Ad impossibilia nemo tenetur. Three case studies on built heritage elements at risk
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1. Introduction
The Built Heritage is rich, articulated and fragile, it is subject to human choices, bringing it to be well preserved and greatly enhanced in its good time and fall into despairing conditions during its bad moments. In our time a lot of precious buildings are at the risk to get irremediably lost and disappear, abandoned for long time and slowly becoming ruins. Probably this condition is common all along the human history, even if in our time our more sensible attention in the Patrimony makes it more hurting at our sight. But rarely people go beyond some blaming about the ruins they are seeing, considering the recovering of these masterpieces as something too far from their possibilities of intervention. So sometimes it is worth to face the emergency of such buildings with some direct and well aimed intervention, at least to document, survey and get the right knowledge about the building at risk. Projecting about it can be a right step to better understand the possibilities for a recovering, but the whole process can be a pain for the researcher, the architect, the lover of Cultural Heritage beauty, because it shows the lost occasion caused by improper use, improper management, abandon, abuse and ignorance.

2. Case study one: The Bruscheto Mill near Incisa (FI), Tuscany
2.1. Study of the place
Immersed in the typical landscape of the Tuscan countryside in the Upper Valdarno, on the border between the municipalities of Incisa and Reggello, on the right bank of the Arno, it stands the Bruscheto’s Mill to which is connected the eponymous bridge, also known as the Hannibal’s bridge¹. This place can be found at 31 km south-east from Florence, following a small winding road from the highway. It’s a place where time seems to stand still. This mill origins can be placed in the early Middle Ages, but a large number of modifications have changed little by little its original appearance until its recent abandon.

2.2. Actual situation
The ruin is in an advanced dilapidated state. Analyzing the outer perimeter of the building, the North-East front appears to be the most compromised. From the reading of the walls it is possible to identify various collapses, with some partial reintegration operated using bricks walls. The area is quite accessible, even if there are various fences and there are signs indicating dangerous state of the building. The Southeast and Northwest fronts have no major damage, except for the pier placed on the East corner of the building which has a transverse lesion. The Southwest front, which faces the Arno, has suffered several alterations over time, and various collapses. The vegetation has rooted in the cracks and in some places there are real trees growing. The collapse of the roof triggered the subsequent collapse of the floors which are gravitated
to the ground floor making it difficult and dangerous to access the interior of the building and to inspect many rooms. The vaulted ceiling of the ground floor rests on the lower basement, it has not collapsed. Upon entering the building, it is possible to see that the architecture is totally devastated. The debris and vegetation follow each other without interruption. Nature has reclaimed the space taken by the former mill. Those whose, one time, were indoors appear surreal: stairs that lead nowhere, doors that open onto the void, cascades of ivy covering entire walls, glimpses of sky. This context seems to catapult the visitor into an Escher artwork. The measurements of the exterior of the building have been made on the North-West and North-East fronts along the road. After completing a part of the survey of the ground floor, supported by photographic shooting, it was possible to understand the distribution of the interior spaces of the building, which are highly fragmented by the necessity of work and production. It is also possible to observe that there have been many alterations to the walls, with openings buffered and then reopened, using recycled materials coming from older collapses.

2.3. Study of the water paths inside the Mill
The survey of the basement of the mill was carried out with traditional procedures. The few vertical linkages partially obstructed by debris were used as the few points of observation. To better interpret the plot of the basement it was necessary to descend inside the water exit door of the mill. The entire structure rests on discontinuous outcrops of limestone rock from which the walls develop from the basement ending in the vaulted ceilings. An external path gives access to the turbine rooms. Here there is the arrival of two ducts, one is still active. The water that passes this compartment, through a lateral outlet, reaches the last room for expansion. This room that could be divided by partitions into three separate areas to manage the flow of water, now is clogged with debris and no longer performs its initial function. The presence of such debris is due to a misguided attempt, carried out by inexperienced, to block, with sandbags, the inflow of water in the underground rooms to protect the foundation. A pier reinforcement was built on the West corner of the mill. The construction of this pier has occluded an outlet for the water. Consequently, the path of the water output has varied its course, and now passes under the pier. This arch has the same wall texture of the arches of the near Hannibal's bridge. Finally, thanks to field investigations, it has been hypothesized a second room that housed a turbine under the central millstone and a duct tangent to the boundary wall of the mill.

2.4. A project for the Bruscheto’s mill
2.4.1. Hypothesis of a river park
In line with the regional guidelines, the Mill will be the centrepiece of an hypothesis for a project of river park, due not only for the geographical aspect, but also for the road network along the territory. From here trekking routes will develop to connect to the existing ones; the cycle tracks will be connected with those already existing in the area and foreseen along the Arno banks; some horse ways will be connected to the places already offering trips to historic si-
tes such as the Tower Lombard and the Abbey of Vallombrosa, but also to the nearby shopping centre “The Mall”. In the end, it is possible to imagine some Land Art installations supporting temporary or permanent events.

2.4.2. Concept - Inspiration for the restoration
The suggestion generated from the ruins of this ancient mill, together with its volume movements recalling a medieval fortress, has spotted the choice to fulfil the intervention idea. So it is thought that the best approach should be keeping the identity of the building, adopting a conservative restoration on the front facing the Arno, but preferring a more direct intervention on the opposite side were the façade is so anonymous and hacked by the collapse, that no longer symbolizes the building identity.

2.4.3. The project and design ideas
The project involves a change of use from factory to public building, which his functions are: the mill museum, conference and exhibition space, winter garden, dining area, administration river park, bike-sharing. It also involves the construction of an artificial canal, below street level, which will power a turbine screw placed near the Mill. The old wrecked oven, in front of the mill, will be used as a technical room for boiler and compaction woodchip. Finally will restore the road conditions of the Hannibal’s Bridge, reconstructing the missing span. The whole intervention is aimed to create a building with a high resilien-
To enhance the educational aspect of the project it is possible the reactivation of some existing millstone to show the ancient processes of production of the flour. It also plans to integrate it with elements of bioclimatic architecture, renewable energy and energy savings. And with a special production of renewable energy: the turbine cochlea outside the mill; this element, combined with other power saving solutions can create both a fully supplied and autonomous building and a energy producer structure.

2.5. In the end, about the work on the Bruscheto’s Mill
In conclusion, this hypothetical project aims to transform an artefact of industrial architecture, now in an advanced state of decay, into a rallying point for the community including educational purposes: the restored building will present the contemporary aspects of bioclimatic architecture and the importance of renewable energy combined with energy savings. Finally, the redevelopment of the park, whose centrepiece will be the mill, would be a great opportunity to make liveable again the banks of the Arno river.

3. Case study two: Livorno, “Terme del Corallo”
3.1. A long story of misfortunes
During the period between the XVIIth and XXth Century, thermal baths have an exponential growth in Italy and several new baths complex were built, “Terme del Corallo” was one of them. The ruins of this building is located along the “Viale degli Acquedotti” in Livorno and was built in 1903 by the engineer Angiolo Badaloni; the “Terme del Corallo” has the main characteristic of an “Art Nouveau” architecture (which was called Liberty in Italy) and it was one of the first building have been built in iron concrete. The history of “Terme del Corallo” starts in the 1854, when the owner of that area was seeking for the water and scientific tests proved that the water was drinkable and had purging features. The complex was inaugurated in the 1904, it had an instant success. Livorno became a popular place for human care with thermal water and was indicated as “Montecatini a mare” (literally “Montecatini” by the sea). People used to spend in the “Terme del Corallo” 15/20 days enjoying sports and relax. About the events that caused the closure of the complex in 1936 there aren’t any clear information. Then, during the second War World Livorno was strongly damaged and the later growth of the city in the East area probably caused a ground pollution and damaged the underground walls protecting the water table. The “Terme del Corallo” lost its monumental appeal and the building had a hurried decline; a succession of different owners changed the primary function of the building into a factory, a deposit, and then into a disco club but in the 1967 the “Terme del Corallo” was finally closed. Today the wreck of “Terme del Corallo” maintains its charm and lies below an overpass built in the 1982 appearing like a crass demonstration of urban insensibility. The complex is composed by a main building connected with other two minor ones by a rhythmic colonnade facing on the garden. All the spaces were organized around their healthy features and around a central magnificent concert hall, the whole complex could house up to one thousand persons.
3.2. The survey

The building is very complex to measure; there are many roofs and vaults near to collapse and so it's very difficult to use direct measurements. The building isn't really safe, debris and vegetation hinder the access to many parts of the building. For all these problematic condition and the great delay caused by the administration in programming a correct documentation using 3D laser scanner solution, it was chosen to operate the survey combining SfM photogrammetric solution and direct measurements. The main hall was the core of the operations, a large vault in reinforced concrete with a skylight on the top. The dimensions of the hall are quite large: the vault reach the 15 meters and the hall has a depth of 25 meters; the floor is strongly damaged and the skylight is near to collapse. To survey the main facade and other parts of the complex was used the same SfM procedure, all the photographic work was supported by the integration of direct measurements, used for reference and correct verification of the digital results. The post processing of all the SfM generated 3D models was planned in order to use this survey to recompose coherent drawings of the main plan, of some meaningful section and of the main front of the building.

3.3. Planning a possible and logic project

Starting from the new survey a possible project was planned to focus on the intervention priorities: 0) consolidation of the structures, while any other operations before this are only aimed to put people at risk 1) Complete retriever of the garden; 2) Renovation of the main entrance of the building; 3) Requalification of the “Viale degli Acquedotti”; 4) Realization of pedestrian and cycle paths, non invasive parking areas, and other urban connections; 5) Start of a process of “giving back to the community” combined to the near “Hotel Corallo” building; 6) Restoration of the complex adding new functions like: conference hall, thermal bath, spa, restaurant.

3.4. Design concepts

The building is characterized by a perfect symmetry. This main characteristic suggest a direction and underline also the importance of South-West front. Around the area of the project there is a disorganized urban fabric. This area was born as an East expansion of the main Livorno town and it doesn’t has meaningful design rules. The choice of suggesting a square in front of the main entrance is guided by the will to create a place where it will be possible to appreciate the symmetry of the whole building and also to give an appropriate importance to the main entrance. The project is aimed to preserving the historical shape of the thermal settlement and it wants to recover all the historical decorations. For this reason all the new functions are placed underground. In the restoration proposal the problem of lighting the underground space is solved excavating below the main colonnade following its same curvature and consolidating its foundations. The main function of baths is inside the main building, the restaurant and café are inside the building in the right side and finally the spa and office are planned in the left side. For the access to the underground space, the symmetry becomes again a guideline: in fact two
symmetrical staircases can be the entrance to the conference hall. The “new Terme del Corallo” is imagined as a contemporary baths/spa with multiple functions inside. In the central building there are thermal baths; the main hall became the internal swimming pool offering a spectacular space to the visitors, the corridor in front of the swimming pool is closed with large glass becoming the reception, all the other spaces orbited around these elements. The main function of “baths” is restored, the lost water table is substituted using sea and treated water creating a place with a strong appeal for the tourists and for the locals.

3.5. In the end, about the work on the “Terme del Corallo”

The project wants to give back to Livorno a part of city, that is abandon for a long time, where a historical building is decaying. All buildings and the garden around are connected in the shape but have independent use, this choice of-
fers an easy access and support a better conservation of the locations. The research starting from the study of the historical complex wants to propose a functional recovering of the “Terme del Corallo”, hoping that this idea could be not only an example but an incentive for an immediate action. The dream of rebirth of the “Stablimento delle Acque della Salute” is becoming all days more far: the buildings are near to collapse and the recovering and the survey are becoming more and more difficult. Behind the complex was built new apartments replacing the STIB factory's storage (with no documentation of the demolished parts), this fact accelerate the recovering of the garden (even if it’s clearly a risk to bring people near the built structures without consolidation). This isn’t the final solution but people will visit the garden and could look closer at the building heritage they could lose. Will this helps this apparently irremediable loss? It’s up to the people from that town to decide and ask their administrations for decisions aimed to recovering and documentation instead of simple waiting and resignation.

4. Case study three: Abandoned church in Romagnano al Monte, Irpinia, Campania
Romagnano al Monte is a totally abandoned town, after the Irpinia earthquake in 1980, its population run away and never come back. So there is only to be spoiled for choice in choosing an abandoned building there, the whole town is almost in the same condition. Recent suggestion for recovering are quite imaginative and seems not to get the right strategies, for example: why planning a school for chiefs and waiters there when a professional school for masons should have a whole town to work on? So it seems a hopeless place. The town can be seen from the distance until a certain hour in the evening, then, when the sun go down, it completely disappear, the buildings, made of the same stone of the mountain has get back their original color and are completely mimetic with the peak were the town was raised. Inside the town there is a church, that's obvious, but any place can give an interesting lesson. During an university workshop about the reuse of abandoned place\textsuperscript{3}, during the January inspection, operated in the logic: “If you want to understand the decay, it is better to see it in winter”, it happened the opportunity to visit this church and immediately it was decided to produce a SfM photographic survey of the interior, the suggestive results, preserve the mood of that place where a special elements teach a special lesson: the wood ceiling was almost completely fallen showing the remains of the wooden structure to support it, between the beams and tables still hanged up it is possible to read the printed word “FRA\textsuperscript{2}GILE”. This can be considered as a sort of poetic resonance element, really well suited to demonstrate the condition of Built Heritage in Italy. No project suggestion for this building but the simple presence of that piece of wood coming from guess what early XXth Century is something casual but worth the effort to be notices and communicated, something strong and symbolic.

5. Conclusions
The Built Heritage at risk in Italy is a meaningful part in each the constructed areas while each town has something worth to be properly recovered, most of
the time the owners, the administrations, the people in themselves, seem not correctly oriented in these interventions: lack of money, ignorance, indifference, different interests, resignation collaborate in leaving these architectures to a slow and unrecoverable decay. Knowledge and documentation are the first steps to start thinking in a different way to the Built Heritage management. A cultural process that starts from the documentation often stimulate a project, a proposal, minimal or rich, possible or just dreamed, but always a first step towards a new life for these buildings. Starting thinking to a possible recover, taking care about the meaning of these architecture its always worth of the effort to hope to seem a better time and not only the regret for an unrecoverable loss.

Notes
1 According to a popular legend, on this bridge Hannibal passed with his army, fighting nearby this area he would lost one of his eyes. Obviously there are no historical evidences of these event.
2 The first non industrial building using reinforced concrete was built in Bourg-la-Reine, Paris in 1892 by François Hennebique. The first Italian building using it is the “Hennebique” Silos in Genoa (1901).
3 The “Nuovi ruoli per territori antichi in abbandono” (New uses for ancient abandoned places) workshop took place in 2012 and was coordinated by Francesco Ventura from the Università degli Studi di Firenze.

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