the region.



Fig. 13. Îlot 3 – Islet 3, Architect: Jean-Vincent BERLOTTIER; Six apartment blocks are arranged around a 15-meter tower. Each house consists of two parts: a core of adobe blocks made of dried clay and a wooden block containing a living room and a bedroom on the entresole

3. ENGINEERING AND CULTURAL AIM OF THE EXPERIMENT

The original characteristics of the Domaine de la Terre habitat in 2009, secured 45th position in the ranking of “Treasures of Sustainable Development” in the Rhône-Alpes Region.

Le Domaine de la Terre tower appears as an emblem in the administrative documents of the town of Villefontaine. Thus, the architectural silhouette acquired the meaning of a landmark.



Fig. 14. Islet 3 has become a recognizable symbol of the place

In 1987, Village of Earth was recognized by the United Nations as a “pilot international operation” with a figure of 40 000. visitors from all over the world annually. Training courses were organized for hundreds of engineers and technicians, which made it possible to build flats from the ground for thousands of third world people.

Moreover, the overall energy efficiency is better than, for example, in a neighboring residential building made with conventional techniques and materials. In addition, in summer, the thermal inertia of the earth keeps the atmosphere fresh inside.

The question is, what do the cement lobby and the mainstream building technologies think?

Certainly the Domaine de la Terre offers an attractive living environment in the spirit of the “village”. Residents appreciate the space of the estate, which is confirmed by the low turnover of tenants. OPAC 38 also accepts regular applications of people willing to live received by the administrator of the estate.

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LE DOMAINE DE LA TERRE – DOMENA ZIEMI**Streszczenie**

25 listopada 1985 roku w miejscowości Villefontaine nastąpiło uroczyste otwarcie wyjątkowej na skalę światową dzielnicy mieszkaniowej we Francji: Domaine de la Terre. Około 600 osób wprowadziło się do 65 mieszkań socjalnych umieszczonych w dwunastu wyspach mieszkalnych zaprojektowanych przez 10 zespołów architektów w celu eksperymentowania z różnymi technikami budownictwa ziemnego.

Pomysł osiedla z ziemi narodził się w 1980 roku w Paryżu. Celem eksperymentu była międzynarodowa wystawa poświęcona historii, bieżącym wydarzeniom i przyszłości architektury z gliny i innych materiałów lokalnych. Projekt stał się poligonem doświadczeń oraz miejscem do stosowania w praktyce nowych rozwiązań technicznych.

Słowa kluczowe: Domaine de la Terre, architektura wernakularna z gliny, urbanistyka, planowanie przestrzenne, osiedle, eksperyment, cegła suszona adobe, architektura krajobrazu