In Memoriam

Katia and the industrial heritage

The Acts of our ICMAH Conference about Industrial Heritage are dedicated to our colleague and friend **Katia Baslé**.

With Katia we have shared number of experiences in particular when I was director of the History Museum of Marseilles (France).

I shall recall here her international dimension in the field of industrial Heritage. Her interest in this field was as enthusiastic and deep as the one she used to develop for any of the interests she would address : With her, it was exigency, pleasure and generosity.

I shall take the example of our last common project, the organisation of our international ICMAH Conference about Industrial Heritage which was held in Baku in October 2017- and without her.

Within the frame of the international Committees of ICOM, being the Chair of ICMAH, (ICOM International Committee for Museums of Archaeology and History) I has to organise the annual ICMAH Conference 2017.

It had been decided, thanks to our colleagues from Azerbaijan National ICOM Committee and Icherisheher Reserve that it was going to be held in Baku and on the topic of industrial Heritage.

I was familiar to the subject, having already collected this kind of specific items to present the 19th and 20th centuries collections for the History museum of Marseilles. On her side, Katia, in charge of preventive conservation, was developing a Master in History of Technics.

It was evident for me to ask her help to set the foundation of our Conference. As soon as our first meeting, Katia had identified our specificities amongst the international context and proposed different axes.

For our second meeting, she had already accumulated articles, references, and papers, those of TICCIH 2015 mainly, she had been attending.

This major professional event had welcomed hundreds of participants… and in the middle of this crowd; Katia had attended many conferences and was capable to remember the ones which could fit adequately our needs.

We build the program during a third meeting, with our ICMAH General Secretary, Burçak Madran, and decided that Katia would come with us to Baku and would be our « keynote speaker ».

It was on April 20th 2017, and happy with this lovely perspective, we share a nice meal.

We had no idea it would be our last meeting.

Our ICMAH Conference was held in Baku in October 2017, with Katia's pre-program orientations but without her.

The acts of the meeting are dedicated to Katia with thanks and affection.

To the memory of Katia, I wish to associate the memory of Odile Lisbonis, another « member » of the industrial heritage family.

She also left us so suddenly.

We miss her and them so cruelly.

Myriame Morel-Deledalle

Chief Curator
ICMAH Chair

Katia Baslé was chief art Works, coordinator for preventive conservation Heritage at CICRP (*Centre interdisciplinaire de conservation et restauration du patrimoine*) of Marseilles.

She died suddenly in June 2017.

Some industrial heritage typologies

Paul Smith

Ministry of Culture, France

The heritage of industry – its landscapes, buildings, machines, artefacts, archives and memories... – began to be recognised and appreciated during the 1960s and 1970s. Great Britain, the 'first industrial nation', was the pioneer here. From the 1950s, the Inland Waterways Association was campaigning to save the country's canals, the historical lifeblood of what we call the industrial revolution, followed by initiatives to save stretches of the country's railway heritage and to give them new life as tourist attractions, 'great days out for all the family' as they are called in England. The expression 'industrial archaeology' was invented there in 1955 and the expression, and its practices, soon spread to other countries of early industrialisation in continental Europe and North America. The International Committee for the Conservation of the Industrial Heritage (TICCIH) was founded in 1973 at Ironbridge, England, proclaimed 'the birthplace of the industrial revolution'.

In this new field, the earliest programmes of study, documentation, interpretation and preservation were, more often than not, of a thematic nature : brick and tile works, charcoal-fired blast furnaces, water-powered sites, textile mills, port installations, matchmaking factories... Understanding the long-term evolution of any industrial process and seeing how this evolution gave rise to new ways of organising production, to new machines and to new architectural forms, understanding, in other words, and being able to evaluate the succeeding layers of heritage bequeathed by this particular industry requires a considerable research investment, years even of 'dry' research in libraries and archive repositories and exploration in the field, sometimes wet and muddy.

Nonetheless, although encyclopaedic overviews of the industrial heritage are consequently difficult to put together, it is perhaps possible to offer other, general typologies of the industrial heritage, in terms of the conservation, or non-conservation status of that heritage. With illustrations taken primarily from France where I work, I would like then to put forward and think about seven categories of industrial heritage that can found today in any country.

Gone... and forgotten

By definition, this first category of heritage that has disappeared and is now forgotten is a difficult one to illustrate. We might think, however, of artefacts that are clearly machine-made, but we no longer know when or where or by whom. We might be confronted with ageing collections of industrial hardware without knowing anything about the uses for which these machines were designed or the factories they were recovered from. Or we might come across some archival mention that tells us little more than that at some time in the past, at such-and-such a place, there used to be a factory or a workshop manufacturing such-and-such a product. An enquiry into the industries of Paris, published in 1864, tells us for example that more than a third of the capital's total population of about one and a half million inhabitants were workers, that the city's factories and workshops were driven by 1 200 steam engines and 500 horse gins. But although this enquiry can also tell us that there were nineteen textile concerns in the

14th arrondissement (where I live), it gives no addresses for me to go to today to see what vestiges might still be there.

Statistically-speaking, however, it is worth remembering that this category of what we might call 'ghost factories' is probably a well-stocked category, particularly where urban environments are concerned. The disappearance of heritage through simple abandonment and dereliction, through wars, fires, floods or earthquakes, through deliberate destruction to make way for new construction, is undoubtedly a common fate, in the manner of the disappearance of animal species: apparently more than 99 % of all animal species that have ever lived on our planet are now extinct.

Gone... but not forgotten

A second category of industrial heritage, also represented by multitudes of examples, concerns sites of which there are no longer any physical traces on the ground, any identifiable buildings or infrastructures, but for which documentary evidence of various types, various origins and various periods – business papers, contemporary written descriptions, catalogues, paintings or engravings, photographs, post cards, films…– are extant. This evidence may have survived by chance, by good luck, as part of private, library or museum collections, or it may be a record deliberately created to preserve information about a site already recognised as heritage and threatened with destruction. The Renault car plant at Billancourt, to the west of Paris, dating back to the end of the nineteenth century, is probably one of the best documented and most thoroughly researched industrial places in the world. The bibliography of technical, historical and sociological studies of the factory is already a sizeable volume in itself. Between 1910 and 1970, the firm had an in-house photographic service which today leaves us some 420 000 black and white photographs of the factory, its buildings, its machines, its social facilities and, above all, its products. Several films from the 1920s and 1930s record the installation of the factory's first Ford-inspired mobile assembly lines. And when the closure of this emblematic factory was announced in November 1989, even more films, photographs, articles and books were generated, by amateurs, by the Renault firm itself, by local authorities, by TV companies and by the Ministry of Culture. The 'deconstruction' of the factory buildings, as their demolition was called, was also well documented. Indeed, 'being demolished', 'in the course of demolition', might also constitute another, specific status category for the industrial heritage. It is a constant feature of urban history that, as far as I know, remains little studied.

In the manner of rescue archaeology, then, industrial sites programmed for demolition can be recorded before they disappear for good. And alongside photography, film and measured drawing, modern techniques of 3D laser scanning are amongst the tools available today for recording industrial sites or machines. Information technology can also be applied to earlier documentary records to create models for research purposes or for interpretation in exhibitions, museums or on the web. The example here is of another car factory in the Paris suburbs, the factory built by Adolphe Clément-Bayard in 1898, probably the first purpose-built car factory in the world, demolished in 1988 but documented by the Ministry's inventory service.

In a few cases, the perceived historical significance of a site that has disappeared may be sufficient to warrant archaeological excavation, although such excavations are exceptional in the realm of industrial archaeology. A recent example here, however,

concerns France's first railway station at Le Pecq, 20 kilometres to the west of Paris on the river Seine. Dating from 1837, this terminal station was abandoned after an extension to the line ten years later. The building was known only from a couple of engravings, but salvage excavation carried out in March of this year found new information about the spatial organisation and the foundations of the station buildings, and of course raised new questions for historical research.

Not yet identified as heritage

My third category, another tricky one to illustrate, concerns places of industry that are not yet recognised as heritage, not yet 'patrimonialised' as the French put it, 'heritagised'. Isolated sites in regions where an awareness of the significance of the industrial heritage is relatively recent might perhaps feature in this category, like the working coal mine at Senjski Rudnik in eastern Serbia, still using an 1878 steam engine for its winding gear. But, in point of fact, the heritage interest of this exceptional site is now fully recognised and the Serbian Ministry of Culture, with European support, now plans to preserve the whole landscape as an open-air site museum.

A more frequent variety of non-recognised heritage is that of small-scale workshops transformed into housing, commercial premises, restaurants or whatever, the original productive function of the place being forgotten and not researched. Paris in the nineteenth century, as we have already seen, with between a third and a half of its population qualified as workers, was the industrial capital of France, but many of its backyard urban workshops and small-scale factories still await proper identification.

Another type of heritage not yet recognised as such is that represented by recent industrial facilities, still in production, on which we have insufficient historical perspective. For their technical, social or architectural interest, some of the factories being built today may perhaps be appreciated as heritage at a future date, but only a handful of star architects – Norman Foster, for example or Renzo Piano – can give us 'instant' heritage. Despite the attraction that Chernobyl now apparently holds out for a special clientèle of 'dark' or post-apocalyptic tourism (10 000 visitors a year!), many ordinary people find do not find it easy to appreciate nuclear power stations as industrial heritage.

Recognised, but transformed into something different

Where the industrial heritage is concerned, more than for other heritage 'families' such as mosques or temples or manor houses, which can keep their original functions as places of worship or family homes, this fourth category of disused industrial sites that have entirely lost their original function and have been transformed into something else is a common one.

Ruins

Many abandoned industrial sites, particularly isolated ones in rural environments, become ruins, and, for two reasons, this particular status seems to me to be a significant one. Industrial ruins can appeal to our aesthetic and romantic sensibilities, and often inspire artists, photographers, film-makers, music video makers. A host of web sites and forums are specifically devoted to images documenting the decay of derelict industrial buildings. Abandoned factories frequently become 'canvasses', so to speak, for new, ephemeral creation under the general heading of 'street art'. These ruins can also stimulate historical research, elicit the curiosity to understand the past glory and prosperity to

which the ruined buildings bear sad witness. Secondly, although this is a relatively common, indeed a representative state of the industrial heritage, it is, by definition, a state without sustainability. If they are not adapted to new social and economic uses, in which case their derelict appearance will be lost, ruins are condemned to disappear sooner or later: rust never sleeps. In a handful of cases, it has been decided deliberately to leave derelict industrial structures as they are, to observe rust and invasive vegetation taking their inevitable destructive course. At Volkingen in the Saar, one of the first industrial sites to feature on UNESCO's list of world heritage, in 1994, some parts of the ironworks, now out of bounds to visitors, are left in this state of on-going decay. It was a solution recently put forward for a huge coal washing plant near Le Creusot, in France, but, in the end, a 'déconstruction patrimoniale' was preferred, a demolition operation taking care to record the site for posterity as it disappeared, in the manner of an archaeological excavation being covered up after having delivered its finds and information.

Converted industrial spaces

Many industrial structures that have lost their original productive functions are still preserved with new functions. The conversion of old industrial buildings to new uses is by no means a recent phenomenon, and, just as early industries could easily fit into existing built spaces, abandoned industrial spaces did not often remain unused for long. These early factory conversions may perhaps be described as 'vernacular', meaning to say that there was no deliberate intention to preserve a piece of heritage. Rather, it was simply a question of occupying a built space immediately available for a new use without the trouble and cost of new construction. Pit head winding towers converted into flats in the 1860s, the central machine shops of a coal-mining company transformed into a vast Leroy-Merlin DIY store in the early 1920s… these are two examples of such 'vernacular' conversions to be found in the Nord-Pas-de-Calais mining basin, inscribed as world heritage in 2012.

From the beginning of the 1980s, with the development throughout Europe and North America of a new sensibility to the interest and values of the industrial heritage, the conversion of old factories to new uses, what began to be called 'adaptive re-use', emerged as a practical way of preserving these factories, giving them a new economic 'raison d'être' whilst at the same time preserving their interest as records of past industrial activities, places with stories to tell. In the most thoughtful cases, efforts were made to interpret the industrial history of the place for its new users; mini-museums or interpretation anchor points might be centred on old machines, preserved in place and acquiring a new status as sculptures.

Apartments, schools and universities, hotels, office space, libraries, archive repositories, congress centres, supermarkets, concert halls, sports facilities, film studios, centres for start-up businesses, cultural centres of all descriptions… former industrial buildings have proved capable of accommodating a remarkable range of new uses. Indeed, only highly specific technical programmes – hospitals, prisons, airports… – cannot be fitted into former industrial buildings. During the nineteenth century, these buildings were generally the industrialist's principal investment, more than his machines. For new uses, the buildings consequently offer robust construction and materials of good quality. They can also offer volumes that new buildings could not possibly afford. In recent years, other advantages of the repurposing of former industrial buildings have come to be better appreciated, not least the environmental advantages. Preserving an old building and

giving it new uses can be understood as retrospective sustainable development, avoiding the heavier carbon footprint of demolition and new building, and avoiding too the urban upheaval that such new building often entails. Re-use, according to Philippe Robert, one of its expert practitioners in France, is like alternative medicine compared to radical surgery.

One frequent new use for an old industrial building is as a museum. In France, the former slaughter houses at Toulouse, dating from the 1820s and closed in 1988, now house a museum of modern and contemporary art. In Paris, the gare d'Orsay built for the 1900 exhibition, was transformed during the 1980s into a major museum for nineteenth-century art. In London, in one of the most famous examples of such conversions, the former Bankside power station, officially inaugurated by Queen Elizabeth II in 1959, has been transformed by the Swiss architects Herzog & De Meuron to accommodate the Tate Modern, opened by the same queen in the year 2000. These last two examples however pinpoint one of the ambiguities of such prestigious conversion projects. Both the broad arched train shed of the Paris railway station and the vast turbine hall of the London power station offer immense and exciting exhibition spaces that would certainly be considered as oversized and too expensive in a new building. But at the same time, neither site has retained any technical element apart from the building itself – a turbo-generator or a locomotive – to remind visitors of former uses. It is possible to visit the Orsay museum in Paris without realising that this was originally a mainline railway station. But, then again, does this matter?

Centrale Montemartini, Rome

Another power station, this time in Rome, offers another perspective. Inaugurated in 1913, it was the first publicly-owned electricity generating plant in Rome, named the Centrale Montemartini after one of its founders. Since 1997 it has been used as an archaeological museum displaying Greek and Roman sculptures, but at the same time retaining most of its remarkable technical equipment: boilers, gantry cranes and two huge diesel engines installed in 1933. The striking juxtaposition of antique marbles and monumental twentieth-century machines leaves no visitor indifferent and raises stimulating questions about museum discourse, about the emotions we expect from visiting museums and about the staging and interpretation both of classical sculpture and of technical history. This museum also offers a transition to my next category, the disused industrial site transformed into a museum of itself.

Transformed into a museum of itself

For 'friends' of the industrial heritage, one of the most favourable outcomes for a disused industrial site, particularly when the site in question retains its production machinery, is the transformation of the site into a museum. This is a solution, however, that cannot be applied everywhere. The public potentially interested in industrial and technical museums, although growing (we hope!), remains a relatively modest and specialised one. Museums of industry all require public or corporate financing (even the Louvre does finance itself from ticket sales and merchandising) and their economic viability does not depend only on the intrinsic interest of their collections: geographical location and accessibility are other key factors. And, if it is to attract people to come back for a second visit, a factory museum must be able to pursue new directions in research and renew its displays; it cannot rely exclusively on a permanent exhibition of old machinery.

Glass museum and workshop, Trélon, Nord

Nonetheless, some factories transformed into museums can be considered as successes. A few French examples here, followed by one from Greece. The Corderie Vallois, situated near Rouen in Normandy, was originally a water-powered cotton mill, erected in the 1820s. Towards the end of the nineteenth century, it was acquired by Jules Vallois who converted the site to manufacture ropes, cords and cables, many of which were used as transmission belts for local textile machines. The factory which, at its most prosperous, employed about forty people, closed in 1978 but all its late-nineteenth century machines were still in place with their shaft and belt transmissions running from a Poncelet type water wheel. The industrial museum was opened in 1994 and is a lasting success. For schoolchildren in particular, it offers a striking impression of a small-scale rural factory of the late nineteenth century, with all the machines in movement, still driven by the water wheel. It is a museum which adds authentic sounds and waterside and oily mechanical smells to the senses habitually mobilised in a museum visit. Trelon, in the north of France, near the border with Belgium, is a former glass works for bottle making which retains its kilns of 1885 and 1926 in a late-nineteenth-century hall, where there are also demonstrations of contemporary glass-blowing. At Saint-Félix in the Oise department to the north of Paris, you can visit a small rural brush-making factory which still uses its remarkable water wheels and transmissions and keeps its workshops more or less as left. At Cerdon, in the Ain department, another water-powered site, the factory-museum recently acquired by the local authorities demonstrates the manufacture of copper ware. Finally, on another scale and in a different country, Gazi, in Athens, only about a kilometre from the Acropolis, is at one and the same time a cultural venue for music and dance festivals and an exceptional site museum showing and explaining what is probably one of the last surviving gasworks in Europe, complete with its nineteenth-century retort houses, gas washing plant and gasholders.

Replicated industrial spaces

In order to preserve their parietal wall paintings, prehistoric caves such as the ones at Lascaux (Dordogne) or near Marseilles (Grotte Cosquer) cannot be visited by the general public and replica caves have been created for the appreciation of these exceptional sites. In the field of industrial heritage, replicated structures are rare but a parallel is to be found at certain mining sites where, for technical, security and economic reasons, visits to underground workings are out of the question, and replicated surface galleries have been built. At Oignies and at Alès these 'mines-témoins' as they are called were in fact created for training purposes, whilst elsewhere, at the historic mining centre of Lewarde, at the Saint-Etienne mining museum, for example, or at Tourve (Var), at the museum of bauxite mining, the galleries have been specially built to replicate underground working conditions and display the evolution of construction, transport, ventilation and extraction techniques.

In activity… but also a museum

The last category I wish to present is undoubtedly the one that is the most appealing and the most satisfactory for people like ourselves, the friends of the industrial heritage. It is the category of places of industrial production that are in activity, but where owners and managers, conscious of the historical, technical or architectural interest of their site, strive to reconcile the constraints of on-going industrial production with preserving their heritage and sharing it with the public. Some electricity generating power stations such as the Cusset hydroelectric power station, one of the most powerful in the world when it was opened in 1899 on a derivation of the Rhône near Lyons, can fall into this category.

The EDF (French electricity generating board) can open this site to visitors without any difficulty or risk.

Brush-making museum, Saint-Félix, Oise

In France, in general, the handful of such 'heritage factories', where visitors can observe different aspects and stages of industrial production, are sites producing traditional, up-market products where the visit generally comprises a passage through a gift shop and where the visit itself, promoting traditional know-how and, perhaps, traditional machines, is an element of corporate communication. A few examples here: the Castellane champagne factory at Epernay, with its sparklingly exuberant architecture and remarkable 66-metre-high water tower, already a striking advertising totem for the city and for passengers on the nearby railway, when it was built in the first years of the twentieth century; the Saint-Louis crystal glassworks, dating back to 1586, where the discovery of a purpose-built museum space and its collection of 2 000 pieces of crystal is completed by a visit, via an overhead walkway, through the workshops; the Fer à Cheval soap works at Marseilles, where the steamy production halls, with their nineteenth-century vats recently given historic monuments protection, are open for guided tours once a week. Two exceptional sites to conclude: The first is France's last nail manufacturer, the Rivierre factory at Creil, an industrial city 50 km to the north of Paris. This factory produces an incredibly broad variety of nails (2 800 references!) on machines which date, for the most part, from the late nineteenth century. Since 2008, guided tours of the workshops have been organised one day a week and at weekends. At

a human level, the director of the factory, Luc Kemp, underlines how important these visits are for the factory's twenty or so workers, who have new-found pride in their technical skills and are only too happy to share with visitors an appreciation of '*la beauté du geste industriel'*, the beauty of industrial work.

The last site I wish speak of is the Manufacture Bohin, the last factory in France to produce needles and pins. In splendid 1880s buildings set in the charming Normandy countryside, this factory has been acquired by the local authorities and is now managed as a museum, but a working museum, where the Bohin firm still manufactures its needles and pins which are exported throughout the world. The workshops here feature as an integral part of the visit, which presents not only the picturesque story of founder of the factory, Benjamin Bohin, but also the context of the local iron-working establishments, the industrial landscape of the river on which the factory is implanted and the different uses of the pins and needles made in the factory. The itinerary through the workshops brings the visitors as close as possible to the 27 distinct operations needed to make a needle, and allows them to converse with the workers and learn from them. Today, about half the factory's turnover comes from the sale of its products, the other half this intelligent form of industrial tourism.

Bohin needles and pins factory, Saint-Sulpice-sur-Risle, Orne

In 1995, before their inauguration as a museum, the Bohin buildings were given statutory protection under the terms of French legislation on historic monuments. Superimposed on the categories outlined above, and varying from one country to another, other categories could be identified in terms of statutory protection: 'classified' as a historic monument, 'inscribed' as a historic monument, scheduled, listed, labelled, designated, merits statutory protection, would have deserved statutory protection…

From stone to turbines: the industrial evolution of the Alto Paraná region seen through archaeological and historical research.

Mirtha Alfonso Monges

Archaeologist at MUSEO de ITAIPU – Tierra Guaraní. Paraguay.

This article's intent is to describe and highlight the industrial development of the Alto Paraná region, located in the southeastern part of Paraguay in the border with Brazil and Argentina.

The definition of industry implies the transformation of raw material into tools and general goods useful for the economic strategy of a specific human group within a determined period. Usually, when we imagine "industry" we see big machinery and buildings, so we tend to forget that this picture of industry first appears during the "industrial revolution", in the 18th and 19th century[1]. Before this time, there were already different types of industry, creation of products and transformation of raw material, but they were mainly associated with craft and not with mass production[2].

ITAIPU Binacional

[1] The Nizhny Tagil Charter for the Industrial Heritage, 2003

[2] Campagnol, G. 2011. Industrial Archaeology and Brazilian Industrial Heritage. Preservation Education & Research PER. 4. 1-18.

This is why, when we talk about industrial archaeology and its evolution in a determined period and for a specific society, it is important to take into account all prehistoric and historic periods, because not all cultures had the same social and material development.

Paraguay and specially the Alto Paraná region had a very peculiar industrial development, as we know it today, which started much later than in other parts of America, and was thoroughly defined by political and social changes. To understand the shifts and turns of this period, it is necessary to have a panoramic view at Paraguay´s early development.

Before the arrival of the European colonizers, the current territory of Alto Paraná had already been occupied for at least 8.000 years by nomadic hunters and gatherers, divided by the archaeology in three groups, based on their material culture. This period known as Paleolithic in Europe and Paleo-Indian in South American contexts, was differentiated by the manufacture and use of stone, bone and wooden tools, from which only the first are preserved in archaeological sites, with some exceptions for the last two. These stone stools were the basis for the economic development of the groups and essential for their survival, used mainly in the preparation of food and as weapons in the form of spears and arrow points. Evidence of these human groups known as Humaitá/Alto Paranaense, Umbú/Mocoreta and Eldoradense, can also be found in Argentina and Brazil[3]; the oldest evidence for the presence of this settlements in the actual Paraguayan territory were found in Alto Paraná during archaeological excavations in the 1970s, before and during the construction of the hydroelectric plant ITAIPU Binacional[4].

Around 2.000 B.P. a new group of settlers appeared on the territory: the proto Jê family[5]. They brought a new social and economic organization, characterized by sedentary settlements in pit houses, horticulture and the making of ceramic pots and vases; although hunting and gathering remained an important economic activity, incipient agriculture took a much meaningful role.

Ca. 1200 B.P., the Guaraní arrived to the region, presumably from the amazon basin of the Madeira River, moving north to south and subjugating other populations they found on their way. Their economy, mostly based on agriculture, for which they cleaned and burned great portions of the native forest, became essential to their way of life, supported by hunting and fishing (done by men) and gathering (a female activity). Their pottery was much more developed than the proto Jê, increasing in size, ornamentation and utility; among them, the big funerary vessels are prominent, for their use in the preparation of food and the ceremonial drink "*kayguy*", and then as mortuary vessels[6]. Pottery was essential to the Guaraní way of life, and was present in their mythology, daily life and rituals.

[3] MENGUIN, O. El Altoparanaense, 1955. 177 – 197
[4] FOGEL, G., 1979. Investigaciones históricas, socioculturales y arqueológicas del área de ITAIPU.
[5] NOELLI, F.; SOUZA, J., 2017. Novas perspectivas para a cartografia arqueológica Jê no Brasil meridional. Boletim do Museu Paraense Emílio Goeldi. Ciências Humanas, v. 12, n. 1, p. 57-84, jan.-abr. 2017
[6] BONOMO, M.; ANGRIZANI, R.; APOLINAIRE, E.; NOELLI, F., 2014. A model for the Guaraní expansion in the La Plata Basin and littoral zone of southern Brazil. Quaternary International 356, 54 – 73.

Guaraní and Je stone tools

Guaraní pottery – Funerary urn

Therefore, in these two periods, we see a dramatic change in the economic activities of the inhabitants, migrating from lithic industry, hunting and gathering to agriculture, although incipient, and the production of ceramics. Through this, the Guaraní were not a nomadic group anymore, but a sedentary one, although some periods of ecologically motivated migration were part of their mystic worldview, in the search for the land without evil or *yvy marane´y.*

This scenario drastically changes once more, around 1524, with the arrival of the first European explorer, the Portuguese Alejo García, the *de facto* discoverer of the current Paraguayan territory; with him a new and very important element is brought into the land: iron. Meetings with the natives required the exchange of courtesy gifts, during which knives, fishhooks, axes and similar iron artifacts took a prominent role. At this point, it is important to notice, that by the time the first Europeans arrive to the current Paraguayan territory, the Guaraní and other native groups did not know how to work and create tools out of metal.

The arrival of the Jesuit missionaries into the Alto Paraná territory first in 1619, and later in 1624 to establish a mission with the Guaraní, was intent to create a safe route and evangelization posts between the earlier founded southern Paraná and the northeastern Guairá reductions. Natividad de Nuestra Señora del Acaray, as the Jesuit mission was named, was a post that, although very well organized and populated, with a church, a school, and an orchard, as it is mentioned in the Annua letters[7], could not further develop into a town of sorts, because of the *bandeirante*[8] attacks in 1631, that started in the Guairá reductions, a period that is known today as the "Guairá exodus"[9]. The Guairá Indians and Spanish settlers were forced to migrate down the Paraná River and reached the Acaray mission, were they settled for almost a year. However, the menace of the *bandeirante* advances, forced both the Jesuit fathers and the Guaraní settlers abandon the Acaray reduction and flee south to the mission of Corpus Christi[10].

This context allows us to understand the change from the Guaraní agricultural self-sufficient system into the missionary work, which kept agriculture as a subsistence method, but introduced new tools to its practice, as well as structural changes to living and worship areas. The traces of this mission, whose remains were lost in the deep Alto Paraná jungle, were unearthed in the 1970s, through archaeological and historical research, and remain to this day an important research subject for the ITAIPU Museum. Rest of metal knives, fishhooks and nails were found, as well as adobe and cane, both used in the construction of habitation structures, as opposed to the typical Guaraní "*roga*", with walls made of wood and roofed with straw or palm leaves.

Another important aspect was the production and harvesting of yerba mate, a native plant that grew wild in the forest, whose leaves the Guaraní used for infusions with

[7] The Annua Letters (Cartas Annuas) were the yearly correspondence of the Jesuits, sent from their posts to their superiors in Asunción or Buenos Aires.

[8] Reduced Guaraní Indians were free of the mandatory service to the Spanish and Portuguese crown. The bandeirantes paulistas or mamelucos, were pirates and slavers from São Paulo and Rio Grande do Sul, who despite the prohibition attacked the Jesuit missions in order to enslave their settlers and take them to the main cities.

[9] MONTOYA, A. R., 1639. Conquista espiritual hecha por los religiosos de la Compañia de Iesus, en las prouincias del Paraguay, Parana, Vruguay, y Tape.

[10] FOGEL, G, 1999. Sociedad, Cultura y Dinámica Regional. 260 - 269

recreational and medicinal purposes. This plant both scandalized and intrigued the Jesuits, who first banned its consumption but then started planting, harvesting and exporting it themselves. The Alto Paraná jungle was rich in natural yerba mate plantations, and therefore, the establishment of new missions in the territory was made with the intent to secure the natural *yerbales* for the Jesuits, as well as for religious and strategic reasons.

After the *bandeirante* invasions, the situation changed for the Alto Paraná. While Asunción and the southern cities continued their development into urban and commercial centers, the Alto Paraná remained unoccupied. No cities were founded or colonization posts established for almost 200 years in the region. In 1811, Paraguay severed ties with Spain and achieved its independence. Through a succession of provisory and dictatorial governments, the yerba mate in the Alto Paraná remained a constant economic asset; expeditions were send to the region in order to harvest it and to establish a permanent post there. In 1844, Carlos Antonio López assumed the presidency of Paraguay as it first constitutional President and passes acts in 1843 and 1846 ordaining that all forests and *yerbales* become property of the Paraguayan state; a decree issued in 1848 also suppresses all indian villages, thus disbanding towns and settlements founded by the Jesuits in ancestral Guaraní territories, beginning the systematic extraction of timber and yerba mate, for its exportation[11].

This measures didn´t affect the Alto Paraná in the way that affected other towns; the eastern Paraguayan region had no colonial settlements but was very important to the government for its vast natural *yerbales.* Explorers and workers were send in order to establish extraction posts and the sporadic encounters between workers and Guaraní Indians living in the deep Alto Paraná forests were not so friendly. This situation forced the government in Asunción to devise a colonization plan for the region, offering lands and subsidies to the families adventurous enough to move into the territory. Some took the risk and moved temporally, but to no permanent success.

While the government in Asunción struggled to remain in control of the region, the rest of Paraguay was living an industrial revolution: railways, ships and machinery are bought and brought from England and France, along with technicians who came to train Paraguayan workers and supervise the building of factories and industrial establishments; a brand new iron foundry is built in La Rosada where weapons, machines and other goods were produced. The export of cotton, yerba mate and timber reach new levels thanks to the foundation and modernization of ports and shipments.

This optimistic scenario changes with the death of Carlos Antonio López in 1862. He is succeeded by his son, Francisco Solano López and three years later starts one of the most tragic episodes in modern history: the Triple Alliance War that confronted Argentina, Brazil and Uruguay against Paraguay for five years, until its end in 1870, leaving Paraguay devastated, with 90% of its male population and nearly 60% of its total population dead. Again, the Alto Paraná region remained untouched by the cruelty of the war; no battles were fought in its territory.

A decree issued in 1885 by the post war government in Asunción, with Bernardino Caballero, a war hero as President, determined the sale of all state-owned *yerbales* and

[11] TELESCA, I. Paraguay 1848: pueblo de indios y conformación del Estado.

forests. La Industrial Paraguaya S.A. (LIPSA), a Paraguayan – Argentinian company was one of the main buyers, acquiring the monopoly for the extraction of yerba mate and timber for 100 years[12]. Here is where the modern industrial development of the Alto Paraná begins, as well as its formal integration into the Paraguayan territory; towns, villages and ports emerge in the middle of the jungle: Tacurú Pucú, today known as Hernandarias, where the main port was installed, nearby the settlement of the late Jesuit mission Natividad de Nuestra Señora del Acaray, Puerto Presidente Franco and Itakyry, where the general administration of LIPSA was located.

The figure of the worker of the *yerbales,* known as Mensú[13], becomes relevant in popular culture. Slavery and ill treatment of the workers is denounced by the press, along with poor sanitary conditions and wages embezzlement by the companies.[14] The situation was aggravated due to the fact that LIPSA and other similar companies held a monopoly over the sale of essential articles, such as food, clothing and medicine; workers could only buy what they needed from the company´s storehouses to exorbitant prices, often through discount system, in which the acquired goods were discounted from the worker´s payment usually leaving him in debt due to the high prices. A significant change in the system is reported in the 1930s, after the Chaco War against Bolivia; many of the workers went to fight in the war and when they came back to their post, embolden by the victory and demanded better work and living conditions.

Mensu carrying yeba mate bundles

[12] GOMEZ, C., 2010. El Paraguay de la Post Guerra: 1870 – 1900.

[13] The word "mensú" comes from the term mensual or monthly, referring to the system of how salaries were paid to the workers.

[14] BARRET, R. "Lo que son los yerbales paraguayos", article from El Diario, 1908.

The exploitation of *yerbales* was a high profitable business, because of the cultural and social role of yerba mate consumption in in Paraguay, Brazil and Argentina. Infusions of crushed mate leaves are prepared with hot water and receive the name of *mate*; *tereré*, however is drunk with cold water adding other refreshing herbs to the mixture.

Machinery, tools and vehicles are imported from Europe and brought into the country by the port in Buenos Aires. The extracted timber rolls and yerba mate bundles were transported on the river in "jangadas", a system that consisted in tying logs of hard and soft wood tightly together and sending them down the river to the closest port; from then on, they were tied and carried into alzaprima carts, pulled by oxen. Later, motored carts were used.

By 1950, the territory granted to LIPSA included 2.647.727 ha, around 17% of the Paraguayan eastern region. Around 1960s, existences of yerba mate and timber in Alto Paraná started do decline due to the massive extraction. LIPSA started to sell its properties, partly to new landowners, some of them foreigners and partly back to the Paraguayan state.

Political uproar began again due to a centuries old conflict between Paraguay and Brazil regarding the Guairá Falls, leading to the mobilization of Brazilian troops and the occupation of the disputed territory between both countries. A diplomatic solution is reached in 1966 with the Yguasu Act; a mutual understanding that stopped all military attempts and laid the foundations to "the hydroelectric exploitation of the Paraná river as far as the Guairá falls"[15]

The ITAIPU treaty was signed in 1973, after several technical studies were undertaken on the upper course of the Paraná River, in order to find the most viable post on which the hydroelectric complex was to be build, and to evaluate the cultural, sanitary, demographic and environmental impact of the project.

ITAIPU Binacional, property of Brazil and Paraguay was officially created in 1975, year on which construction work on the chosen site started. More than 40.000 workers were employed in its construction. In 1981, the first of the current 20 generator units was installed, with energy production starting in November 5th 1982, thus becoming the world´s largest hydroelectric plant. This record was held until 2006, when the Three Gorges Dam, located in China, was completed. ITAIPU still remains the world´s largest generator of clean and renewable energy, breaking the record of 100.000.000 MWh generated in 2016.

Industrial development in Paraguay it's irrevocably linked to political and social changes, but modern industry can also become sustainable in many ways. ITAIPU supports several research and conservation programs for water management, biodiversity, cultural heritage, health, infrastructure and education. It provides not only the funds to other organizations that foster similar programs, but has created inside its own organization chart, units and facilities like museums, wildlife research centers, laboratories, and natural protected areas, all attended by highly capable professionals.

[15] Iguasu Treaty, 1966

Industrial heritage is a new concept in Paraguay, its importance it´s starting to be understood by society, but it is still linked to painful past episodes and thus regarded as irrelevant for our culture by the broad public. A lot of research and valorization is still to be done for the public to understand its relevance, and to value real knowledge against the popular beliefs and myths.

The ITAIPU Museum is in charge of telling this story, the regional evolution and development, as well as ITAIPU´s own history since its creation to this day. Industrial development in the Alto Paraná region continues, becoming the real engine of Paraguay and Brazil´s own evolution. It is our work, as a museum, as researchers and cultural promoters, to unveil and communicate its past in order to project a better future.

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Genesis pottery production in Azerbaijan based on the archaeological collection of the National Museum of History of Azerbaijan

Makhfuza Zeynalova

Deputy Director, Chief Curator of the National Museum of History of Azerbaijan.

Traditional crafts and skills are one of the forms of artistic expression of folk arts. For centuries, passed down from generation to generation, they have formed the historical, spiritual, and aesthetic experiences of people, as well as spiritual and moral foundations of human development.

The importance and significance of the research is also defined by fact that there is an urgent need to enhance the protection of the cultural heritage, as well as revival of the traditional ethnic culture, and its further development. Over time, pottery making has become one of the oldest and most widespread of the decorative arts in Azerbaijan for its simplicity of use and through its convenient handling, usability in different spheres of life.

The primary objective of this ongoing study is to investigate and examine the development process and emergence of pottery crafts, identify specificity of types and ornamentation of pottery ceramics in its different stages.

The history of pottery in Azerbaijan dates back to over 10,000 years ago, during which this type of handicrafts pottery seems to have undergone a process of adaptation and modification in terms of production techniques, shapes, ornamentation, which particularly depended upon purpose and application of items. The collection of pottery of the National Museum of History of Azerbaijan is the largest in terms of the number of items (museum's archeological and ethnographic funds). The pottery collection represents all historical periods of human activity on the territory of Azerbaijan starting from the Neolithic age until the present day. Household items, implements of labor, tools, pottery objects used in rituals and cults, were mainly products of local craftsmen. The main factor of multifaceted pottery development in this region was the presence of raw material sources - clay deposits. Over 80 different types of clay have been unearthed within Mingechevir, and a large number of clay objects was characterized by an extraordinarily high ceramic value, being used not only as construction material, but also as high-grade ceramics (2, c.10).

The oldest samples of the Neolithic and Eneolithic period were rude, irregularly shaped, thick-walled, unburnt molded utensils. Designs being executed in clay, either in relief or as incised ornaments on large vessels pertaining to the Eneolithic period were found on the territory of the Kur-Araz, between two rivers, and its analogies could be traced to the Early Bronze culture (4, c.30). It should be noted that the Bronze age in Azerbaijan is represented by three archaeological cultures - the Early Bronze - the Kur-Araz, the Middle-Nakhchivan, the Late Bronze age - Khodjaly-Kedabek, while crafts became increasingly specialized and crafts market became increasingly diverse. Each culture had its own techniques, shape, color of clay and ornamentation.

The Kur-Araz archeological culture existed approximately between 4,000 BC and 2,200 BC (twenty-two hundred) on the territory of the North Caucasus, Transcaucasia and in the neighboring regions of the Middle East (the Caucasus, Eastern Turkey and Northern Iran). Culture –bearers lived in fortified dwellings and its walls were built of mud bricks. So, in the Kur-Araz settlements similar forms of residential architecture are observed in the form of circular-plan buildings with Eneolithic monuments (8), which testify to the tradition of continuity. The main occupation in this period was agriculture and cattle breeding. During this period the great majority of population was engaged in crop farming and animal husbandry.

On the territory of the Kur-Araz cultural, archaeologists have unearthed numerous artifacts proving the existence of the cult of a bull, which symbolized strength and fertility. These included clay vessels with handles resembling the nostrils of a bull, and numerous clay zoomorphic figures, among which cattle were the most common and prevalent.

In the meantime, extraordinary ornaments are found on the vessels of the reviewed period, and some of the scholars noticed the resemblance of the ornament to pictographic script. One of the reasons therefore lies on the fact that the ornament is devoid of rhythm and repeatability of elements, which allows us to judge more than just the decorative designation of its constituent characters. Kuro-Araz culture further significantly impacted the subsequent Trielian culture (nearly 2, 200 - 1, 500 BC) (5, c. 56-58).

The Middle Bronze age on the territory of Azerbaijan is represented by the Nakhichevan archaeological culture (II millennium BC.), explored and studied on the basis of the monuments of Kultepe I, Kultepe II, etc. (*3,* c. 9).A large number of exquisite monochrome, as well as polychrome glazed ceramics were unearthed in the ground burials, stone boxes and barrows of the reviewed period. Of particular interest are pitchers with a handle and tea-pots.

The late Bronze Age and the Early Iron Age are represented by Khodjaly - Kedabek archaeological culture (13th-7th centuries BC) (11). Besides bronze weapons and adornments, large amount of pottery was unearthed in ground burials and barrows - black and gray glazed ceramics of unique shapes and decor, being a valuable historical source for studying the tangible, intangible and spiritual history of Azerbaijan. Of particular interest are zoomorphic vessels, which, besides its household purpose, had a decorative and ritual character. There are unique boot-shaped vessels with curved tops (2, c.50-51), the shape of which is testifying that in the 1st millennium BC people in this region had already been making leather shoes. This type of Caucasian boots existed in Azerbaijan until the beginning of the 20th century AD. The other interesting artifacts are clay vessels and stamps with solar symbols attesting to the beliefs of the ancient people. Decoration applied to the pottery objects used techniques of inlay, and fancy pattern in the form of deep cuts was filled with inserts of white paste.

Similar ceramic products with ornamental motifs in the form of wavy lines, circles, triangles, which were discovered mainly in ancient Ganja, were made until the era of antiquity (14, c. 70-72).

Pottery art of the Caucasian Albania was also reflected in burial rituals in the form of jar graves burial, pertaining to the 4th century BC - 8th century AD. Initially the dead were buried in large earthenware jars in a heavily contorted position on the side, together with burial implements containing household items, metal objects (bronze and iron tools and weapons, bronze, silver and gold jewelry), wood, stone, clay, glass and paste, etc. This culture belonged to sedentary farming dwellers that were also engaged in cattle breeding, hunting, fishing and crafts.

In the Hellenistic era new type of pottery products were introduced into the craft, such as rhytons and vessels with images of mythological unicorns, etc. During this period, along with geometric ornaments on pottery, famous craftsmen made their own stamps on ceramics. Craftsmen, potters from Caucasian Albania also produced a large number of objects of art ceramics, distinguished by high technique of design, richness of forms and ornamentation. Thus, excavations of recent years show that roofing tiles were made in Albania in the Hellenistic era (7, c 91). Zoomorphic and anthropomorphic decorative vessels are distinguished by specific grace, beauty and originality (13, c.9-14).

The aesthetic priorities of that period were reflected in the highly artistic objects of the Yaloylu-Tepe archaeological culture, which were in the form of globular shaped vessels, with a three-petal corolla, elongated drape in the form of a pelican beak and one ribbon-shaped handle, a black and red baking vase on one and three legs (6, 92). Burials and ceramics of this culture were unearthed throughout the territory of Caucasian Albania. Thereafter, according to the area of its extension, established as a result of archaeological explorations, it is possible to trace the ethnic affiliation of the population, territory, as well as even the country's borders (10, 91).

Therefore, raised on ancient local roots, distinguished by a wide variety of forms, this ceramics have much in common with the ceramics of Asia Minor, the Eastern Mediterranean and other regions (12, 48,100).

The manufacture of toys was also coincided with the old pottery production. Hand-molded toys of red clay - animals, whistles, dices and other objects are astonishing by the softness of the outlines and the ingenuity of the masters.

Clay also served as raw material for the re-creation of deities - idols of female forms, with distinct signs of reproductive characteristics. The navel was especially decorated the chest and neck were covered with adornments.

However, these objects of burial decoration are not only the sources of beliefs and worldview, but also evidence of taste preferences in female fancy decoration, as well as the source of jewelry art of ancient Azerbaijan.

The bright colored glazed ceramics is typical for the era of the developed Middle Ages. Pottery objects of green-brown color were decorated with human's images, animals, and calligraphic inscriptions made in Arabic script which served not only the pattern, but also contained data about the manufacturer.

There are various types of ornamentation and decoration of vessels, bowls, dishes including bright patterns of coating materials, tiles covering the facades of buildings of this period. Glazed ceramic products were widespread, especially among the urban

residents, because besides the utilitarian purpose, painted vessels were part of the interior decoration in the Azerbaijani homes. Furthermore, glazed ceramics embodied a large art culture of the local people.

It should be noted, that history of glazed ceramics in various areas of the medieval world, has common ground, as well as general features with general trends showing further progress, representing a unique historical and artistic phenomenon. Therefore, these artifacts are evidences of cultural links and countries' and people's interaction in the Middle Ages (15, 139-159).

Of particular interest are the spheroconical vessels, in terms of shape and application, which were discovered in the Middle Ages, not only in Azerbaijan but also in Egypt, West Asia and Asia Minor, Iran and Central Asia, the North Caucasus, the Crimea and the Volga region.

The main characteristic and typical feature of these vessels is spherical upper and conical lower parts. The common shape of the lower half of the cone is completed by variations of the bottom: elongated, pointed, rounded, flat, etc. Spherocones have a neck in the form of a small hole with a diameter of 3-8 mm, designed to hermetically block it. Spheroconical vessels were made from fine-grained refractory clay. The outer surface of the vessels was made according to different techniques; most of these objects were decorated with overhead and stamped patterns. With completely smooth and glossy surface, the vessels were often covered with marks, symbols, inscriptions and imitations of inscriptions. The purpose of the sphereconical vessels has not been resolved yet.

The complete disclosure of the purpose of the object is more complicated by the fact that besides its direct application and purpose, these items continued to serve the same purpose in everyday life afterwards as well (1, 24-29).

The underground pottery water pipes of the 11th-12th centuries, found during archaeological excavations near cities such as Ganja and Gabala, are the evidence of high urban culture. In this period Azerbaijani towns were distinguished by a higher level of accomplishment. In these towns, constructions such as underground vaulted tunnels with water pipes were discovered. The elements of the water pipe were clay pipes with a diameter of 12 to 20 cm and in length up to 60 cm with a socket at one end, in which was inserted the narrow end of the other pipe. The water supply network extended to the center of the city with a slope and provided a pressure in order to supply water to the houses. Furthermore, towns had a solid and broad network of clay water pipes that supplied people with spring water (9, 20-21).

Pottery traditions are traced in the subsequent period in the history of Azerbaijan. Figurative ritual vessels, which were primarily created to perform various religious rituals, continued to serve the same purpose in everyday life in subsequent periods as well. Pitchers, bowls, flasks, and etc., were used since ancient times and continued to serve the same purpose in everyday life afterwards as well.

Thus, according to the materials collection of the National Museum of History of Azerbaijan we can trace all stages of the development of techniques, forms, and ornamentation of pottery, proving the identity and recognizable features of local products.

In addition, more complex vessel structures and pottery techniques demonstrate long-duration and deliberate processing of its adaptation for use in everyday life.

So, various forms of ceramics and terms used to describe the pottery products, as well as the decoration applied to it that reached our time, attest to the higher level of welfare and recreation needs and aesthetic tastes of our ancestors.

Thus, historically, pottery has always been one of the oldest and most widespread crafts in Azerbaijan from the oldest Neolithic layer to this day, which reveals the traditions of genetic continuity. At the same time, the presence of various (technologically, typologically and ornamentally) ceramic collections, testify to the development of this type of craft in conjunction with trade and craft centers of the East.

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Industrial Heritage of the past on the modern Landscape of Qala village (on the base of funds of Qala State Historical – Ethnographic Reserve).

Malahat Farajova

Director of Qala State Historical –Ethnographic Reserve

"The study of the past can only be constructed by archaeological approaches to the material record of the past grounded in social theory, relevant Ethnography and an understanding of fundamental human processes."

Andree Rosenfeld

Historically, the Absheron Peninsula has consisted of 32 villages. The archaeological, epigraphic and numismatic studies carried out here show that Qala village attracts more attention from its scientific and practical significance. The caves, kurgans, temples, remains of fire found in this area cover the period from the second half of the III millennium to the first half of the second millennium BC.

The historical part of Qala settlement was established as Qala State Historical Ethnographic Reserve in 1988. It was reconstructed by Heyday Aliyev Foundation and opened to the public in 2008. 228 architectural and archaeological monuments from Bronze Age until medieval time are reserved here. The oldest found monument is ancient settlement that dated back to III-II millennium B.C. There are five mosques, three bathhouses, and four reservoirs, remains of castle, mausoleum, tombs and dwellings (houses) among the architectural monuments in the territory of Qala village. There are also monuments of industrial heritage (pottery and blacksmiths yards, underground water supplies, salt extraction, and oil derricks).

Pottery and blacksmiths yards

In medieval period, the pottery and blacksmiths yards turned to workshops. There were five districts in Qala Village in middle ages: Tarakama, Haji Ramadan, Balaverdi, Tatlar, Chambarakend.

Many carpets were weaved in each house and they were known with their names. The experts proved that the main source of Absheron carpets was Amirjan and Qala villages.

One of the blacksmith workshops that belong to Middle Ages in Qala village situated at the crossing of Tarakama and Haji Ramadan district. This workshop was restored in the middle of 20th century.

Underground water-supplies

Drinking water line was drawn by underground water-supply wells from Khasha-Khuna, not far from Gala. The water was delivered with ceramic pipes. The ceramic pipes is covered with limestone stones to protect the pipes from being damaged..

At the beginning of the 19th century, drinking water line was drawn by underground water-supply wells to Qala from the place called Khasha-xuna, which was not too far from here. It was necessary to draw underground water supple from Qurat gardens- 150-200 meters north of this area to Khasha-khuna gardens in order watering here. Ovdans- water reservoirs, wells, underground water supply drawn from Khasha-khuna were used for covering the population's water demand. These water wells were situated in front of the mosques

People drew underground water supply from different sources or used ovdans- reservoirs and wells, which was characteristic in Absheron at that period in order to cover population's water need, also in agriculture, and in cattle breeding.

People used methods like winding, windmills, traction, and crankcase for extracting water from the well. Underground water supply system arranged beginning from Balaverdi district –the upper part of the village – crossing from Chamabarakend and Haji Ramadan districts and ending in Tarakama district- the lower part of the village- through the territory of Qala. Underground water supply was systematic. Wells were drilled sloppy in order to ensure that water flow easily.

People used wells for extracting water. The rest of the water was collected to a big reservoir near Bayramali bathhouse in Tarakam district (nation's bath-house, repaired by a person by name Bayramali in 1881 according to the epigraphic writing), the other to an empty place-puddle forward the wells on the road side. People used the water of reservoir to wash their clothes. They brought their animals to the puddle for watering them.

Salt extraction

Archaeological and historical information, as well as ethnographic materials, indicate that Qala was one of the oldest industry and trading centers. Salt, livestock products, etc. in trade of transit took the main place. Also, 72 defenses found in the Qala reserve prove it. Qala was well known for its salty lake. The salt extracted from this lake was considered as the best quality for its taste and whiteness. European traveller- Kempfer who visited Qala village in 17 century noted that this salt differ for it whiteness and not being bitter. Salt production has also played an important role in the employment of Absheron population, as well as in Baku's trade with other regions of Azerbaijan, in commodity exchange and in commodity-trade relations with foreign countries. The history of salt extraction and salt production in this territory relates to a period before Christ. The salt residues found in Turkan village during archaeological prove it.

An English traveller- Shupov who visited this area said: "*There are two salty lake around Baku. People extract salt from these lakes with the help of natural climate*".

Masudi, a medieval Arab author, notes that salt plays an important role in the foreign trade of Baku. Abd al-Rashid al-Bakuvi wrote that there were homegrown salt and very good quality salt was produced for sale with other countries in Baku. At that time, the high quality Absheron salt was exported mainly to the Caspian countries, Iran, Byzantium, Russia, Central Asia, Iraq, Syria, India, China and other countries. Marshall Biberstein, who was in Baku in 1796, wrote that, salt brought a lot of income to Baku as oil. In the second half of the XVIII - the beginning of the XIX century, in every year income of the Baku khanate from oil and salt was about 40,000 manats. Farm labours

were engaged for extracting salt. Most salt lakes were at the disposal of the state treasury.

In the 30's of the 19th century, every summer about 30000 calves were collected from Absheron salt lakes. The length of Qala salty lake was 1 verst 125 sec and the contour was 3 verst 300 sec. The salt extracted from Qala salt lake differs with it quality, whiteness and not being bitter. This salt was filled to the sacks and brought with caravans and besides using in the household.

The legend has spread among local people about salt as it so the local khan aimed to lease the salt lake for profit. However, suddenly the lake covered the bloodstream. Seeing this, the khan changed his decision. Therefore, people used the same salt without any payment as before. This salt was used for treatment among people widely ancient times.

Oil derrick

On the bank of Shor lake-in the south-west of Qala village oil derricks of Benckendorf-one of the important oil fields are situated. Concerning A. Benckendorf, he received patent for his declared invention "Bore for an air-to-water drilling" from Department of trade and manufacturing of the Ministry of Finance. In 1835, he became the head of the administration of the second Insurance Society of Russia.

The firm possessed 74 wells of which 54 were production wells from them. The sites of the firm were located in Balakhany, Sabunchy and Surakhany. In the crafts there were 3 mechanic-repair workshops. The "Benkendorf and Co", along with other petroleum producers, built its own gas pipeline with a diameter of 6 inches in Balakhany-Sabunchy district.

In 1889 on Benkendor's field was arranged electric lighting. Not only building and drillings, but also craft itself were lit. In addition, one more not without an interesting touches to the portrait of the "Benkendorf and Co" trading house.

By 1892 year, 8 oil companies concluded with the insurance companies' private insurance for their employees and trade workers. One of these 8 firms was Benkendorf's firm. The priests came to "Benkendorf and Co" Trading House to conduct services for all comers, regardless of their place of work. The note from the "Caspian" newspaper in 1892: "*Passover on the mining*" describes how solemnly celebrated Passover on Benkendor's fields.

"Tables were prepared; workers were going to their baths. In the evening, the table at the club was perfectly ready. The toasts were raised, the zurna was played, and the songs sang and danced. The workers were enthusiastic, generous and gratifying. Meanwhile, tea and various sweets were distributed, and at 12 o'clock, everyone went home. The following evening, tables were set up for Muslim workers on the occasion of the month of Ramadan".

The "Caspian" newspaper reported that there was a strong fire on October 21, 1891 on fields of "Benkendorf and Co" in which stewing all workers selflessly took part. Local population of Qala witnessed heavy fire on fields.

In the nineteenth century a bridge was built over the lake connecting the village of Qala to Benkendorf. During the 80th years, the bridge was destroyed for security reasons.
In 1889, "Caspian" newspaper writes about the company as "the most responsive of local oil firms". Bekendorf took land from local residents of the settlement of the Qala for rent and local residents provided them with goods for their living quarters.

It should be noted that the fragments of old industrial buildings were preserved on the south-west coast of the Shor Lake, which were apparently used for oil storage and buildings oil production.

"Benckendorf and Co" company engaged in charity and was a shareholder in the construction of the children's tuberculosis sanatorium in Buzovna and the children's hospital in Baku.

The funds of Qala State Historical-Ethnographic Reserve let us to reconstruct the landscape of the industrial heritage of the past of Qala village.

Local Volunteers acting as Community Curators: the Rupel Experience

Bruno DE CORTE

Introduction

The Rupel Region is a post-industrial area in Belgium. This region is located next to the river Rupel and covers approximately 46 square kilometers. The five communities have a global population exceeding 58,000 inhabitants.

The landscape was radically reshaped as a result of clay extraction activities and the brick manufacturing process. The kilns, the adjacent drying sheds and the huge chimneys dominated the landscape of the region. So the entire physiognomy of the area is related to one single industry: brickmaking.

The area extends at the north of the river Rupel and comprises the villages of Boom, Hemiksem, Niel, Rumst and Schelle. Next to the River is a geographical questa called the "Boom Clay". This layer was formed in the Oligocene. The Rupel clay is an ideal raw material for the making of bricks. The river Rupel, connected to the river Scheldt (which leads to Antwerp) was the transport factor. Bricks were hard to transport by land, barges were preferred. For this purpose a typical boat type was developed, the "Stonebarge" ("Steenschuit").

Rise and Fall of the Brickmaking Industry in the Rupel Region

Brickmaking started in the Middle Ages with the monks of the St Bernard's Abbey in Hemiksem. In the beginning there were ambulant field kilns, of which we have not found traces so far. In 1358 there was already a permanent kiln. The spreading happened gradually in small scale local units, following the rich clay deposit at the right bank of the river.

Wars, occupations, fire disasters and demolitions caused a decline of the abbey and its related brickmaking in the second half of the 16th century.

A major breakthrough was the Rupel-Brussels Canal in 1550-74. The spreading of the brickmaking over other communities happened gradually in small scale local units, following the rich clay deposit at the right bank of the river. The market for the industry reached now from Brussels in the South till the Antwerp region in the North.

Centuries later another expansion came with opening in 1832 of the Brussels-Charleroi Canal, which made the industrious Walloon region accessible for the stone barges. At that time the Rupel industry became a player on national level.

A big expansion came in 1859 as a result of political and military factors. In that year the great entrenched camp at Antwerp was finally taken in hand, following the lessons the Belgian military staff learned from the Siege of Sebastopol in the Crimean War. This was the start of an nationwide continuous building program of polygonal fortifications, led by General Brialmont. Till the 1880's these large fortresses were made in masonry. This phenomenon kept the demand for bricks constantly very high.

This led towards the emergence of new brick makers in the North and West of the country from 1874 on. These new factories were mechanized from the beginning whereas the Rupel factories kept to traditional methods. The Rupel brickworks were family enterprises which were reluctant to go up in bigger capital structures. The landscape was dominated by these concentrations of kilns. The border of the river Rupel became a wood of chimneys. Very typical was also the adjacent housing phenomenon, which added to the fragmentation of the landscape.

Post-war periods and the reconstruction of devastated areas had a benign influence on the Rupel region, where brickmaking reached its summit in 1957. In the sixties mechanization took command which led to a raise of unemployment. An acceleration of the decline was the Oil Crisis of 1973-74: between October *1973* and January 1974 world oil prices quadrupled, putting an end to decades of cheap energy. As brickmaking depends a lot on energy (also coal prices went up), the fate of the smaller factories was sealed. Between 1960 and 1990 approximately 75% of the brick workers in the Rupel area lost their jobs. From 42 the number of factories went down to five (1991, nowadays only one single enterprise is left). Also related economic branches such as the shipbuilding went down. People started commuting or emigrating to Brussels and Antwerp, housing was abandoned. The population census reached an absolutely low in 1989. The Rupel region became an economical depressed area.

The big empty clay pits gave the region the nickname of the "Moon landscape". The industrial buildings became derelict. To the public, the image of the region was increasingly becoming negative.

In addition there came ecological crime. The clay pits were ideal places to dump toxic waste and governmental control was sloppy. Within a few years, the Rupel area was becoming the trash can not only of the nation but also of adjacent countries. Many scandals occurred.

Economic Aid and Structural Problems

The first reaction to the industrial paralysis was short-sighted: local authorities and the government wanted to fill up the numerous clay pits in an attempt to clean up the old industry and to have terrains where new industries could settle. From 1969 on permissions were given to owners of empty pits for this purpose without any control on the substances. These politics gave ground to strong reaction of the public.

In the eighties, the national government had to deal with the decline of several large industries in Belgium of much bigger size such as steelmaking, shipbuilding, textile industry, coalmining …So there came only little help from the central government. The local authorities were overwhelmed by the economic setbacks. The Rupel Region was truly abandoned, becoming a wasteland with a high endemic unemployment. The local communities were too poor to develop their own initiatives.

In matters of economic renewal the central government started to react in the 80's but the various initiatives for economic regeneration were financially too weak, too short and mostly uncoordinated.

The intergovernmental body between the national government (i.c. Flanders, Belgium is a federal country) and municipalities is the Province (similar to the "County" in the UK), in this case the Province of Antwerp. In October 1981 Governor Andries Kinsbergen stressed the big structural problems of the region. Since then the Province of Antwerp was a key player in the Region. In 1986 the Province bought the huge clay pit "De Schorre" to rebuild it as a recreational space. Nowadays it houses the famous rock festival "Tomorrowland".

The most successful program of the central government was the establishment of an independent Ecological Agency (OVAM, in 1981), which was very concerned about the toxic waste scandals in the Rupel region and quickly proceeded to action. The development of natural reserves and the regeneration of the landscape was since then quite successful. A derelict clay pit – if not polluted - transforms itself automatically into a biotope for extraordinary specimens of nature. So a part of the industrial landscape became recreational zone.

The main problem of the Rupel Region is that it is in fact a too small depressed area and the surrounding areas are wealthy. To qualify for the big EU structural funds (European Regional Development Fund/ERDF), regions must have one of the three objectives set by the EU. These are: to help under-developed regions (with a GDP less than 75% of the EU average); adapting to major economic changes, such as declining rural areas; and helping those with special educational or employment needs.

In the meanwhile the Policy of the European changed a lot in a positive sense, also there is more attention for the cultural heritage. But getting funding from the EU is still a long and difficult administrative process.

To summarize governmental action in the period 1980-2010, there were several basic flaws:

- Funding was over relatively short periods
- Planning was oriented towards a "tabula rasa" of the industrial past of the region, to create a "green belt" where new industries could settle down
- In the beginning there was no interest for the built heritage, so an important part was lost.

On the local level there is the fact that the five municipalities are acting as separate units. The history of all these smaller brickworks was local and so is the "mémoire collective". Worse even is that the neglecting attitude of the governmental bodies led to the destruction of a majority of structures. In Boom, where the grassroots movement was the strongest, a large scale entity was kept: "Noeveren". It would be logic to concentrate everything there but this would cause frustration among the other 4 municipalities.

The Province of Antwerp, in an attempt to stimulate cooperation, created a focal meeting point "Heritage House" ("Erfgoed- en Landschapshuis", ELAH) in 2013. The center wanted to boost the cooperation between the five municipalities of the Rupel Region. Moreover, under supervision of the Province the five municipalities signed in August 2014 an agreement to cooperate in museum matters.

To support local initiatives you really need a holistic plan for the whole region, combining all forces. We had to wait until 2010 for a regional strategic plan to be conceived to enhance the image of the region, including all elements from transport infrastructure till nature regeneration.

Alas, within the framework of the federalization of Belgium the role the Province is diminishing. In 2018 the Province will lose its competence in cultural affairs. This a serious backlash for the development of a heritage policy.

The big issue in regional planning matters is to find a functional balance between future economic developments and the building heritage, the museums, the landscape as well as the current nature.

Popular reaction, grassroots movements and "community curators"

In the seventies the region became an example of ecological crime and gave the impression of a being a "total loss".

To counter this situation a strong grassroots movement started everywhere in the whole region. The development of natural reserves and regeneration of the landscape turned into the biggest ecological struggle in Post-War Belgium. Today, some 100 hectares of former clay pits have been preserved as recreational and ecological zones.

The people who reacted to the deterioration of their region very fast understood that the old sites were in fact valuable heritage. In 1975 a first proposal was introduced to protect some of the built heritage. Also first steps were undertaken to collect objects. Other local initiatives followed, and at the end of the 80's the region had several small clay-related museums run by volunteers. These initiatives were as small candles of hope in a dark night of recession.

Already in 1972 in Rumst the Mayor of the municipality was pushed by locals to create an initiative to collect the relicts of the fast disappearing industry, which became the local museum "Rupelklei". In 1984 in Boom two museums were created: "'t Geleeg" and the "Ecomuseum en Archief van de Boomse Baksteen"(EMABB), in 2005 in Niel the "Niels Erfgoed Archief" (NEA) was founded to collect printed, written and also oral testimonials of the past. Nevertheless, it took ten years of administrative struggle to put the first buildings on the official Heritage List.

The interesting feature of this popular movement was the holistic approach. People were not only concerned about nature and the industrial heritage, but also wanted to preserve skills such as the shipbuilding which was closely connected to the brick making industry.

It is a considerable achievement but nothing is conserved for eternity. To preserve these natural reserves and built heritage, holistic planning and public support are needed.
But only in recent times government finally realized that the key problem of a depressed area is in fact its image. When there is no hope left, nobody will invest. Volunteers are pioneers, but they cannot do everything.

The force of local initiatives is their embedding in the local community. The weakness is that exactly this embedding makes cooperation on a regional level problematic.

Attempts of the Province to merge the various museums into one new initiative proved unsuccessful, because they did not take into account the local feelings and because the collections one wanted to bring together are owned by the local volunteers. Merging various museums would lead to the irrevocable loss of objects, because often the same items are collected in every museum.

The authorities stimulated the registration of the collections, but the application they supplied was not web based. This did not lead to a better inter-local collaboration and moreover the complexity of the input procedure frustrated the volunteers.
The weaknesses of community curators are the ageing of the volunteers and the fact that the way they preserve is not always optimal.

An additional problem is the growing pressure to have the heritage incorporated into tourism. The positive side of this is that tourism generates income. On the other side, it asks for a dedication from the local volunteer and this at the cost of the maintenance of buildings and collections.

Another problem is the Belgian state reform. As from 1st January the Flemish provinces lose all responsibilities in the field of cultural heritage. So governmental support will be temporarily a problem.

Conclusions
What can be learned from this story? The Rupel case is a good example of cooperation of volunteers in an extremely difficult environment, a region which I would describe as "total loss" at a single moment. The balance is positive but we could have done more if not that much time had been lost on topdown planning. But finally, after many years, "topdown" slowly meets "grassroots".

Although there are many insecurities for the future, the positive effect of the community curators on the preservation of the industrial heritage can hardly be underestimated.
Local community curators are a gift to the political leaders. Community curators are pillars of a civic society and deserve more attention and support.

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Intangible Industrial Heritage: The Collections of Audio Interfaces and Transport at the Museum of Portable Sound

John Kannenberg

Introduction

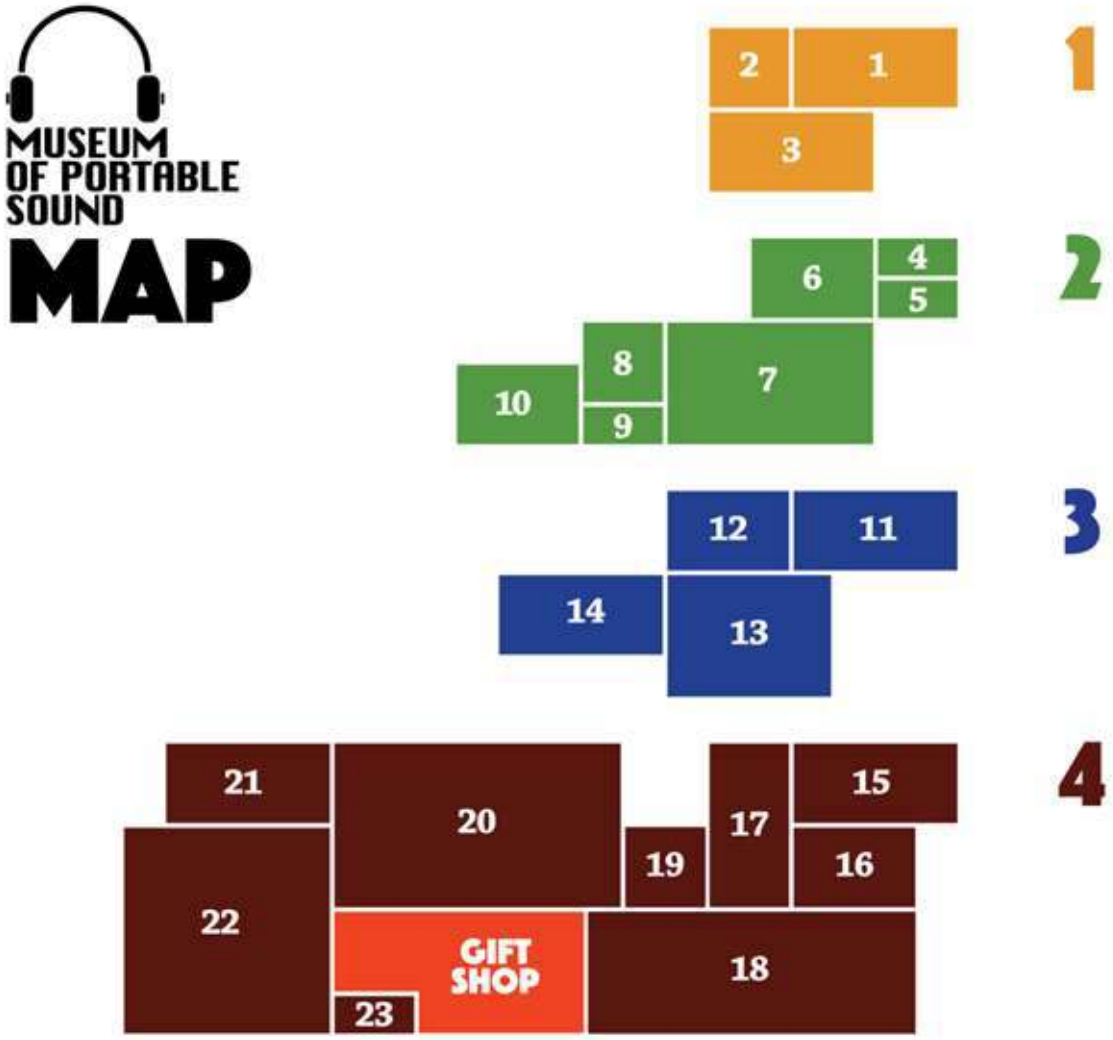
The Museum of Portable Sound (website: <https://museumofportablesound.com/>) is an artist's museum I established in London on 11 November 2015. As the primary focus of my current artistic research practice, the Museum of Portable Sound (hereafter referred to as 'MOPS') has become an experimental laboratory via which I have conducted tests relating to the display of sounds as objects of culture within a museum context. Part research lab, part cultural institution, and part performance art project, MOPS displays its collections of digital sound recordings on a single mobile phone, which I carry with me at all times – the sounds are not distributed online, and there is no mobile app available. Visitors must make an appointment to meet me in order to experience the collections; when we meet, I provide them with the mobile phone containing the sound files as well as a map of the MOPS galleries, and an extensive printed *Gallery Guide* containing the object labels and didactic texts that would normally be found on the walls of a conventional museum. After a brief induction session, visitors are then free to listen to the museum as long as they wish (see Figure 1). In its current form, the MOPS Permanent Collection Galleries contain 200 sound recordings (or *sound objects* as they will be referred to hereafter) with a combined duration of five hours.

Once a visitor has completed their listening session, they often engage me in a conversation that usually covers their experience of MOPS, their experience at other museums, and their experience of sound in their daily life. In this way, MOPS acts as a portable 'contact zone' – a term originally coined by James Clifford in 1997 and recently eloquently described by anthropologist Haidy Geismar as "*a material mediator between collections and ideas, people and things, modes of analysis and forms of experience. It is a container of knowledge and a provoker of questions*". (2018: 29)

While the form and experience of MOPS raises a number of questions regarding the changing definition of what may be considered a museum in the 21st century, those questions remain outside the scope of this paper. It is the sound objects on display within MOPS, and some of the taxonomies by which they have been organised, that constitute the focus of this article.

Left: A typical Museum of Portable Sound setup while waiting for a visitor inside the Café in the Crypt, St Martin-in-the-Fields church, London, UK, 27 March 2018 (Photo by author.) *Right:* The author and a visitor meeting in the café inside University of Westminster on Regent Street, London, 28 November 2016 (Photo by a helpful anonymous bystander.)

The sound objects in the MOPS Permanent Collection Galleries consist primarily of recordings that I have captured myself in my practice as a *phonographer*, or field recordist, since the late 1990s up to the present day. Many of the sound objects on display represent (as, indeed, audio recordings are documents that quite literally *present again*) the sounds of post-industrial technology. Using sound objects displayed in two of the MOPS exhibition galleries, this paper will seek to establish the notion of what I refer to as *intangible industrial heritage* that, for my purposes as an artist working with sound, includes the sounds of post-industrial culture.



1: NATURAL HISTORY

1. Animals
2. Insects
3. Weather & Water

2: SCIENCE & TECHNOLOGY

4. Laboratories & Medicine
5. Acoustics
6. Recording History
7. Audio Interfaces
8. Glitches
9. 20th Century Audio Equipment
10. 21st Century Audio Equipment

3: SPACE & ARCHITECTURE

11. Construction, Exteriors & Tours
12. Doors, Windows & Fixtures
13. Plumbing, Heating & Cooling
14. Interiors

4: ART & CULTURE

15. Art Processes
16. Archaeology
17. Bells
18. Transport
19. Food
20. Rituals & Events
21. Libraries & Archives
22. Museums
23. Exhibitions of Sound

The Map provided to Museum of Portable Sound visitors, showing the museum's four major topic areas and the galleries they contain. The sounds are organised onto the MOPS mobile phone as albums inside the mobile's built-in music app. (Map designed by author.)

The galleries that make up MOPS are divided into four general topic categories; these categories are further subdivided into a total of 23 'gallery spaces' (see Figure 2), which exist inside the music app on the phone as 'albums' (e.g. one gallery = one album). These taxonomies provide the overall structure by which MOPS presents its sound objects, and are evocative of similar taxonomies employed by what has come to be referred to as 'universal museums' (i.e. those that aim to collect the culture of the entire world – see Huxley 2003; Curtis 2012; Duncan and Wallach 2012; and a critique of the term as a false 21st century construct in Hicks 2018). The sound objects on display in MOPS are rarely isolated recordings of a single sound-generating subject; rather, they often contain layers of multiple sounds, yet a specific sound within the recording may be highlighted by the object label in the *Gallery Guide*. Some may define these types of recordings as *soundscapes* – 'any acoustic field of study' according to R. Murray Schafer, the term's most famous proponent (1994: 8), or 'an auditory or aural landscape' (Thompson 2002: 1). However, for my own work, I find the term soundscape problematic, as it was '…shaped by a relationship to recording, reproduction, and western art music concert tradition' (Sterne 2013: 190) rather than anthropological or museological traditions. Therefore, I choose to regard the MOPS recordings as representing *sounds in their cultural contexts*; my sound recordings, and my method of displaying them in a museum context, are about the *connections between concurrent sounds*, not a type of 'sonic landscape' such that the term soundscape implies. By collecting and presenting recordings that do not isolate a single sound but rather represent sounds within their original acoustic environments, my field recording and curatorial practices work together to explore why multiple sounds coexist in their original contexts – an attempt at merging acoustic and museological authenticity. I would argue that these contextual sound recordings, combined with their categorisation within the MOPS taxonomies, result in the establishment of the above-mentioned concept of intangible industrial heritage, which the case studies below will elaborate upon.

The Sounds of Industrial Heritage: Listening to Objects

In the past decade, a movement has developed amongst some philosophers known as *object-oriented ontology*. First coined by philosopher Levi Bryant in 2009, this complex and multi-faceted area of thought seeks to not only redefine what may constitute an object, but also to encourage the idea that objects are not defined by human-imposed interpretations. In his 2011 book *The Democracy of Objects*, Bryant seeks to 'think the being of objects unshackled from the gaze of humans in their being for-themselves' (19); or to put it in simpler terms, Bryant prefers to think of 'subjectless objects' that are not defined solely by the perceptions of human beings. While I do not place myself in the same philosophical camp as the object-oriented ontologists, this new emphasis on 'the rights of objects' does seem to reflect my own curatorial desire to more fully study the sensory lives of objects, as well as my own suggestion that sounds themselves (or recordings of such sounds) should be considered objects within a museum context (Kannenberg 2017). It is through this preoccupation with the concept of sounds as museum objects that I have come to study post-industrial sounds and, consequently, sounds related to industrial heritage.

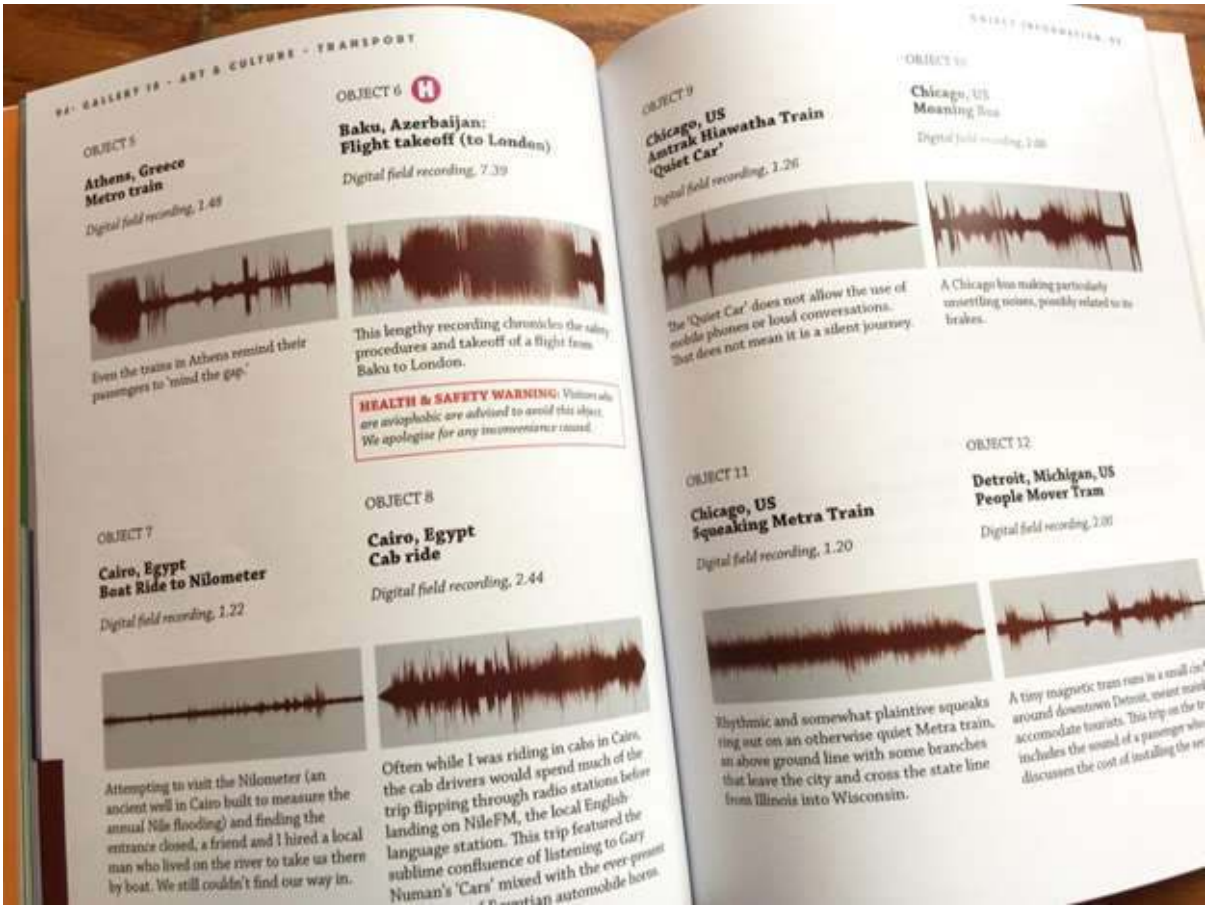
Industrial heritage as a topic area aligns closely with my museum's aims of investigating what a 'universal museum' of contemporary experience might focus on: 'Of the "cultural goods" that modern societies aim to sustain for their future well-being, few are more universal than industrial heritage' (Douet, 2013: 1). As with most museological concepts

used to define what is and is not considered worthy of being declared cultural heritage, the accepted concept of industrial heritage focuses on physical objects rather than the sounds they make. This makes sense when considering physical remains that date back to the beginning of the Industrial Revolution, the historical starting point of industrial heritage's domain, since it can be inherently difficult or impossible to operate machinery from this era that would have made sound, and few if any recordings might exist of machinery from that time period. However, as time passes and the purview of what is meant to be preserved as industrial heritage comes closer to the present, the physical remains of industry are not only functional, they can be easily documented in their working modes via audio and video recording. Indeed, the sounds generated by machines of many types during the Industrial Revolution have been responsible for massive cultural shifts: the birth of soundproofing (Picker 2003: 41); the ritual and 'unifying experience' of families across countries simultaneously listening to the radio (Hilmes 2012: 352); and electroacoustic music in symphony halls and 'talking pictures' at the cinema (Thompson 2002: 229-294) are merely a handful of examples. Museums concerned with industrial heritage such as the Science Museum in London hold collections of countless machines whose sounds help define the way humans interact with them; these sounds become integrated into daily life and have significant positive or negative impacts upon those who have no choice but to listen to them day in and day out. However, when these objects are displayed, they are non-functional and thereby non-sounding – leaving a significant gap in the presentation of how these machines impacted upon human culture.

Sound Objects As Intangible Industrial Heritage: Street Crossing Signals and Public Transport

So how do humans interact with post-industrial sounds in their daily life? What follows are case studies behind the curation of two collections within the Museum of Portable Sound that make comparisons between similar mechanical sounds across multiple cities. The first, Gallery 18: Transport (see Figure 3) features sound objects that document public transport systems of various types in a variety of cities. The second, Gallery 7: Audio Interfaces (see), contains a selection of my collected recordings of the sounds made by audio traffic signals – electronic sounds triggered at crosswalks in order to assist the visually impaired in knowing when it is safe to cross the street.

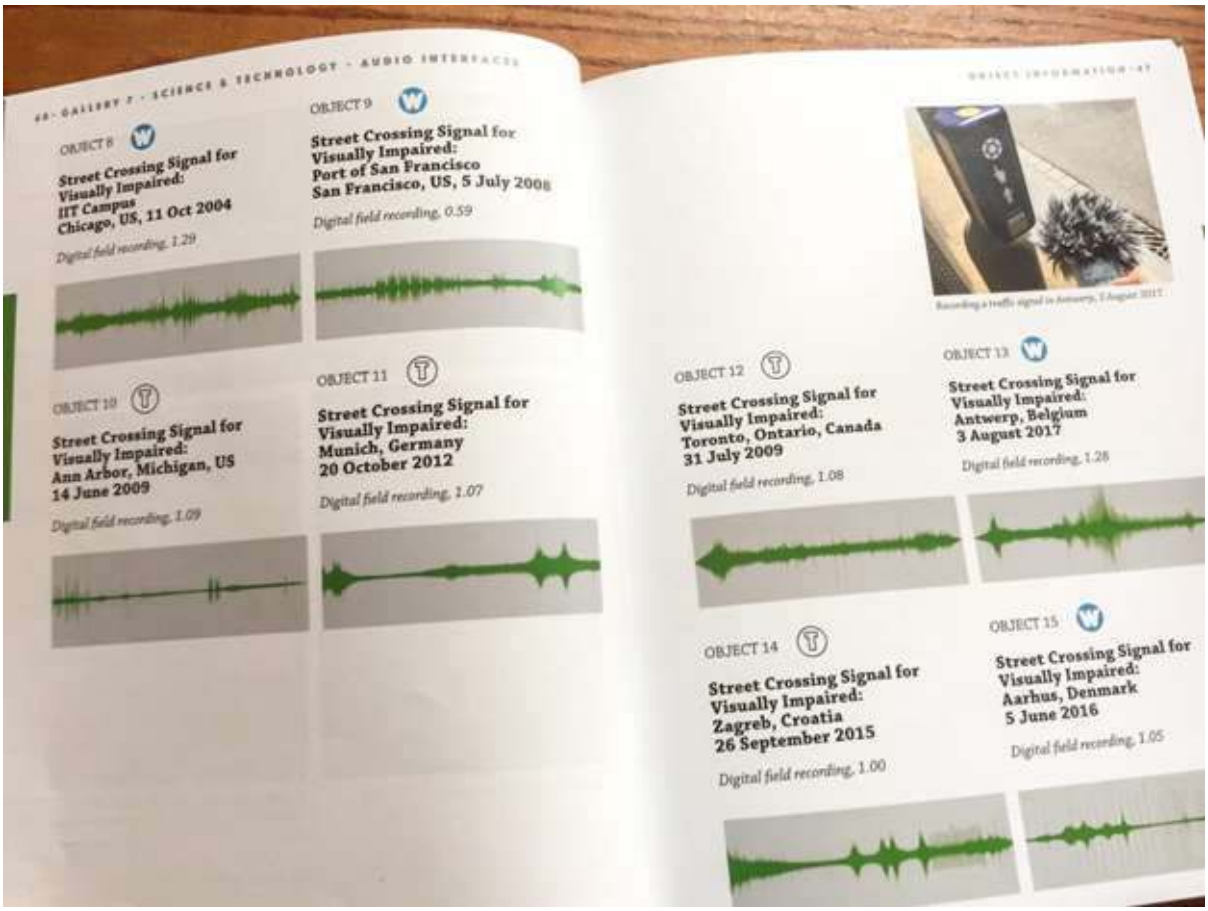
These collections are primarily artistic collections that, through their long-term accretion, have begun to share a commonality with an anthropological study; however, I do not view them as scientific collections, but rather as the output of a creative practice. If their collection was a purely scientific exercise, I would have crafted a hypothesis to prove, then would have collected sounds in order to either prove or disprove the hypothesis. Instead, the collection is organic and based upon my own travels – I rarely travel to specifically record sounds, but when I encounter them, I make sure to document them. It is an intuitive practice rather than a scientific one, similar to other such creative projects of visual collection and classification as *Semáforos*, an ongoing video project begun in 1995 by the Belgian-born, Mexico-based artist Francis Alÿs <http://francisalys.com/semaforos/>.



An excerpt from the Museum of Portable Sound's *Gallery Guide* depicting a portion of Gallery 18, Transport. (Photo by author.)

In this project, Alÿs collects photographs and video of the iconographic indicators for walking displayed on street lights in cities around the world. They are presented as a simple collection, in no apparent order, stripped of all context but the name of the city in which they were documented.

While not intended to act as a museum installation, Alÿs' video displays a similar notion of intuitive collection and careful documentation that I have attempted with the MOPS recordings; similarly, my displays play with the notion of appearing to be scientific classification through their presentation (providing provenance, corresponding waveform images, and other didactic information). Yet the displays of the two collections I will discuss below are inconsistent: e.g., the crosswalk signals include their date of collection, and are numbered in a seemingly random order not by date of acquisition, geographic region, or any other noticeable classification system; while the transport recordings are presented in alphabetical order by name of city collected, with no date of acquisition provided. Depending on the visitor, these inconsistencies in display techniques begin to become little games to be puzzled out – *why are these things in this order? If I listen to them in a different order, what will that do to how I experience them? Am I doing this wrong?* Inconsistencies of this type occur throughout the exhibition strategies of the Museum of Portable Sound, barely noticeable but, once noticed, become fodder for discussion with me during a visit. The inconsistencies in the MOPS exhibition strategies are most often intentional, devised to act as a parody of the often inscrutable methods audiences tend to perceive (or simply fabricate) behind why museums do the things they do.



An excerpt from the Museum of Portable Sound's *Gallery Guide* depicting a portion of Gallery 7, Audio Interfaces. (Photo by author.)

Through the examples below, I hope to demonstrate that both these sound types – the transport sounds and crosswalk signals – function as representations of expanded notions of industrial heritage and intangible culture. These multiple identities or states-of-being-culture are one of the primary motivations for the particular exhibition strategies I have pursued when curating the content of the MOPS galleries: selecting content in an attempt to present sound recordings not just as aesthetic curiosities, but also as collected, categorised, and museologically resonant examples of sounds as objects of culture. By listening to multiple instances of like-intended machine sounds from different cities and countries, I believe it becomes clear that these sounds, once noticed, are significant events within the sensory experiences of the local people who regularly hear them. As such, I view them as examples of intangible culture that should be preserved for a future when undoubtedly new technologies and cultural practices will replace all of these machines, or possibly even make the motivations behind their invention and use obsolete.

Case Study 1: Sounds of Transport at the Museum of Portable Sound

There are 28 sound objects related to public transport in Gallery 18, the MOPS Transport gallery (for the complete listing, please see the PDF version of the MOPS *Gallery Guide* at <https://museumofportablesound.com/plan-your-visit/gallery-guide/>). Although the sound objects could have been sub-divided by type, within the Gallery itself they are presented in alphabetical order by city name. This was a conceit developed for the initial version of this gallery when it held far fewer sound objects, and has been carried through

to the gallery's current incarnation. Having completed the below analysis, it now feels the gallery could be much improved by presenting these sounds in grouped typological categories, which will be implemented when the Permanent Collection Galleries are next updated.

In keeping with the spirit of MOPS as primarily a record of my own experiences rather than an attempt at presenting ideal 'specimens', these recordings are neither the most interesting sounds available to be collected, nor are they presented in a manner to suggest they could or should be compared scientifically – hence my initial reason for presenting them within the Gallery in a seemingly random order controlled by alphabetisation. For the purposes of analysis of the collection and curatorial strategies at work behind their display, however, I will discuss them as a series of nine typological subgroups: (1) *Inter-city Trains,* (2) *Intra-city Trains,* (3) *City Trams,* (4) *City Buses,* (5) *Personal Street Transport,* (6) *Water Transport,* (7) *Air Transport,* (8) *Tourism Transport,* and (9) *Mechanisms of Transport.*

Subgroup 1: Inter-city Trains

Object 1. Alexandria, Egypt: Train To Cairo, 2010
Object 9. Chicago, US: Amtrak Hiawatha Train, Quiet Car, 2010
Object 23. Speyer, Germany: Train to Karlsruhe, 2012

Each of the above examples is a train traveling direct between two cities, on a return trip to the location I was currently calling 'home'. Each train sounds unique, even though all three examples were recorded during times the trains were particularly quiet: Object 1 was recorded early in the morning, Object 9 was a car specifically designated as a 'Quiet Car', and Object 23 was a late night return from a day trip.

Subgroup 2: Intra-city Trains

Object 5. Athens, Greece: Metro train, 2011
Object 11. Chicago, US: Squeaking Metra Train, 2008
Object 18. Paris: Metro Train to Montmarte, 2012
Object 20. San Francisco, US: BART train to 24th street, 2008
Object 25. Toronto, Canada: Subway, Museum Station, 2009

These objects represent train systems that solely serve the inhabitants of a single city; all operate underground save for Object 11, the Chicago Metra train. Again, due to the intrinsic mechanical sounds of each train, plus the sound of their announcement systems, these trains are easily identifiable with a corresponding location, placing the listener immediately in the sound recording's city of origin.

Subgroup 3: City Trams

Object 2. Amsterdam, NL: Tram To Rijksmuseum, 2010
Object 12. Detroit, Michigan, US: People Mover tram, 2009
Object 14. Lisbon, Portugal: Night tram, 2015
Object 16. Minneapolis, Minnesota, US: Tram Approaching, 2008
Object 22. San Francisco, US: Cable car, 2008
Object 24. Strasbourg, France: Tram, 2012

Much like Type 2 above, these recordings are intra-city systems, but are run via electricity on tracks built into city streets that share the road with automobile traffic. The outlier in this group is Object 14, due to its late night provenance as well as the changing face of Lisbon's public transit. As Lisbon's tourist economy expands, more and more tourists have begun to flood the public tram system. Their lack of knowledge of local customs has made tram travel more inconvenient for the local population, and some tram drivers such as this one have taken to drastic measures in order to preserve their own sanity: in this recording, the tram driver has masking-taped a portable radio to the dashboard of the tram and has chosen to play Brazilian dance music.

Subgroup 4: City Buses

Object 3. Ann Arbor, US: Number 9 Bus, 2009
Object 10. Chicago, US: Moaning Bus, 2008

These recordings do not present buses in their best light, nor are they particularly iconic examples of the sounds of public buses. They are both from the United States, so their use as scientific representatives of a broad scope of bus sounds from around the world is null. Object 3 is simply an average-sounding trip on a bus I often road while living in Ann Arbor, while Object 10 was a particularly strange sounding bus that in no way represents the Chicago Transit System's bus services. Yet in terms of listening to this gallery's objects from start to finish, they provide transitions from one type of transport to another and break the monotony of listening to trains. As such, their inclusion was approached similarly to the contents of a mixtape, where their acoustic quality serves as a sort of 'sonic sorbet' (or 'phonographic palate cleanser'), along the way while still adhering to the Gallery's main topic.

Subgroup 5: Personal Street Transport

Object 8. Cairo, Egypt: Cab ride, 2010
Object 15. Milwaukee, WI, US: Harley-Davidson Motorcycles, 2007
Object 27. Warsaw, Poland: Horse-drawn carriages, 2017

This subgroup covers the private arena of urban transport, the sounds of modes of transport that carry only one or a small group of people from place to place and are either privately owned or individually hired. Object 8 was originally included primarily because of the pop music radio station that was also playing in the cab at the time, and I was pleased by the odd juxtaposition of capturing the sound of Gary Numan's 'Cars' emerging from a taxi cab radio surrounded by the sounds of Cairo. Object 15 represents the American tendency to fetishise personal transport: it is a recording of Harley Davidson motorcycles made during the annual 'Harley Fest' event in the city where the Harley Davidson motorcycle was invented. Object 27 represents a form of transport that was once commonplace in urban areas and now exists primarily as both a luxury and a curiosity.

Subgroup 6: Water Transport

Object 4. Ann Arbor, US: Paddle Boat, Gallup Park, 2010
Object 7. Cairo, Egypt: Boat Ride To Nilometer, 2010
Object 19. Pelee Island, Ontario, Canada: Ferry boat, 2010
Object 26. Venice, Italy: Boat in a canal, 2014

Object 4 is a recreational form of water transport, available when the seasons permit it in the cold Michigan climate. Object 7 was captured as the result of a friend of mine (and guide in Cairo for the day) hiring a local man's personal boat to see if it was possible to travel with it inside the ancient Nilometer, an architectural structure built on the Nile in order to keep track of its annual flooding in the days before the Aswan High Dam, since the structure itself was locked at the time of our visit. The boat was not an official tourist boat and its pilot knew we would not be able to enter the Nilometer, but took our money anyway. The other recordings in this subgroup represent more public forms of water transport, with Object 26 being the sole exception since it may have been a private boat; however, boat travel in Venice's canals is more analogous to road-based intra-city travel.

Subgroup 7: Air Transport

Object 6. Baku, Azerbaijan: Flight to London takeoff, 2017

This object holds the distinction of having the longest duration of any sound currently in the Museum's Permanent Collection Galleries: at 7 minutes and 39 seconds, it poses a challenge to visitors with short attention spans. It is also the only object currently on display in MOPS accompanied by a health and safety warning in the *Gallery Guide* (94), as this extended recording of the flight crew preparations for the takeoff of a passenger jet could potentially trigger aviophobic museum visitors. I believe this recording also disproves R. Murray **Schafer**'s assertion that 'No sound contains less interesting information than that of an airplane' (**1969: 58**).

Subgroup 8: Tourism Transport

Object 13. Karlsruhe, Germany: Steam Train, Schloss Grounds, 2012
Object 28. Zagreb, Croatia: Funicular, 2015

These objects have been included mostly because they function as curiosities. Object 13's train is a tiny replica of a steam train that transports visitors (mostly children and their parents) around the grounds of the Karlsruhe Schloss, the city's castle. Object 28 is a funicular, a specialised train designed to traverse the steep incline of a mountain; as such it is not inherently a transport solely designed for tourism, but in this particular funicular's case that is most certainly one of its primary functions, judging by the driver's repeated boasts (in English) that this funicular is 'the shortest in all of Europe.'

Subgroup 9: Mechanisms of Transport

Object 17. Paris: Escalator at St Lazare train station, 2012
Object 21. San Francisco, US: Cable car underground cable, 2008

These recordings represent mechanical sounds not made by the primary mode of transport associated with their sources, but nonetheless serve vital functions in relation to the movement of people via public transport: a slightly wobbly escalator in a Paris Metro station, and the sound of the underground cable responsible for keeping a San Francisco cable car on its track, recorded via an open access hatch in the pavement nearby. These sounds are integral to the experience of these modes of transport; regular commuters using these systems would notice the sound of the faulty escalator and also notice its disappearance once repaired; a local commuter would also be familiar with the sound of the cable mechanism issuing forth from the pavement. These may merely be

mechanical sounds, but they are the sounds of systems related to the transport of people (or in the case of the faulty escalator, the result of the breakdown of such a system).

Case Study 2: Audio Interface Sounds at the Museum of Portable Sound

MOPS Gallery 7: Audio Interfaces, contains a subgroup made up of eight examples of street crossing signals for the visually impaired, each from a different city. Each recording has been edited to last approximately one minute, in order to achieve the best balance between duration, information, and engagement with a MOPS visitor's attention. The similar running time also helps visitors in making comparisons between them. Below is a brief description of each example sound object.

Object 8. IIT Campus, Chicago, US, 11 October 2004

This crosswalk was the first example I ever recorded; it caught my attention at the time because the intersection was quiet while I was there, and the electronic chirping sounds appeared to be echoing off the surrounding buildings. I made several recordings at the time, trying to isolate the sound of the signals from the sounds of traffic or pedestrians. It soon became apparent that this was impossible, so I gave up trying and focused on obtaining a recording as free from wind noise as possible.

Object 9. Port of San Francisco, San Francisco, US, 5 July 2008

This recording features a crossing signal that is a combination of beeps (indicating the presence of the crosswalk) and a grinding tone (indicating when it is safe to cross). Besides the obvious presence of traffic, a street musician plays percussion at an 'island' in the middle of the rather large crosswalk.

Object 10. Ann Arbor, Michigan, US, 14 June 2009

This signal uses beeps similar to those in Object 5 above; however, the beeps play at two speeds, with the faster speed indicating it is safe to cross. In combination with this, a voiceover also chants when the 'walk' sign is on, and a countdown from ten indicates that time is running out. The unedited recording in my archives also includes the voice saying the name of the street being crossed, in this case 'Huron'.

Object 11. Munich, Germany, 20 October 2012

This signal uses beeps loud enough to be heard on both sides of the street simultaneously regardless of traffic noise level, captured in this recording as one beep per stereo channel accomplished by standing partially in traffic to hold the microphone at the proper angle. The beeps never change speed, pitch, or timbre, only playing when it is safe to cross.

Object 12. Toronto, Ontario, Canada, 31 July 2009

This crosswalk uses electronic whistling tones that sound vaguely bird-like in the resting mode (indicating the crosswalk's presence) and then switches to a double-beep similar to the Munich system when it is safe to cross. Notably, this is the same system and sounds that appears in the above recording at the Illinois Institute of Technology in Chicago, in

2002, as well as a crosswalk I lived near in Milwaukee, Wisconsin, United States before I began making field recordings. Due to the three cities' geographical closeness, this would indicate the presence of localised standardisation that I have yet to find evidence of between any other cities.

Object 13. Antwerp, Belgium, 3 August 2017

This signal uses an analog ticking sound at two speeds: slow for wait, fast for walk. It is similar in speed and timbre to the Zagreb system below, yet appears to be fully analog in nature rather than electronic or synthesised.

Object 14. Zagreb, Croatia 26 September 2015

This signal uses two different sounds to indicate opposite sides of a street: an electronically generated click on one side, and a beep on the other. When it is safe to cross the road, the sounds on either side of the street quicken their speed in unison, and the difference in the tones aids the perception of how far across the street the pedestrian has crossed as the sound shifts from one side to the other.

Object 15. Aarhus, Denmark, 5 June 2016

This recording captures primarily one side of a crosswalk; due to traffic, the opposite side of the street's tones is difficult to hear, but occasionally become audible for a few brief seconds. This system uses the same tone on either side of the street, but the sound itself is a curious blend of a click and a beep, a hybrid between clicks and beeps heard separately in Object 9 above. The relatively slow pace of the sounds in this signal make it sound particularly lugubrious when compared to the signals from other cities. The single strike of a neighbourhood church bell is also heard in the distance.

Conclusion: Towards a Notion of Intangible Industrial Heritage

In surveying the above sounds on display in the Museum of Portable Sound, it is possible to perceive them as examples of a phenomenon also defined by composer R. Murray Shafer, the *soundmark*: site-specific sounds that become identifiers of a community. Schafer suggests that these types of community-focused sounds should be preserved: 'Once a Soundmark has been identified, it deserves to be protected, for soundmarks make the acoustic life of a community unique.' (1994: 10). In the case of the MOPS Transport gallery, each of the cities' various modes of transport systems has a particular sound – not just specifics like the vocal announcements of train stations, but also the particular attacks and timbres of beeps to alert passengers, the sounds of different types of automatic doors, engines, etc. These sounds alert passengers that they are travelling within a specific community.

Likewise, people in urban environments depend on specially designed audio interfaces for guidance within many post-industrial systems. Smartphones, microwave ovens, elevators, cash machines, and other devices are all designed to sound in specific ways in order to convey specific information to aid the user's understanding of their operation. Although the traffic crossing signal sounds described above in the MOPS Audio Interfaces gallery are designed for use by people with a visual impairment, they are also heard by everyone capable of doing so, and heard consistently in specific locations. These signals not only assist in crossing streets, but their presence helps to alert members of a

community which intersection they are currently at, or which neighbourhood they are in; they become part of the auditory signals that community members use to wayfind. The unique design of each city's street crossing signal system is a kind of soundmark that helps to identify a community.

These are the sounds of industrial heritage – the sounds of machines produced by industry to be used by the public in their daily life. These sounds may be ephemeral interfaces, but they also can function as part of a community's sonic identity; one only has to think of the marketing and merchandising of a phrase such as the London Underground system's 'Mind the Gap' announcement to realise the power that the sounds of transport systems possess to become symbols of a community. As such, there is a vast world of sonic cultural material that, if it is collected at all, is usually done so by libraries and archives rather than museums, where it is (mostly) left to languish unheard. Institutions such as the British Library's Sound Archive hold phenomenally large collections of recorded sound; and although they do occasionally exhibit selections of their sound collection, the majority of it remains locked away in the archive, with only portions of it currently digitised and available online. There is a great difference, however, in accessing sounds in an archive versus encountering them on display in a museum. People interested in the collections of the British Library Sound Archive must do their own digging to discover what might be relevant to their interests. Museums remain the world experts at the curation and exhibition of cultural heritage, and as such, would be able to reach a more diverse audience if they chose to display post-industrial sounds as objects alongside the physical ones they currently focus on displaying.

Part of the reason why museums remain ambivalent about the significance of sonic culture may stem from the limitations of UNESCO's above-mentioned definition of intangible cultural heritage:

> *[Intangible cultural heritage] includes traditions or living expressions inherited from our ancestors and passed on to our descendants, such as oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts.* (UNESCO 2017; emphasis mine)

This definition's focus is on the past and the future, not the present; it acknowledges rituals and traditions made in the past by *ancestors* being passed on to future *descendants*, yet it is not inclusive of ritualistic behaviours and cultural practices of the present. In addition, although this definition takes into account many traditions that generate sound-related heritage, the sounds themselves are not actually prioritised as intangible cultural heritage – only the *knowledge* needed in order to re-create a contemporary facsimile of a previous era's practice. Indeed, UNESCO's definition, in its justifiable intention to be inclusive of the cultural traditions of so-called 'non-Western' cultures, has also overlooked a significant aspect of Western and Westernised culture: industrial heritage. While industrial heritage traditionally focuses on the physical artefacts produced by industry, many of these artefacts also made – or make – sounds crucial to the way these devices are used or interpreted, as demonstrated by the sound objects in the two case studies above. Yet, due to museum practitioners' lack of either experience with or knowledge of sonic culture, important sonic heritage of the present remains overlooked by many museums.

What if there existed a sort of 'expanded field' of intangible cultural heritage within museum practice, one that included the collection and preservation of sounds in its remit? While a similar strategy has been previously attempted by the World Soundscape Project (co-founded by R. Murray Schafer), their anthropological and ethnomusicological work has primarily remained an influence upon the worlds of musical composition and musicology rather than museology, and been relegated to a few album releases (Jèarviluoma et al 2010). Similarly, cultural anthropologist Steven Feld's seminal work in this area (2012) has likewise been embraced by the anthropology, sensory ethnography, musicology, and sound studies worlds but has rarely dovetailed with museum practice; and more recent work by the Sensory Ethnography Lab at Harvard University <https://sel.fas.harvard.edu> has primarily been focused upon creative outputs of art installations and documentary films (Leimbacher 2014).

As museums seek to escape their own sensory silo and cross over into areas of display beyond the visual, an expansion of UNESCO's definition of intangible cultural heritage could help to more fully integrate the notion of post-industrial sounds – both recorded and live, collected by humans and generated by the devices they have crafted – as an aspect of human culture studied and exhibited within museum practice. This acceptance of an expansion of UNESCO's notion of intangible cultural heritage could have a significant impact upon the world of museum practice in general: indeed, what kinds of stories could museums of all types tell if they could let visitors *listen to*, and not just *look at*, the artefacts of humanity's industrial heritage?

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What will our future collection look like?

Pieter Neirinckx

The museum

In 1975, Ghent City Council members noted the neglected state of the mule jenny. This early 19th-century spinning machine, the symbol of the first industrial revolution in Flanders and centrepiece of Ghent's textile heritage, was kept, disassembled, at the Castle of the Counts (Gravensteen).[16] A year later, the city ordered a working group for industrial archaeology to create a textile museum, to house the newly-restored spinning machine. The new Museum of Industrial Archaeology and Textiles, MIAT for short, was temporarily housed in an annex of the city archive. Museum Director René De Herdt, together with a small team of motivated employees, introduced the first forms of public activity around a modest collection of industrial heritage artefacts.[17] Due to a lack of space, temporary exhibitions were held in various cultural and historical buildings in Ghent.

In 1985, MIAT was given permission to use the former Desmet-Guequier cotton-spinning mill as a museum depot. Four years later, Ghent's City Council decided that the mill was also the most suitable location for showing MIAT collection. The construction, built of cast iron, steel and brick, dates back to 1905-1912. As with the textile factories in Manchester (England), large windows and shed roofs let in as much natural light as possible. Hence, the building forms a unique historical environment or context for the collection. On the other hand, it poses challenges for presentation and storage conditions.

The permanent exhibition, displayed on ca. 3,300m², is currently under partial reconstruction. From September 2018 onwards, visitors will discover the story of Ghent as an industrial city, embedded in a broader national and international context. A second part of the new museum set-up will focus on the history of manual and industrial printing. The third section, 'Cotton Noise', portrays a textile factory, tracing the production process from cotton plant or fibre to finished product. Volunteers demonstrate the historical collection of spinning machines and weaving looms, creating the same racket as in the old days. Temporary exhibitions will highlight various sub-collections. On average, MIAT welcomes 40,000 visitors per year.

Parallel with the refurbishment of the permanent exhibition, MIAT plans on moving the entire museum collection towards a new, and for the first time, purpose-built or specially-equipped heritage depot. Time to assess the existing collections or accumulated wealth and to make plans for the future.

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[16] The mule jenny is a semi-automatic spinning machine. It has been listed among the Flemish Community's Masterpieces, since 2010. Only two other working examples are known to have survived, worldwide.

[17] VAN NIEUWENHUYSE A. met de medewerking van DESIMPELAERE N. en KINNAER C., Het MIAT, van mule jenny tot een museum met een kwaliteitslabel, Geschiedenis: zijn werk, zijn leven: Huldeboek René De Herdt, Gent MIAT, 2010, p. 241 – 272.

Building the collection
Given the importance of the textile industry for Ghent and the surrounding area, MIAT concentrated on this specific branch of industry when building its collection between 1977 and 1989.

In the 1990s, the museum widened its focus and started looking at the material culture of industrial society. Efforts to build the collection became object-driven, rather than thematic. The bulk of the collection was acquired passively, by accumulating donated items, instead of actively purchasing missing links or filling in gaps in a pre-compiled collection plan. Thirty-eight years of 'passive' collecting results in an impressive and diverse collection of more than 30,000 objects, which can be divided into almost 38 sub-collections:

Agriculture and Horticulture, Architectural Elements, Archives, Cartography, Clay and Brickmaking, Diamond Industry, Education, Emergency Services, Energy Industry, Film Equipment, Food Industry, Fur Clothing, Gunpowder and Ammunition, Home Appliances/Small Appliances, Home Maintenance/Household Products, Laboratory and Research Equipment, Logistics and Transport, Marketing and Advertising, Medical and Paramedical Services, Metal Industry, Musical Instrument Construction, Office Supplies/Office Automation, Packaging Industry, Personal Hygiene/Welfare, Pest Control and Pest Management, Pigments and Dyes, Printing Industry, Pulp and Paper Industry, Rope Works, Stage Techniques, Shoemaking, Street Furniture, Tannery, Telecommunications Audio/Video, Textile Production, Tobacco Processing, Woodworking.

Due to its pioneering position, the museum collected a very wide range of artefacts. Its collection efforts were often motivated by a certain fear of loss. 'Who else will keep it?' Unfortunately, for lack of budget or shifts in staffing, building or maintaining the necessary expertise regarding certain topics or collections sometimes seemed impossible. Meanwhile, the industrial heritage community in Flanders grew, with new powerful players. In the context of the move to the new heritage depot and the related collection valuation process, the museum tries to find the most relevant heritage partner for each collection. MIAT considers every collection for which it can find a heritage partner with specific expertise to be closed. These collections are also eligible for deaccessioning. So in time, MIAT will only remain active in sectors or collections in which it is the only or most important expert. In doing so, the museum wants to motivate and encourage other heritage managers to take up responsibility for a particular topic of industrial heritage, by specialising, and therefore building or retaining a reason to exist. Nevertheless, MIAT also wishes to appeal to national and international heritage partners, through peer evaluation, on topics or collections for which the museum itself has built up considerable expertise (e.g. printing and textile production). Networking still is a valuable tool.

Preservation and valorisation of industrial heritage in Belgium and Flanders has long been supported by the motivation and commitment of small local institutions and volunteers, often with limited resources. Both the professionalization of the sector and the development of a commercial circuit of restorers came late. Private owners and project developers often lack the necessary knowledge when preserving industrial heritage or experience difficulties in finding skilled support. By sharing its experiences and expertise, the museum wants to motivate owners to preserve, large-scale industrial heritage in the first place, especially in situ. Therefore, the function of MIAT recently shifted from a

classical collection acquirer to a cultural broker who shares his expertise and mediates within the wider heritage community.

Today, the museum checks each potential acquisition of new collection pieces against a set of selection criteria. These are partially based on Spectrum and are adapted to the needs of the collection.[18] The questionnaire ensures that the acquisition process is based upon conscious choices. Over-collection or collecting outside the collection topics (hoarding) should be things of the past.

The revival of 'Oral History'

Ever since its foundation, MIAT has collected more than just items related to the pure material and technical aspects of the industrial history. Influenced by the developments in 'Oral History', which were introduced in England by Prof. Dr Paul Thompson, as early as 1978-1980, MIAT started a series of interviews, entitled 'Their Work, Their Lives'. All 80 textile workers interviewed, predominantly from the centre of Ghent, were active in industry before the 1950s. Conversations on working conditions, union membership, leisure time or even random memories draw a unique picture of a specific population, active in the first half of the 20th century. It offers the museum the opportunity to frame the machine in the context of the working and living conditions of the workers, who toiled long hours, and thus focus on 'the man or woman behind the machine'. In the 1980s, the data was used for a series of successful panel traveling exhibitions, with accompanying catalogue, a broadcast on national television and three colloquia on oral history, among other things.

A sequel was launched this year, under the title 'Their Work, Their Lives'. Testimonials from the Ghent textile world, 1950-2010.[19] This time, the study includes the difference between the academic approach of oral history and the practical context of a museum. It is the intention to register the testimonials as part of the museum collection, making them accessible by using the existing collection management system and even linking them to classic collection pieces, which are being acquired within the framework of the project.

The current permanent museum exhibition uses testimonials, albeit in a limited capacity. They were reread by the witnesses themselves, following a transcript, and were processed in sound bites of approximately 4 minutes each. For most museum visitors, it adds a certain charm. Others find it contrived. And although the witnesses do their best not to use a pronounced Ghent accent, dialect sometimes forms an obstacle.

Communicating the more conceptual or abstract themes that 'Oral History' tackles has always been a challenge for the museum. In preparing exhibitions on topics such as child labour, working conditions and union membership, more textual notes, documents and audio-visual elements (flat material) are in supply than classic three-dimensional collection pieces. With the rise of multimedia, the problem might be exacerbated over the next decade. While the museum could count on immense interest in the 1980s, using 'panel traveling exhibitions', today we not only face the question of how to capture the

[18] http://www.collectionstrust.org.uk/spectrum

[19] in verslag, Lezing en Workshop Oral History – Paul Thompson – woensdag 29 maart 2017 – MIAT, p.9, http://www.miat.gent.be/sites/default/files/bijlagen/nieuws/20170330_ve_workshop_en_lezing_oral_history.pdf, consulted on 27/09/2017

visitor's attention, but also: how long we can stretch his attention span? Generation Z, also known as the I-, or Internet Generation, zaps, clicks and swipes away. Why go to a museum? The internet makes everything available from your easy chair, 24/7. In addition, patient museum staff and participatory internet users, worldwide, provide more internet content, every day.[20]

How about 3D digitalisation?

In the past, MIAT accepted offers of large-scale machinery, equipment, cast iron columns, the bigger steam engine, as well as storefronts, a port crane and even small pavilions from property developers and industrial plant managers. This resulted in a valuable and very diverse collection, but large-scale heritage comes with large-scale challenges. Due to their size alone, these pieces often literally weigh on the storage facilities of the museum. Besides, they are difficult to integrate into new projects or a new museum set-up.

When possible, MIAT tries to implement an active presentation of the collection, through demonstrations, because nothing is as passive and complex as a machine exhibited statically. And nothing draws the attention or arouses the interest and curiosity of the visitor more than the same machine, running at full power. On first sight, technical or substantive problems, such as providing the right raw materials and spare parts or securing the engines, so that they meet modern safety standards without compromising the historical value, are manageable. But both the textile and the historical printing department of the museum are supported by the indispensable commitment of a large group of volunteers, most of whom have enjoyed an active career in this specific branch of industry. They are the ones bringing heritage to life, providing the museum visitor with a unique experience. This particular part of intangible heritage is not easily registered and stored, as we, in the museum world, have always done, since the cabinet of curiosities was first created. For this is not 'the man behind the machine', but 'the man in interaction with the machine'. And what if the collection is too old, too unique or too valuable for demonstration?

We also note that production units and equipment are not only difficult to preserve, in terms of size, but safety requirements of recent decades ensure that the public sees a machine as a shielded and impenetrable, computer-controlled 'black box'. Raw materials enter at one side. Finished products miraculously emerge, on the other side, making it difficult for the public to grasp the actual functioning of the machine.

Together with eight partners, MIAT developed the project 'Diving into the Machine'.[21] It explores current 3D technologies, such as x-ray imaging, CT scanning, CAD modelling (and reverse engineering), photogrammetry and 3D laser scanning, through several case studies. The data are then evaluated on their usability in the preservation and dissemination of mechanised industrial and agricultural heritage. Can we use 3D in preservation and restoration? To what extent can we use 3D animation to give our

[20] .NEIRINCKX P., Le travail du MIAT relatif aux témoignages dans une perspective muséologique globale, de l'acquisition à la valorisation. In, Les témoignages dans les musées industriels. Entre Mémoire et Patrimoine, Maison de la Métallurgie et de l'Industrie de Liège, Liège 2016, p. 111-120

[21] https://duikenindemachine.wordpress.com/cases/, consulted 2/10/2017

visitors insight into the working principle of a machine? What are the short- and long-term costs? What are the advantages or disadvantages? [22]

The last part of the project focuses specifically on the sustainable preservation of digitised or even purely digital born 3D data, by raising awareness among 3D service providers on the use of archival standards and guidelines when producing 3D documents. The latter is not to be underestimated. Nor is good IT support.

Conclusion

The collection is no longer considered a fixture. Networking within the industrial heritage community allows the museum to refine the scope of its collection and to hone and better carry out its mission. Selection criteria, based on the evolving techniques for collecting, studying and communicating the different aspects of industrial heritage, can be used for acquisition and deaccessioning. The museum aims to offer its visitors a well-balanced overall experience, resulting from an optimal combination of tangible and intangible heritage, using the collection and diverse media. Sharing experiences and expertise has also shifted MIAT's function from a classical collection acquirer to a cultural broker, mediating outside the museum walls.

[22] VERROKEN T, LEMMES B, MESTDAGH R, 'Using 3D Digitization in the Preservation of Industrial and Agricultural Heritage', in Archiving 2017, Final program and proceedings, *IS&T Archiving Conference Riga*, 15-18 May 2017, p.49-53

Corporate Museum in France

Pr.-Dr. Florence Hachez-Leroy

Université d'Artois et Centre de recherches historiques (EHESS/CNRS)

At the beginning of the 21st century in France, many questions were raised by the opening of several new corporate museums, with resources and scenography of very high quality [1]: *L'Aventure Michelin* (2009), the museum Cristal Saint-Louis (2008) or even the Musée Yves Saint-Laurent Paris and the *Musée du 11 Quai Conti* in 2017 in Paris. At the same time, collections of companies are regularly exhibited in prestigious places: in 2011, at the Carnavalet museum, an exhibition on the leather goods Louis Vuitton, the Ratp at the Museum of Arts and Crafts, toys Villac at the *Musée des Arts décoratifs* after the Playmobils, or, in 2014, the Orient Express at the Institut du Monde Arabe, in 2017, Vicat for its bicentenary, at the *Société d'encouragement pour l'industrie nationale*[2]... and Paris does not have the exclusivity of these presentations: in regions, the Casino stores had their exhibition as well as the textiles of Rhone companies at the Museum of Art and Industry of Saint-Etienne for example.

These museums seem to meet the general criteria of museums: quality collections are presented with a neat exhibition design in appropriate environments and they have nothing to envy, for the form, to national museums and to those who have the label "*Musée de France*". Some corporate museums are also recognized under the name "*Musée de France*", a label awarded by the Ministry of Culture and imposing scientific requirements. Their creation has most often been entrusted to communication or architecture agencies, specialized or not in the industrial, economic and technical heritage. There remains the question of content: the visit of a number of these places suggests that if the use of such companies is indeed a sign of quality in the presentation, the text (or the global discourse) often lacks the necessary distance to avoid falling into hagiography. This question is all the more crucial that we see a large attendance of schoolchildren in these places.

[1] Florence Hachez-Leroy et Louis André (dir.), *Musées et collections d'entreprises, L'archéologie industrielle en France*, n°58, juin 2011. Pascale Meysonnat-Courtois, « Les musées d'entreprise en France. Une réalité à dépasser, un concept à inventer », *Lettre de l'OCIM*, n° 34, 1994, p. 13-17. Isabelle Cousserand, « Musées d'entreprise : un genre composite », *Communication et organisation*, n°35, 2009, p. 192-213. Philippe Boistel, « Collection d'entreprise : un sujet de narration pour les organisations ? », *Communication et organisation*, n°49, 2016, p. 161-174.

[2] https://www.industrienationale.fr/journees-patrimoine-2017/

Vicat Group organised an exhibition for its bicentenary in Société d'encouragement pour l'industrie nationale, Place Saint-Germain-des-Prés, Paris, 2017. ©FHL

The definition of corporate museums

Logically, a corporate museum is a collection presentation space that belongs to an industrial or private service company. This assumes creation and management without public subsidies. This difference in status does not subject them to national legislation such as the French Heritage Code. The public authorities do therefore not have control over corporate museums, whether at national or local level and their collections are not alienable: the museum can close, and the collections be sold at any time. Their fragility is one of their characteristics, very often linked to the economic health of the company. This was the case of the Christofle museum, in Saint-Denis, in Seine-Saint-Denis, near Paris, on the historical site of the company (2008), as well as for the museum of Seita, in Paris (2000), a company originally public, then privatized, which fell into the hands of Imperial Tobacco[3]. We must also add the closure of the museum Amora, in Dijon, producer of the famous French mustard (2006). In the first two cases, all or parts of the collections were sold at best in the auction room, and at worst to a scrap metal dealer for machine tools. Overall, most of them do not conduct studies on their collections or open them to researchers. From this point of view, most do not fit into the definition proposed by ICOM: "A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches,

[3] The privatized Seita merged with the Spanish group Tabacalera in 1999 under the name of Altadis, a company that passed under the control of the Imperial Tobacco group in 2008.

communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment.[4]"

Their origin

In France, the creation of collections within companies has its sources, during the nineteenth century, in the desire of entrepreneurs to anchor their activity in a certain technical history, legacy of past know-how, entering the path of progress and industrialization. There are also places at this time dedicated to the presentation to the public, of industrial machines and tools, constituted in particular by chambers of commerce and industry or by groups of entrepreneurs. The goals were clearly pedagogical. They aimed at familiarizing the working class and craftsmen with new techniques and machines, "taming" them in some sense, as well as informing the contractors likely to use these machines. In this context, it should not be forgotten that pedagogy and museums were also intended to create an available and qualified workforce, just as artistic research aimed at maintaining quality and French art in the face of massive production – and invasive – of the all-powerful England. Collections both technical and artistic were also presented in other places, as it was necessary for these captains of industry to affirm their erudition by the possession or even the order of paintings or sculptures related to their activity. A number of these images of the industry were thus command works. Indeed, there were often within large established companies and family-owned, rich and diverse collections[5]. The oldest of these museums in France is undoubtedly that of the Benedictine, this liqueur manufactured in Fécamps, in Normandy. The Benedictine Palace, with its eclectic architecture (mix of neo-Gothic and neo-Renaissance style) built in 1888, has been welcoming visitors since. It presents the collection of ancient and medieval art of the founder Alexandre-Prosper Le Grand, together with an exhibit presenting the history of the manufacture of this liquor (room of spices and distillery).

Very heterogeneous forms

The forms of the corporate museums vary considerably, from a modest room in the administrative building (Arc International) to the former "castle" of the director (Essilor) and to the museum with the most accomplished scenography (L'Aventure Michelin), and even the construction of a new building (La Vache qui rit). Among these museums, some are installed at the very places of the company activity. The city of Telecom Pleumeur-Bodou, created by the company Orange, is located on the site of the radome, inaugurated in 1962 to provide transatlantic television retransmission. The Lactopôle André Besnier, in Laval, is situated partly in the building of the former dairy cooperative of 1933 reconstituted with period equipment. The Musée Yves Saint-Laurent Paris, opened in Paris in 2017, takes place in the former haute couture house of the couturier. The Fondation Pierre Bergé-Yves Saint Laurent, established in 2002, manages it. This foundation has two other museums dedicated to the life of Yves Saint-Laurent: the Jardin Majorelle and nearby, the Musée Yves Saint Laurent, both in Marrakech. Other museums can be installed in a large storage shed open to the public and presented as a conservatory (Citroën). Some very successful museums allow combining the visit of the permanent exhibition with that of workshops in activities. The Bohin pins factory in Normandy is a very successful example of such offers, with employees trained to speak

[4] http://icom.museum/the-vision/museum-definition/ (accessed June 23, 2018)

[5] The Musée d'Orsay, in Paris, has presented the collections of Schneider in 1995 and Saint-Gobain in 2005.

in front of the public. Another example, the Musée du 11 Quai Conti, in Paris, opened in 2017. After a magnificent visit of the rooms of the museum installed in the old factory and dedicated to the numismatics history, one can visit the engraving workshop to discover a multi-century know-how. The Monnaie de Paris was created there in 864 with the Edict of Pitres promulgated by Charles II. It is the only workshop in France that has been active continuously since its creation.

The milk jugs, Lactopôle André Besnier, Laval, 2018. ©FHL

What is the nature of these collections?

The vast majority of companies present in their museums objects related to their technical and commercial history. The visitors can see the oldest objects produced by the company. This is often the case for automobile museums such as Peugeot or Citroën. They can also discover the history of production technology in the company, from the artisanal stage to the automation. The history of advertising and marketing holds an important place in them, possibly occupies the whole space for some: Maison de la Vache qui rit, L'Aventure Michelin, the Haribo Museum, etc. Some of these museums have a much broader scope, and tend to present the history of a consumer domain, beyond the scope of the company. This is the case of Lactopôle in Laval, owned by Lactalis, but which offers collections of objects related to the production, processing and consumption of milk from all over the planet. This is a collection started by the original owner and continued by his successors. The postal museum, L'Adresse, located in Paris, exhibits many objects that can trace the history well before the creation of the company and linked to the political history of France. This museum is labelled "Museum of France" and was previously a public museum, when the company belonged to the French state.
The Louis Vuitton Company has a collection of trunks and old luggages that can complete the range of its own productions and tells a story of travels. It also runs a museum in Asnières-sur-Seine where the company's story is told.

Other kinds of museums complete this panorama, for instance, contemporary art collections in vogue since the year 1990. The personal collections of the managers of very large international groups are presented in prestigious locations due to renowned architects. The legal forms of these places are variable, most often optimized for tax purposes; this is the case for foundations like those of Bernard Arnault[6] (LVMH) and François Pinault[7] (Kering). Some captains of industry invest in prestigious collections of industrial objects. For instance, the Ralph Lauren's sports cars collection that has been presented in 2011 at the Museum of Decorative Arts includes old cars since the 1930s.

The usefulness of corporate museums

A company that embarks in the creation of a corporate museum makes a strategic decision in terms of communication and marketing. Here, the museum is an instrument at the service of an internal and external strategy. Its constitution makes it possible to formalise an identity and a corporate culture around a common history and the know-how of employees. For the external side, the objectives of corporate museums may be central or not. For some, the museum gains the loyalty of customers by offering a moment of pleasure and renewed business benefits at each visit through the associated store. The visit is also a way to explain the manufacturing process and to respond to consumer questions (Roquefort Société). In some cases, the visit of the museum is combined with those of the factory or not: sometimes, the visit of the museum could substitute to the visit of the factory. That is true in the agrifood industry, where the hygiene constraints are very strict (Cité du chocolat, Valrhona). More immediate motivations can overcome the cultural and educational objectives. The image issue remains nevertheless important, and it is reflected in the choice of the name of the museum. In France, the term *musée* (museum) is considered old and dusty. Marketing agencies are choosing other names like "espace" (Space), "Aventure" (adventure),

[6] Francine Rivaud, « Quand Bernard Arnault lève (enfin) le voile sur ses trésors cachés », *Challenges.fr*, mis en ligne le 25 octobre 2014.
[7] Raphaëlle Bacqué, « François Pinault, le collectionneur », *M le magazine du Monde,* mis en ligne le 22.06.2018.

"Maison" (home) or "Cité" (city) with or without a qualifying sentence to advertise the experience: "The Michelin adventure: a place, a history, a future", "Cité de l'Espace: live the experience", "City of champagne: a journey in the effervescence" etc.

To conclude: designing a quality charter

Gradually, corporate museums have become economic and cultural actors in their own right. They drain important tourist flows and complement, even boost, the tourist and cultural offer of the territories. Many of the collections that are presented have no equivalent in public museums, which in any case do not intend to keep such collections. Their contribution to the history of technology and to economic history, as well as to industrial heritage, is important and should not be underestimated. However, the content that is exhibited could often be improved: without contradicting the opening remarks of the company, historical contextualization would make them real places of reference for all audiences, including schoolchildren. From this point of view, the presence of a scientific council, supported by historians, would ensure the public a more solid and correct presentation, that can objectively stimulate reflection visitors. The presence of qualified curators could also help the optimal conservation of collections, and their eventual enrichment. The heterogeneity of corporate museums does not facilitate the task: the drafting of a quality charter could lead to a greater homogeneity of practices and improve the quality of these places. The different actors from both the cultural and economic sides would gain from the adoption of such a charter. A dialogue remains to be established from this viewpoint, which we call for.

The machinery room to make needles. The visitors circulate in the center during the activity of production. Panels are had part and others to explain the process. Bohin manufacture, Normandy, 2017. © FHL

Application of modern technologies on studying and preserving cultural heritage

Professor Dr. Kamil İbrahimov

The article shows the importance of applying new technological innovations to the historical significance of the archaeological and architectural heritage of learning, preservation, restoration, and transmission to future generations. In connection with the application in computer and other modern technologies, which have become an integral part of our lives in modern times, the historical history of the Icheri Sheher, the pearl of our architectural heritage has been adapted to this technological process. The article describes the advantages of modern technologies for the acquisition of innovative scientific-practical results by the electronic cadastral map of the ISC "Icheri Sheher".

Historical, cultural and archaeological finds are the product of the superstition, which holds the economic-political and legal relations of a certain period. Therefore, architecture, as well as material and cultural monuments, are not merely aesthetic and philosophical concepts of a society that creates them. It is an art form of a complex which is enriched form of many aspects of society, economy, and politics.

One of the major problems of studying and preserving cultural heritage in the present time is the accurate assessment of historical and cultural monuments without denying the culture of the distant past.Cultural monuments are a material contrast to the distant past, and we treat them as if we were to perceive and preserve these stone chronicles.

At the moment, under the conditions in which the wealthy society has grown, the initial social expression of the architectural monuments reflecting the economic and political features of the era has changed in many respects. These monuments are a reminder of the architectural skills and folk arts of the past.

These monuments bring people closer together, enriching them, leading to the mutual influence of national cultures, creating communication between different nations. Foreign tourists who want to watch and study our historical and cultural monuments are also embracing the culture of our people.

From this point of view, the Icheri Sheher historical and architectural complex monuments are the cultural pearl of our nation since 2002, at the time that it has been added to the Universal Heritage List by the UNESCO organization and turned into a common asset of humanity.

This city is a kind of urbanism and its self-sacrifice. Some cities were stuck in military and political positions, while some were hit by a strong tornado. Some of them have been destroyed by tyrannies, floods, and natural disasters, while others have fertile landscapes, favorable natural-climatic conditions, a strong economy, trade, and craftsmanship.This was how Medieval Baku city look likes.

In order to properly illuminate the socio-economic life of the Azerbaijani people their material and spiritual culture, the study of cities and urban life in the Middle Ages has

great scientific value. Based on historical, archaeological, numismatic and epigraphic materials, this problem is thoroughly studied. However, in the modern world where integration and globalization developing, there is a need for new electronic techniques in the study and protection of cultural heritage.

Buildings, separate complexes along with aesthetic values have also material value. Along with new buildings, old buildings are also used for a variety of purposes. The Venice Charter also highlighted the need for public-historical monuments and public buildings.

But in the conditions of the market economy, the private property and property markets destroys many historical, cultural and architectural monuments of the country. As a result of the privatization of residential houses and the ownership of some buildings, the architectural appearance and planning of historic buildings are largely corrupted. Their extensive research and destruction will separate us from our distant past.

The most important measures taken in this direction were the Order of 16 August 2006, signed by the President of the Republic of Azerbaijan on restoration and preservation of historical architectural monuments in Baku. It was tasked to implement a series of measures to preserve the historical architectural monuments as a national cultural treasure. The main purpose was to strengthen its role the next generation and to ensure the proper promotion of the numerous foreign visitors to our country.

Strengthening scientific research to maintain the archeological and historical architectural monuments under the conditions of urban development and construction, also has leading roles in this area. This requires the use of modern technologies to carry out field exploration, analytic results, and systematic study. Efficiency is dependent on the nature of the field research, the applied technology, the nature of the results and the application of similar methods is almost crucial for the current period.

The world's research methods are based on the application of modern space and surface technology. This includes distance capture, space photogrammetry, stereo grammetry, scanning from space or space, aerostereoslovel trailers and global positioning devices.

The use of infrared and radio equipment is a great opportunity to detect and safeguard archeological monuments without any preliminary excavations. With the use of surface laser scanners, it is possible to obtain a large number of dots in the 3D version of the outer and inner dimensions of the monument, each of which has dimension information.

With vectorization of such points, it is possible to have valuable information carriers of the state of restoration with the development of scientific researchers based on numerous scientific analysis and analysis of the real state of architectural monuments. It is possible to analyze the chronology of changes taking place in the history of the city by collecting aerobics and space images of different periods. Drawing up digital maps based on information on architectural monuments, creating personal computers with their extensive technical capabilities. Their software provides reliable protection for new archaeological research methods, a study of monuments, and systematization of data. In modern times, the main development directions of society are computerization and informatization of all spheres of social life. It is no coincidence that one of the eight development goals of the third millennium adopted by all UN member states and it is the

development of a global partnership that has the potential to benefit from information and communication technologies (ICT). ICT is applied to all areas of social and economic life at a dynamic pace as it affects the development of society and the economy. Currently, the ICT coverage covers government agencies, non-governmental and private entities, socio-economic, social-political, educational, etc. The necessity of providing society with the necessary information is now recognized by all.

At the World Summit on Information Society, held on 10-12 December 2003 in Geneva, the use of information technology capacities to achieve the goals set out in the Millennium Declaration's Principles has been considered as a major task. Along with the widespread development of computer technology, with the help of this technology, new research methods are being developed every day.
It is a prerequisite for rapid data collection and rapidly analyzing and informing users about the availability of information. These can be done simply by creating a final system that can not be completely remedied, just like a process. GIS (geographical information system) is a perfect system for reliable analysis and management of planning, data composition, engineering and historical data needed to make optimal decisions in the area with certain boundaries.

In the case where mapping is very ancient, geographical information systems are the latest technology created by people of the past and revising the environment. Geographical Information Systems – Creating the map of the global world as the element of events and in the real world, planning and management are not wrong.

GIS technology has the capability to provide comprehensive visualization of all the data presented on the basis of maps, including spatial geographical analysis, basic data, and prices.

The widespread implementation of all these capabilities makes the GIS different from other information systems.

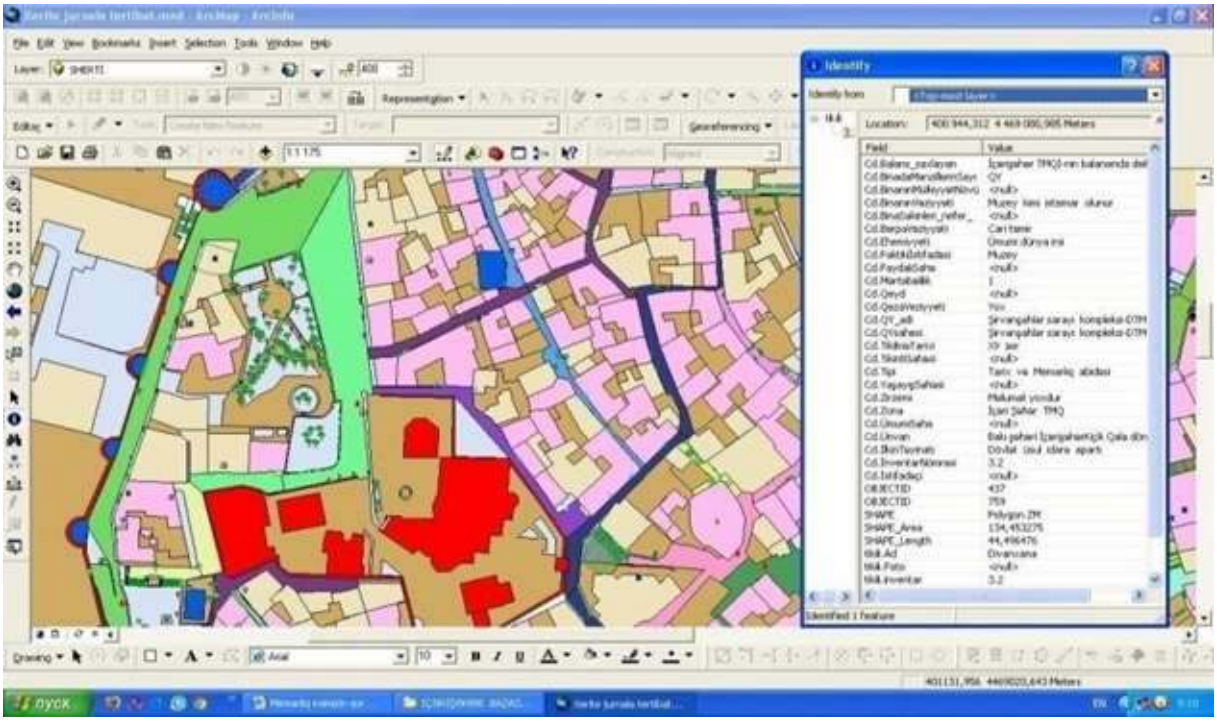
It is possible to get absolute results in terms of strategic planning over its predictability. Whereas the mapping and analysis are not regarded as a new direction, GIS technology focuses on the most recent one, and in this context, it can effectively, comfortably, quickly solve many problems and issues globally. All analyses are automated and a number of problematic issues that people have not been able to solve beforehand are effectively solved by modern technologies.

Any existing geographic information has information on the spatial status. Because these data are geographically related to coordinates, their automated management is very easy. With it, you can quickly and accurately identify any object and event information from the map. For example any address, institution, natural disaster, route, natural object, station, and so on. The process of obtaining detailed information on processes is one of the factors that once again demonstrate the functionality of the CIS. The application of the analysis in any direction creates conditions for the saving and utilization of large quantities of material resources. In this system, cartographic base data is uninterrupted and does not depend on scale. Various scale maps can be drawn for any area based on such baseline estimates. At any time, base data can be updated in a short timeframe. Map and data created for any area can be used by various organizations instantly and on all networks. The system created to meet the internal information and

management requirements of individual organizations can be easily integrated into public information systems in the future.

The digital electronic map of the Icherisheher Historical Architecture Reserve has been compiled using this technology innovation. Inventory numbers on the historical and architectural monument and the parcels of the land plot were placed on the list approved by Decree No. 132 of the Cabinet of Ministers of the Republic of Azerbaijan, and the other buildings and the land plots where they were located were also drawn up and tabulated. A map was drawn on the archeological monuments and archaeological excavations along the same rules and associated with attribute data. With the help of the created electronic map and databank, it is clear that the city's changing plan for the various historical periods is closely monitored and explored.

Planning arrangements at the beginning of the XVII-XIX centuries, despite the dramatic changes in the structure and composition of ancient cities, the main city ensembles have been able to maintain their active compositional significance. In the course of exploration of the data, there is a change in the location of the settlement in different historical periods. For example the project of reconstruction of the Baku fortress built in 1835, which was already studied by Icherisheher researchers. Some of the details of this plan change can also be viewed from historical publications.



During the archeological excavations carried out in 1947 and 1958-1962, a large bath (26 room) complex was discovered beneath the ground cover. At present, the bath is cleaned from both the top and the inside and the Shirvanshahs are included in the palace complex.

Another example is: it is possible to note that at the bottom of the walls of the sacred fortress, close to the double fortress doors, there is currently a bath in the middle of the Baku khan's house under the ground. The interior and exterior dimensions of the monument were scanned in the 3D version with the use of a groundbreaking laser scanner in this bathroom compartment. Thus, the effectiveness and success of the archaeological excavations carried out in this area have been achieved, and the ground and conditions for future conservation work have been created, and all this data bank has been transferred to GIS map.

It should be noted that, based on all the information and information on 50-year archaeological excavations in the ancient city of Baku in the last ten years, an archaeological map of Icheri Sheher was created on the basis of photographic and architectural plans, and this information bank was transferred to GIS map. Any user who can now access the GIS map of Icheri Sheher can get acquainted with the archeological map and the archeological history of the city in the electronic version.

It is important that all members of the organization use the information collected on any organization to become a necessity for the establishment of different corporate networks. This is particularly relevant in the case of mixed analyzes such as the management and coordination of many economic, political, social and cultural information in the use of space-related information. The introduction of an electronic cadastral map in corporate systems enhances the widest possible use of collected data.

Thus a study of the historical and cultural architecture of our archeological monuments on the basis of modern technologies in our country is the systematization of scientific and practical analyzes and research on the history. Also, it affects our architecture and the legal and cultural significance. On the other hand, scientific improvements and archeological exploration also improve the efficiency of the excavation work. It is useful for studying, mapping and preserving all of our cultural heritage sites throughout the country.

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Attempt of a corporate museum that owns industrial collections about tobacco and salt

Reiko SAKAKI

Tobacco & Salt Museum, Tokyo, JAPAN

Tobacco & Salt Museum opened on November 3rd, 1978, and since then has been engaged in a variety of activities, including collection-building, research, and giving presentations abroad on the history and culture of tobacco and salt, in addition to hosting special exhibitions on a variety of themes. But from the open till the present we have been asked the following questions constantly: "why tobacco and salt?" or "are there any relations between tobacco and salt?"

The answer is simple. Because the museum was founded by the Japan Tobacco and Salt Public Corporation (now Japan Tobacco Inc.), which handled tobacco and salt as monopoly commodities at that time. Then, why did the Japan Tobacco and Salt Public Corporation decide to establish the museum? We look back upon the short history of the museum.

The short history of the Tobacco and Salt Museum and its collection

The museum opened in 1978, but the collection of materials dates back to more than a half century before that. It all started in 1932, when at that time Director-General of the Monopoly Bureau in the Ministry Finance decided collecting materials in an organized basis. His aim was to collect *ukiyo-e* woodblock prints depicting smoking items or smoking scenes, smoking implements, and other historical materials related to Japanese tobacco culture. At the time, the unique Japanese habit of smoking finely shredded tobacco through *kiseru* pipes was gradually declining in popularity due to the introduction of the new smoking styles like as pipe, cigar and cigarettes from abroad. Also in this period there was a thriving movement surrounding the export and sale of Japanese artwork overseas, including *ukiyo-e* prints, *kiseru* pipes, t*abakoire* tobacco-pouches, *tabakobon* tobacco trays, and others used for so long in daily life of the Japanese people. In view of this situation, the Director-General thought that it would probably have been impossible to put together a complete collection thereafter if he had let that opportunity slip by.

Thanks to his decision, at that moment about half of the Tobacco & Salt Museum's current collection of *ukiyo-e* prints and smoking implements was complete. At around the same time, a "Tobacco Exposition" toured major Japanese cities with the principal aim of spreading general knowledge and understanding of tobacco among the public, and some of the collected materials were exhibited in these expositions, meanwhile some materials related to the local tobacco history were added to the collections. But the outbreak of war suspended collecting materials, and most of the collections were stored in a warehouse equipped with the most up-to-date temperature and humidity controlled facilities.

After the war, in1949, the Japan Tobacco and Salt Public Corporation was separated from the Monopoly Bureau, and efforts to build up a collection were resumed, albeit on a small scale. Once again a part of collections were displayed to the public at events related to the corporation, but calls for a permanent public display gradually grew in both inside and outside the corporation. Then, in 1974, the decision was made to establish the Tobacco & Salt Museum in commemoration of the 70th anniversary of the tobacco

manufacturing and sales monopoly. And the Tobacco & Salt Museum opened its doors to the public in Shibuya, Tokyo, on November 3rd, 1978, as a facility where, rather than merely exhibiting the collected materials, research could be conducted and materials collected on subjects such as cultural and industrial history related to tobacco and salt which, at the time, were monopoly commodities handled by the Japan Tobacco and Salt Public Corporation.

Since its open, the museum has been engaged in a variety of activities, meanwhile, as the 30th anniversary had passed by, problems like facility deterioration and the lack of storage space became increasingly apparent. It was around this time that we began to consider a new vision for the museum, to solve these problems and rework the exhibits overall, based on a vision for what the Tobacco and Salt Museum ought to be in the future. After repeated considerations, the relocation of the museum was decided. The museum in Shibuya wad closed on September 1st, 2013, and the new Tobacco & Salt Museum was reopened to the public on April 25th, 2015, in Sumida, near the TOKYO SKYTREE.

Thorough more than 35 years activity, the total number of collections has amounted to about 40,000, including 1,800 *ukiyo-e* woodblock prints, 800 *tabakobon* tobacco trays, 600 *tabakoire* tobacco pouches, 1,000 *kiseru* pipes, 1,800 signboards or posters, 8,000 cigarette packages, 10,000 tobacco items across the world, 1,030 salt related items, etc. Also we have collected more than 62,000 books or documents, photos, films, and so on.

At two permanent exhibition rooms new museum, rather than merely exhibiting these collected materials, we attempt to introduce correct information on tobacco and salt, and to gain public awareness and understanding of such industries, reflecting new information and utilizing new tools.

Permanent exhibition room of tobacco: History and Culture of Tobacco

Originating in the Americas, tobacco has formed various regional tobacco cultures as it has spread across the world. This exhibition room covers the history and culture of tobacco in the following sections: "The Birth and Spread of Tobacco Culture", "Tobacco Cultures across the World", "Tobacco Culture in the Edo Period" and "Tobacco Culture in the Modern Era".

1. Birth and Spread of Tobacco Culture

The tobacco plant is thought to have originated in the Andes Mountains in South America. The inhabitants of the Americas used tobacco in a variety of forms throughout a long history. After the first voyage of Columbus in 1492, tobacco and tobacco culture crossed the ocean from the Americas to Europe, and later to the world. In this section, we present the history of birth and spread of tobacco culture with the items like as pipes of the pre-European era and graphics. Also we have reproduced the inner chamber of the "Temple of the Cross" in the Palenque Ruins of Mexico in full size as an introduction to the exhibition room.

2. Tobacco Cultures Across the World

After the 16th century, in the process of spreading all over the world, the tobacco items and its uses also came to vary to suit each individual region. In this section, we introduce the diversity of the tobacco culture across the world, displaying various tobacco items such as pipes, water-pipes, snuff boxes, cigarette packages, etc.

3. Tobacco Culture in the Edo Period

Tobacco is thought to have arrived in Japan via foreign ships that came frequently in the latter half of the 16th century. At first, the Japanese imitated the smoking customs of the Europeans. As the customs came to take root, Japanese began to cut tobacco leaves as fine as hairs and smoke them in *kiseru* pipes. Throughout the Edo period, a unique tobacco culture was formed profoundly within Japan. In this section, we introduce the tobacco culture in the Edo period with the reproduction of a small tobacco shop and a *tabakoire* tobacco pouch shop in the early 19th century, the items like *ukiyo-e* woodblock prints, *tabakoire* tobacco pouches, *tobakobon* tobacco trays, and graphics.

4. Tobacco Culture in the Modern Era

Since the Meiji period (1868-1912) started, the Japanese Meiji government considered tobacco as a precious source of revenue to advance modernization of Japan, and in 1904 imposed a monopoly system on the manufacture and sale of tobacco. In 1985, under pressure for market liberalization from overseas and amidst administrative and financial reforms, the monopoly system was abolished and Japan Tobacco Inc. was established. In this section, we present a deep connection of tobacco with the society, lifestyle, and customs of the times through the items like cigarette packages, posters, signboards, graphics, videos, and many other materials. We also introduce the history and progress of tobacco cultivation and manufacturing with tobacco-leaves cutting machines, cigarette-making machine, pictures, and so on.

Permanent exhibition room of salt: The World of Salt

Salt is an indispensable substance without which humans and animals could not survive. This exhibition room covers salt-related topics in the following sections: "World Salt Resources", "Salt Production in Japan" and "The Science of Salt".

1. World Salt Resources

Salt is present in the world in a variety of forms like seawater, salt lakes, rock salts and more, and humans have devised various ways of producing salt as appropriate for their living environments, in order to obtain the salt necessary. Today, approximately 280 million tons of salt are produced annually around the world, and most of this is from non-seawater sources such as rock salt and salt lakes. In this section, we exhibit specimens of salt around the world, and graphics. Especially, rock salt sculpture of Saint Kinga Statue Altar, created with special permission from Wieliczka Salt Mine and made by sculptors among the Wieliczka miners and other Polish craftsmen, and chandelier made by rock salt crystals are one of the special-feature exhibits in the museum.

2. Salt Production in Japan

Japan lacks rock salt and salt lakes, and its rainy climate makes it difficult for salt to be created through solar evaporation. Because of this reason, since ancient times Japanese people have developed salt production methods consist of two processes: *saikan*, which concentrates seawater and extracts brine, and *sengo*, the boiling of brine to obtain salt crystals. In this section, we present the history and progress of salt production in Japan with models, diagrams, pictures, videos, and so on. Especially we utilize many diagrams to explain each process of salt production.

3. The Science of Salt

In this section, we introduce the various properties of salt with a "scientific" approach, meanwhile, every summer the museum offers a special exhibition about salt for children. Among the exhibition theme that changes every year, there is a "Shopping Game" in which children can learn many roles of salt not only in food but also in various household items, enjoying in the special exhibition room transformed as a "supermarket". At this most popular exhibition, children choose five items from shelves and bring them to the "Salt Cash" register to get information on how each product is made, and how salt is used in the production process. This "Shopping Game" is a development form of the "Tree of Salt Uses" in the "Science of Salt" section. The branches of this tree diagram represent the different categories of uses of salt as like uses in households and food processing, general industrial uses, uses in the soda industry and uses of chlorine compounds, while the leaves introduce typical and representative products for each use category.

Conclusion

Sumida-ward, where new Tobacco & Salt Museum is located, is a district deeply related to the history of tobacco industry, but there are no longer any old tobacco factories left. Also a large number of historical or industrial facilities or materials related to tobacco and salt have been disappearing in various parts of Japan. In such circumstances, one of the important issues for our museum is to continue collecting materials and investigating the history and culture of tobacco and salt. Especially the most urgent issue is to investigate and put in good condition several cigarette manufacturing machines that are temporarily placed in the warehouse adjacent to the museum.

In any case, we will continue to act as a museum that introduces and provides correct information on history, culture and industry of tobacco and salt.

3D modelization and the industrial heritage

Dr. Jean-Louis Kerouanton (assistant-professor),
Université de Nantes, Centre François Viète, Epistémologie Histoire des sciences et des techniques, France
Dr. Eng, Florent Laroche (assistant-professor),
Ecole Centrale de Nantes, Laboratoire des sciences du numérique, France

3D modelization is very well known today in industry and engineering but also in games. Its applications for culture and human sciences are more recent. However, the development of such applications today is quite important in archaeology with amazing results. The proposal of this communication is to show how 3D modelling, and more generally data knowledge, provides new perspectives for approaching industrial archaeology, between knowledge, conservation and valorisation, especially in museums. A new way for us to imagine contemporary archaeology: by the way not only new methodology but actually archaeology of contemporary objects. That is we are trying in Nantes associated laboratories (*Université de Nantes*, *Ecole centrale de Nantes*) in stretch collaborations with museums. This double point of view succeeds necessarily with interdisciplinary questioning between engineering and human sciences approaches for the development of digital humanities. We are trying today to enhance and develop our interdisciplinary methodology for heritage and museology in a new *ANR* research project, *RESEED*[i1].

Interdisciplinarity for valorization

"When heritage becomes virtual"
Over the past 10 years, our research collaboration has focused on industrial heritage. It is an interdisciplinary approach between the *Centre François Viète*[2], a laboratory of history of science and technology from University of Nantes[3], and the *LS2N*[4], Laboratoire des sciences du numérique de Nantes, a mixt Research unity between *CNRS* , the *University of Nantes* and the *Ecole Centrale de Nantes*, and more precisely inside *LS2N*, the ex *IRCCyN*, a cybernetics laboratory from Centrale Nantes[5].

We are developing our common and interdisciplinary research with bijection between historical archives analysis, on one side, and data management and visualization, on the other side. A such approach allows us to propose for historians, museologists and the whole public multiple and crossed narrations from and about heritage objects

We founded together with our student team an informal resarch group we named *EPOTEC*, *Etude des procédés et des objets techniques* (Study of technical objects and processes). It is possible to see our common production on our website[6]

[1] « Retro-conception SémantiquE d'objEts patrimoniaux Digitaux »,. http://reseed.ls2n.fr.
[2] http://www.cfv.univ-nantes.fr/.
[3] http://www.univ-nantes.fr.
[4] https://www.ls2n.fr/.
[5] https://www.ec-nantes.fr/.
[6] *www.epotec.fr*

Of course, we are not the first team to develop research for museology with new technologies and digital considerations. In France it is clearly possible to note some developments about these new preoccupations from the last 90's years. In 1996, an important congress organized by the *Ecole nationale du Patrimoine* held in Paris at *Bibliothèque Nationale de France* and permitted 400 hundred of scientists, museums and heritage specialists to listen forty communications on the subject[7].

Of course, we are not alone too. One of the most notable recent researches about industrial heritage and 3D modelization is the *ANR* program *Usine 3D*[8] supported by Alain-Pierre Michel from the University of Evry. Professor Michel held from years his scientific research about the story of automobile and especially *Renault* Company[9]. 3D modelization allows him to understand and explain the evolutions of the industrialization in the *Renault* factory in Boulogne-Billancourt and how really created and developed line work in the 20's. There are also other examples of automobile history in this project about *Citroën*, *Clement-Bayard* and *Peugeot*, with the collaboration of Paul Smith, Jean-Louis Loubet and others, who embraced different digital methodologies from technical and architectural 3D modelization to GIS (geographical information system).

More generally, 3D modelization is encouraged and supported by CNRS through the *Consortium 3D-SHS*. This group was initiated by Robert Vergnieux, the creator of *Archeovision* in 1993 at Bordeaux, one of the best center in archaeology and 3D modelization in France[10]. *Consortium 3D-SHS* is one of the groups of the *TGIR Huma-Num*, which is dedicated to federate the digital humanities in France in all its diversities[11]. *EPOTEC* at Nantes is an active member of the *Consortium 3D-SHS*[12].

All these researches proceed to develop an original point of view in the different approaches of digital humanities[13]. It is evident for all together digital studies must necessarily increasing in the same time than digital in the whole society, culture, economy and production. Human sciences are obviously for us in a central place. The originality of 3D modelization, not *a priori* a human science methodology, resides to insist on the complex relationship between material and immaterial culture in past and present, beyond the textuality.

"When industrial engineering becomes heritage"

Our projects are developed in a renewed interdisciplinary scientific approach. They are situated in the heart of the contemporary evolutions of the digital technology between

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[7] *Patrimoine et multimédia : le rôle du conservateur*. Colloque Paris, Bibliothèque Nationale de France, 23-25 octobre 1996, Paris : La Documentation française, Ecole nationale du patrimoine, 1997. For a recent example, Bernadette Saou-Dufresne (ed.). *Heritage and Digital Humanities. How should training practices evolve ?*, Zurich, Berlin : LIT, 2014.

[8] www.usines3d.fr/. Alain Michel, Stéphane Pouyllau. *Rapport final du projet " Usines 3D "*. [Rapport de recherche] Centre Alexandre Koyré - CRHST. 2011. <halshs-01592432>, https://halshs.archives-ouvertes.fr/halshs-01592432/document.

[9] Alain Michel, *Travail à la chaîne. Renault (1898-1947)*, Boulogne-Billancourt, ETAI, 2007

[10] http://archeovision.cnrs.fr/.

[11] https://www.huma-num.fr/.

[12] https://shs3d.hypotheses.org/.

[13] Anne Burdick, Johanna Drucker and alii, *Digital Humanities*, Cambridge, Massachusetts : the MIT Press, 2012. In French a short but very good synthesis by Serge Abiteboul and Florence Hachez-Leroy. "Humanités numériques". *Encyclopédie de l'humanisme méditerranéen*, 2015. 〈hal-01120259〉

the human and social sciences and the sciences for the engineer. To make a complete study, to establish a model, it is for us the base of research for the documentary and historical point of view and a base for the public too.

Our ambition is to speak about technical objects, machines, factories or port relations in the city and territory, earth, river or sea. It is to speak as long from the point of view of the town planning, of the architecture, of the formal study, that from the point of view of techniques and networks. Objects and scales are multiple: factories, workshops, places of production, but also in a larger way, understanding and explanation of traffic, circulations, and networks, wider point of view of the "territory" and history of the "landscapes".

The *CFV*, the laboratory of history of science and technology, and the *LS2N*, the laboratory of engineering, collaborate for 10 years together. This collaboration baptized *EPOTEC* focused in its beginning on the industrial heritage. This approach was immediately voluntarily interdisciplinary[14], but the separation between every specified domain remains still strong[15]: analyses and historical records on one side; management and valuation of data of the other one.
Highly rated engineering? You have to do specifications and format the data.
Highly rated historian? You have to understand in a double movement of separation / collaboration three bound problems around the very narrative:

- Within the narrative: the studied subjects (technical, network systems) question the classic linearity of the narrative as the exclusive representation of the history.
- Between narratives: the capitalization of the historic knowledge is essentially translated by the juxtaposition of autonomous and motionless narratives. When the production of the historian is natively digital technology, the hegemony of the book / article is questioned.
- After the narrative: the exploitability and the valuation of the "simple" historian narrative are complicated.

The modelization as a scientific approach

"From engineering to heritage"

Our scientific proposition is to reverse the time axis of the design process, using tools and methods of virtual engineering. The beginning of the methodology was clearly an adaptation of the "reverse engineering"[16] used in factories and research and development. This new interdisciplinary, and reflexive, connection between history and

[14] "La numérisation du patrimoine technique", *Documents pour l'histoire des techniques*, n°18, 2e semestre 2009. A topical theme of eight scientific propositions, introduction by Michel Cotte: "Les techniques numériques et l'histoire des techniques : le cas des maquettes virtuelles animées », pp.7-21.
[15] Florent Laroche, *Contribution à la sauvegarde des objets techniques anciens par l'archéologie industrielle avancée. Proposition d'un modèle d'information de référence muséologique et d'une méthode interdisciplinaire pour la capitalisation des connaissances du patrimoine technique et industriel*, Thèse, génie mécanique : Ecole Centrale de Nantes , Université de Nantes, 2007. 〈tel-00382703〉. For a first and short reading in English, Florent Laroche. "Advanced Industrial Archaeology and Techno-Museology: A new virtual life for industrial heritage". *TICCIH Bulletin*, 2008, pp.3-4. 〈hal-00422346〉
[16] *Reverse engineering*, also called *back engineering*, is the process by which a man-made object is deconstructed to reveal its designs, architecture, or to extract knowledge from the object, https://en.wikipedia.org/wiki/Reverse_engineering.

archaeology from one side and engineering and manufacturing on the other permits a new way to think the interactions between real object and virtual object[17].

The central problematic is to extend life-cycle comprehension for heritage objects to obtain its specific PLM (product lifecycle management)[18]. It is a KLM methodology, (Knowledge Life-cycle Management), who is extended here possibly far away in the past[19]:

- Past information of a specific object
- Contemporary information of the same object
- Relations between those two pieces of information in the past and present

The case of an heritage object is considered in the same way, from ordinary life to heritage life-cycle extension with its own problematic and scientific proposal, from objectives and constraints to proposition:

- Objectives: Create connections between physical object, digital representation and context information
- Constraints: Take into account temporal, physical and multidisciplinary aspects. Encapsulate complex and multi-scale systems: product, tool, machine, plant, city
- Proposition: Extend ordinary PLM with the long life-cycle of objects to museological PLM (product life-cycle management). Finally, obtain a *Digital Heritage Reference Model*, an operational framework, with process view and product view

The Digital Heritage Reference Model

The difficulty of the historical narrative in space and time is to construct knowledge between the crossed consideration of synchrony and diachrony. The very specificity of heritage scientific consideration is probably to add the question of passed time to present time. If we compare those historian or museologist considerations with engineer considerations, it is in fact possible to ally its own questionings about product and process. It means to bind product view and synchrony explanation, process view and diachronic explanations, during all life since passed creation until our daily presentation or valorisation.

Product view

The DHRM operational framework is overall a consideration about the association of objects and relationships constituting coherent items, exploring them with the exploitation of data and documentations.

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[17] Florent Laroche, Alain Bernard, Michel Cotte. « A new approach for preserving the technical heritage". *conférence VRIC - salon Laval Virtual*, Mar 2006, Laval, France. 11 p., 2006, ISBN 2-9515730-5-7. 〈hal-00473008〉

[18] "*product lifecycle management (PLM)* is the process of managing the entire lifecycle of a product from inception, through engineering design and manufacture, to service and disposal of manufactured products. PLM integrates people, data, processes and business systems" https://en.wikipedia.org/wiki/Product_lifecycle .

[19] Florent Laroche, Alain Bernard, Michel Cotte. « Knowledge management for industrial heritage". *Methods and Tools for Effective Knowledge Life-Cycle-Management*, Springer, pp.307-330, 2007. 〈hal-00412066〉

The object is considered in a large meaning to say process, product, components, Human or events we want to explore and valorise.
We have to consider two generic relationships:

- Direct, between real objects
- Indirect, between real object and abstract concept

The documentation is obviously composed of heterogeneous data, archives, papers, photos, sounds, videos, 3D scans …
Taking into account space and time needs overall explanation and comprehension; that is why the semantic consideration is so important for the meaning. That is a crucial question who engaged not only scientific data consideration in computer ontologies, but in the same time the way we understand the actual meaning of the past creation, use, consideration and conservation or valorisation in the present .

Process view

The process view could be imagined as a simple roadmap in three steps[20]:

- Digitalizing and Knowledge Management: the time to start from the real object, to consider and document its technical and industrial context as well as its socio-economic situation in use during its life cycle.
- Modeling: the time to elaborate the Digital Heritage Reference Model with the 3D modelization and reverse engineering; the object is necessarily contextualized with help of data and documentation.
- Dynamic used situations and virtual reality :the time to show, demonstrate and valorize the model in different possible cases, standalone use at home, standalone use in Museum, immersive System…

Some realizations

A machine: Batz-sur-Mer salt laundry

We first can talk about of the salt laundry of the *Musée des marais salants* of Batz-sur-Mer[21]. At the end of years 2000, the extension of the museum in a closer old workshop and salt warehouse from the beginning of 20th century was the opportunity to discover and study a salt laundry machine, essentially in wood. Its appearance was really a pity and it was just impossible to think to restore it cause of the wood irreversible degradation. Our first idea was to save not the machine itself but to model it and study it for best comprehension and virtual valorization.

But the mechanical re-engineering in CAD was so significant and meaningful for the curators they arrived to conclude a reconstruction was possible in the new museum, at the original place in the warehouse. That one reconstruction is now working since the reopening in august 2013!

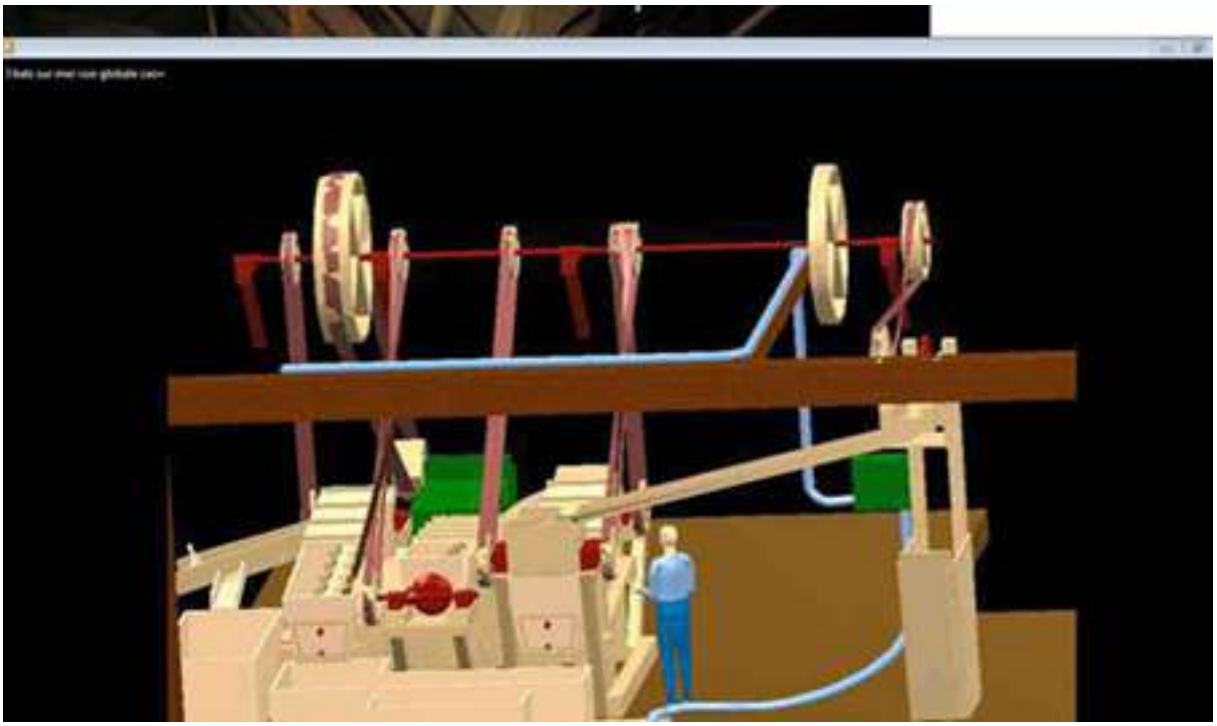
It is important to say this not just a material copy of the old and destroyed machine but really the result of the archaeological and mechanical study. Because it is mechanically and dynamically exact, the CAD software use allowed to valid the whole functioning and efficiency not only of the machine but of the general surrounding process too. That

[20] The 3D modelization methodology has been precised recently by the Consortium 3D-SHS, Violette Abergel, Pascal Benistant, Laurent Bergerot, Jean-François Bernard, Hervé Bohbot, et al.. *Livre blanc du Consortium 3D SHS* : . France. 2017. 〈hal-01683842〉

[21] Florent Laroche, , *Contribution à la sauvegarde des objets techniques*…, op.cit, pp.265-349

constitutes a tremendous difference with video games or simples illustrations. Here we are in a scientific process, able to calculate, verify and transpose.

Batz-sur-Mer Salt Laundry, Cl. Jean-Louis Kerouanton 2004



Batz-sur-Mer Salt Laundry, Screen shoot 3D CAD Florent Laroche.

Batz-sur-Mer Salt Laundry, the new museum, Cl. Florent Laroche

A factory : La Ciotat shipyards

Our first visit in the La Ciotat shipyards was in 2007 on the invitation of regional representation of the Ministry of the Culture to make an expertise about the cranes. The question to have the good knowledge of the shipyard's technical installations yet in place was important to indicate a possible proposal for conservation and valorization.

Probably in history the second one in France behind the Saint-Nazaire shipyards, La Ciotat is a very important site reopened in a new economic model since 1995 after the shipyard closing in 1987 and seven years unionized workers occupation. Just interrupted by a short and ephemeral attempt of economic recovery, this movement is quite singular and effective in the work history in France. They actually saved the main functioning machines and overall the Titan and Goliath cranes from destruction and disease. It was just the only condition for a possible reopening and they succeed.

The first study was general[22]; it consisted to inventory all the shipyard cranes, in operation or abandoned, from the smallest to the giant gantry cranes. The site contextualization was evident and the study immediately extended to the industrial landscape and the constructions of the whole factory, administration, workshops, warehouses and obviously maritime infrastructures as quays, dry-docks and slipways. Our proposal, closer to the objects notices, was based on database and GIS to map the

[22] Jean-Louis Kerouanton, *Les chantiers navals de la Ciotat*, rapport de recherche : Centre François Viète, Université de Nantes, DRAC Provence-Alpes-Côte d'Azur, décembre 2007.

site evolution in time and space, to place the machines, to reference some old maps and plans in their geographical situation. It was our first digital approach[23].

The second digital approach proceeded to the necessity to study before its destruction a bending machine which appeared very original. The *Bennie* machine, with the renewed Ministry of culture support, could be the subject of our methodology. After work in place, 3D scanning, archives documentation, we could propose the mechanical modelling and then a video film for story and valorization[24].

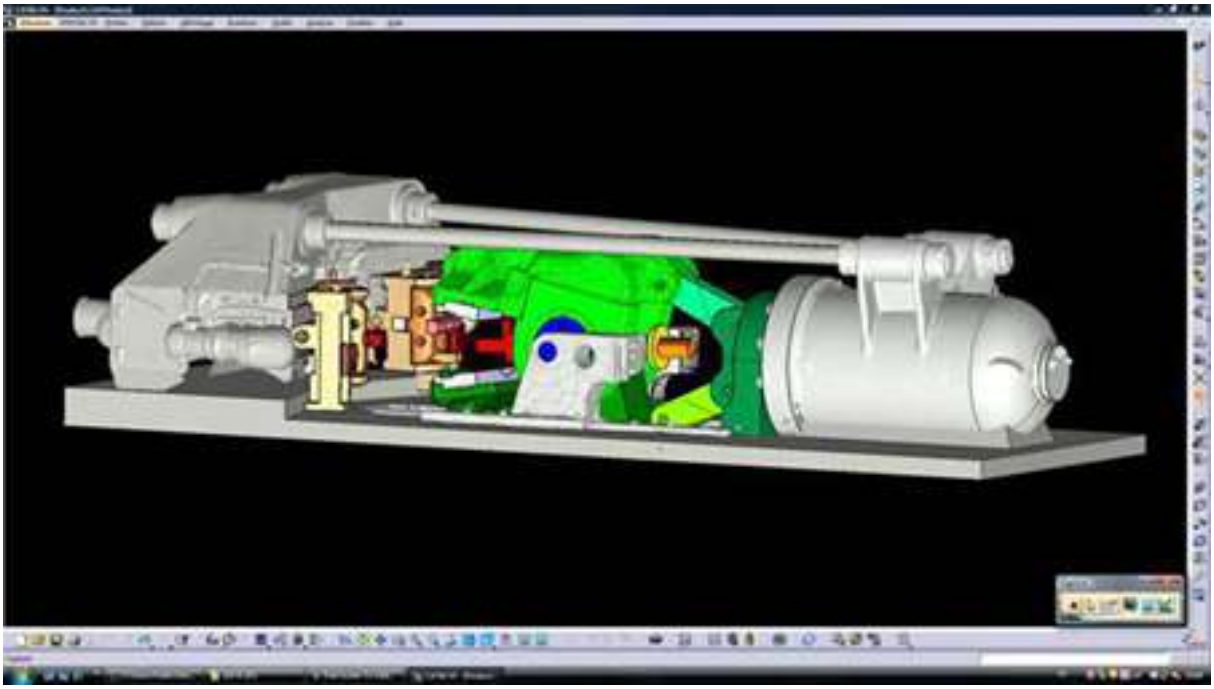
Today, in the large difference of ten years ago where the closure memory was still painful, it is clearly possible to speak in the city about the shipyards past and story[25]. In 2011, a public conference we did showing the video was really a success.

La Ciotat Bennie bending machine, Cl. Jean-Louis Kerouanton 2007

[23] Jean-Louis Kerouanton, « Pour l'utilisation des SIG (systèmes d'information géographique) en histoire des techniques : entre documentation et analyse spatiale », *Documents d'Histoire des Techniques*, n°18, décembre 2009, pp. 81-94

[24] Jean-Louis Kerouanton, Florent Laroche, Didier Serveille, *La cintreuse à membrures Bennie*, video film, 2010 https://www.youtube.com/watch?v=HvyPULjlRbs.

[25] Sylvie Denante, Jean-Louis Kerouanton, "L'image virtuelle comme source de connaissance pour le patrimoine industriel : les chantiers navals de La Ciotat, espace et représentation technique entre port et architecture du XXe siècle", *RIPAM, Rencontres Internationales du Patrimoine Architectural Méditerranéen*, Marseille : CICRP, octobre 2013, pp.131-133



La Ciotat, Bennie Machine, 3D CAD Didier Serveille, 2010

A city industrial harbour : Nantes in 1900

The mock-up of Nantes harbor is one of the most important objects of the Nantes history museum, the *Château des Ducs de Bretagne*. Built by Pierre-Auguste Duchesne in 1899 for the 1900 Paris *Exposition Universelle,* but actualized until 1914, the mock-up is probably one of the best documents for the urban and economic history of Nantes around 1900[26].

The museum curators and the research team had together recognized its interest since a few years[27]. Our common interest for new technologies into museology convinced us to imagine a new common project. We were together thinking to the innovative use of digital technologies to promote cultural heritage. The interactive device was first, and is actually today, a proposition to valorise the object itself.

The first step was to scan the entire mock-up in 3D; then the historical documentation was provided for the database. It was really a work in progress and a real academic experience with approximately one hundred and fifty students during several years, both engineering students and heritage students for the most part, learning from themselves to cross their own academic languages to make common sense.

[26] COURTIN, Ch. GUILLET, B., KEROUANTON,J-L., LAROCHE, Fl., *Nantes 1900, la maquette du port. Une valorisation scientifique et muséographique innovante*. Nantes : Château des ducs de Bretagne — Musée d'histoire de Nantes, 2015. 〈hal-01243990〉

[27] Bertrand Guillet, Laurent Huron, Jean-Louis Kerouanton, « La maquette du Port de Nantes », *Congrès national des Sociétés savantes « Des villes, des ports : la mer, les hommes» (n° 124; 1999; Nantes)*, Paris : CTHS, 2001, pp. 143-155. The scale model is approximatively 1/500 with 9.20m length for 1,85m large.

The scientific objectives were progressively fixed at the same time in permanent discussion with the museum team. They are analysed in the thesis of Benjamin Hervy[28]. Our preoccupations were to develop the DHRM as defined by Florent Laroche in his 2007 thesis, insisting on semantic recognition of 3D elements, time integration (link past/present) in the knowledge database and on the "self-adaptable" meta-model for supporting updates in a sustainable life perspective.

The three interactive multi-touch screens are placed just in front of the mock-up, bounded to precise geo-referenced lightning when notices and thematic links can be read in the same time during navigation. The idea is to help visitor to understand the mock-up as an artistic production, a tri-dimensional town city plan[29], and of course an amazing document for the historians and visitors for the comprehension of the harbour and the city surrounding the river Loire, in its maritime part.

Model is not a simple mock-up !

Of course, this short presentation of our works is not exhaustive. If our research began with industrial heritage objects, it seems to allow some similar considerations on others heritage fields. However, our approach looks probably especially accurate on technical and industrial objects. The 3D modelization, with a real CAD methodology, is obviously operant with technic and past functioning, cause of its precise mechanical and dynamical aspects. But our first reverse engineering methodology drives us to increase the reflexion on data and permanent reflexive links with all their complexity for the historian narrative. We have now to improve it, to anticipate the integration of the outdated phases since the design phase, the reuse phases or recycling phases, to add layers for the present, including heritage life phase.

Our proposal about the *Salons Mauduit*[30], put on some developments in the answering with immersive and interactive situations, augmented reality, serendipity visit or "free but guided" visit. We want to test too the possibility for the visitor to be himself an author, a testimonial contributor *in situ* or on line, in link with the future Nantes City "wiki heritage".

Virtual 3D heritage objects can become a real tool for understanding our history. It is a present question to envisage new representations of the history and to facilitate the valuation by a reflection on the possibilities of the documentary analysis between narrative of the historian and network of knowledge. For the historian, the double crosslinking, within the narrative and between narratives, opens new opportunities of

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[28] Benjamin Hervy. *Contribution à la mise en place d'un PLM muséologique dédié à la conservation et la valorisation du patrimoine : Modélisation et intégration de données hétérogènes sur un cycle de vie produit complexe*. Thèse : Sciences de l'ingénieur : Ecole Centrale de Nantes (ECN), 2014. 〈tel-01102311〉.

[29] As such as the best well-known "plan-reliefs" of the frontier cities since the firsts produced in Louis XIV reign. Eric Deroo, Max Polonovski, *La France en relief: Chefs d'œuvre de la collection des plans-reliefs de Louis XIV à Napoléon III*, Paris : RMN, 2012

[30] Florent Laroche, Jean-Louis Kerouanton. Muséologie, patrimoine, humanités numériques et 3D. *Digital Intelligence*, Apr 2016, Québec, Canada. 2016, Conférence Digital Intelligence. 〈hal-01280767〉. The *Salons Mauduit* is an art-deco well-known place in Nantes, destructed last year but rebuilt this one closer the primary place.

description and understanding. This transfer of the writing and the accesses goes to the sense of the Digital Humanities such as we analyze them from now on.

That is the reason we launched in 2016 our *ReSeed* project[31], financed by the *Agence nationale de la recherche* until 2020, over the Florent Laroche responsibility. Semantic reverse-engineering of digital heritage objects: this present work is clearly the direct following of all the precedents[32]. With its multidisciplinary approach, the Digital Heritage Reference Model contributes to the scalability of knowledge, its interoperability, as well as the re-usability of the framework, independent from the nature of the project. It allows multi-dimensional relationship (belongings, history, geography…), as well as a renewed answering about the interaction between qualitative and quantitative.

Most of the time, 3D use drifts towards creation of perfect models that do not fit with heritage ethics. Because each object is unique, there are no unique methods nor unique tool or general technology to support those approaches. So, managing 3D systematically is a real challenge. Inside the field of the Digital Humanities[33], *ReSeed* project aims to invent a "new use of 3D model". This project meets an interdisciplinary consortium with industrials and universities coming from Human and Engineering Sciences domain. Federated by the Digital area, *ReSeed* put its skills for the cultural society of tomorrow. It will meet the four great challenges of heritage paradigm: knowledge, protection, restoration and enhancement.

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[31] http://reseed.ls2n.fr/fr/le-projet/presentation/

[32] The most recent work, the specific approach on textuality of Matthieu Quantin, *Proposition de chaînage des connaissances historiques et patrimoniales. Approche multi-échelles et multi-critères de corpus textuels*, Thèse : Génie Industriel : Ecole centrale de Nantes, 2018. For a short view, Matthieu Quantin, Florent Laroche et Jean-Louis Kerouanton « Récit historique et objet technique : outil de valorisation mutuelle », *Cahiers d'histoire du CNAM*, vol.5, 2016, pp.93-121, or Matthieu Quantin, Benjamin Hervy, Florent Laroche, Jean-Louis Kerouanton. « Haruspex, Outil de Gestion de Connaissances non Structurées. » *Archéologies numériques*, Openscience, 2017. 〈hal-01617790〉

[33] While digital humanities, on that question of history and heritage, are rather turned on texts and archives. Bruno Bachimont. *Patrimoine et numérique. Technique et politique de la mémoire*, Paris : Ina, 2017.

Reconstructing Greece's Industrial Prime in Museum Exhibitions: 4+1 Examples

Erato Koutsoudaki Yerolymbou

Architect – Museologist, Exhibition Designer

Introduction

It was back in the late '80s that the renowned historian of Industrial Archaeology, Jacques Pinard wrote:

"...The remains of Industrial Heritage are not really valuable for the knowledge of the history of sciences and techniques unless they have been carefully recorded, studied and conserved, so that they became useful to the education of the future generations as well..."

Ever since the middle of the 20th century, when the term Industrial Archaeology first appeared in Great Britain, much progress has been made in every country, regarding the research tools and the broadening of the scientific field. Yet, one could argue that back in the late '80s, Jacques Pinard did not stress enough the importance of also interpreting all these sites, buildings, machinery, products and infrastructure at hand, to a broader public, in the form of "musealization" them and still keeping them alive and relative to our present and future.

In my country, the field of Industrial Archaeology emerged at a later time compared to central Europe. Two important efforts were made in the early stages of this scientific field in Greece. The first, took place in the 80s, and it was the preservation and renovation of Athens Gas Factory, one of the first Greek industries. The architectural interventions on the buildings are considered controversial; a museum was set to plan but never developed. The second effort appeared a decade later in the form of the preservation and reuse of a network of industrial ruins in Hermoupolis, Syros, the capital of Cyclades, in the Aegean Sea. Please note that Hermoupolis was the first industrial and commercial center of modern Greece, in the 19th century. The effort led to the creation of the Centre of Technical Civilization by a group of important historians and architects and ultimately resulted to the creation of Hermoupolis Industrial Museum. The renovations are to this day, considered of high architectural quality, but the museum comes short in offering visitors information on the socio-economic environment of the artifacts on display.

In the decade to follow (2000-2010), a very active foundation took action (almost all the action in this scientific field), by studying, preserving, exhibiting and financing thematic technological museums around the country. Its name is PIOP (Piraeus Bank Group Cultural Foundation). Only recently, the last 2 out of 9 such museums were inaugurated. All 9 museums are considered of the highest level of scientific and museological quality, yet one could express an argument concerning their liveliness.

Let me take you back in 2010, when, shortly after the completion of my studies in museology, I was commissioned with my very first museum of industrial archaeology. It belonged to the Hermoupolis network of industrial relics. One project led to another and now, almost ten years later, there is a range of such projects in hand that allows me to present you a concise body of work on the field of exhibition design of industrial heritage related museums. After briefly presenting each, I will conclude by sharing with you some thoughts on what life has tough me on the subject.

4+1 Examples

1. Anairousis Lead Shot Factory Experiential Museum

The George Anairousis lead shot factory is salvaged unaltered with a significant part of its original machinery and tools. It is considered to be the most complete unit of its kind in Europe. The uniqueness of the shot factory lies in the complete absence of mechanization as well as the existence of a cooling tower, which is not to be found anywhere else in the country. The lead shot factory appears to have already been in operation since 1889. It produced exclusively hunting shots, at a time when hunting was popular, and sold it nationwide, as apparently, the quality of the shots was excellent.

"Anerousis" Lead Shot Factory Experiential Museum, Hermoupolis, Syros island

Since 1999 it is part of the Hermoupolis Industrial Complex and it belongs to the Municipality of Syros Island, in the Cyclades. Hermoupolis' prime lasted from 1830s to 1930s. Apart from creating strong business companies in a variety of industries, such as textiles, machinery, shipbuilding and tanning, Hermoupolis was also a renowned commercial center in the Mediterranean and quite famous for its progressive social and cultural life.

By designing this exhibition, our aim was to convert this old factory and its remaining parts to a fully experiential museum space, combining authentic objects with digital technology, leaving the original building as unaltered as possible. Visitors are welcomed to see and set in motion the original machinery, listen to the last workers' oral testimonies; study copies of the firm' s 70 years of business documents, learn about the products of this factory and gain information regarding other lead shot factories around the world. Most importantly, visitors can travel back in time and feel how it was like to work in this little old factory. The exhibition's highlight is a digital installation, explaining the function of the cooling tower to visitors, in a somewhat abstract way.

The museum was inaugurated in 2010, while at the same time we were asked to prepare a proposition for redeveloping the permanent exhibition of the Hermoupolis Industrial Museum, which at the time was 20 years old. The proposed restructuring attempts to present the island' s industrial heritage through the inhabitants' entrepreneurship and ability to adjust to the vast historical and social economic changes taking place in the course of time.

Visitors are welcomed to experience a flowing change of atmosphere through the creation of a "live engraving" environment.
For each chronological period in hand, a background exhibition surface is provided offering the cultural, historical and socio-economical information. The main technological sector, one that thrived in the same period, is displayed at the center of each unit.
Materials are a key element of our exhibition design, as well as projections, soundscapes and a broad band of digital applications. The implementation of our proposal, already approved by the Greek Ministry of Culture, has been temporarily put on hold by the local municipality.

2. Temporary and permanent exhibition about the Greek refinery company "Hellenic Petroleum S.A."

The temporary exhibition was commissioned by the company and run for a year, at the Hermoupolis Industrial Museum, in 2012. Its goal was to present "Hellenic Petroleum", the largest Greek refineries, its 55-years of history and activities in an engaging and easy to understand approach.

The basic idea of the exhibition's design was to create a large oil tank, within which visitors could learn all about refining, a typical day at work, the company's structure through time and technologies that became obsolete due to progress etc. An impressive installation, made of pipes in colors used in refineries, led the visitors from the oil tank, on the ground floor, to the 2nd floor mezzanine, through the main stairways, where the exhibition continued, accompanied by a small auditorium and space for educational games addressed to school children.

Shortly after its completion, we were asked to prepare a proposal for creating a permanent exhibition and a little mediatheque inside the oldest refinery of the leading oil company in Greece and one of the biggest in Southeastern Europe. The facilities lay in Aspropyrgos, the western industrial zone of Attica, located between the cities of Athens and Elefsina.

Hellenic Petroleum SA – "Energy paths" exhibition

Our aim was to best demonstrate the company's rich collection, as well as to inform the public on its history and variety of activities. In a surface of almost 300 s.m. we designed a "box inside the box", in which, through oil pipes, visitors can walk in a number of thematic rooms and learn about various subjects, such as where does oil come from, or how does it reach our homes, what are the security procedures in a refinery, the company's future plans etc. The project is currently being postponed.

3. Industrial Gas Museum

The project was to examine the old Gas Factory of Athens, where a very popular cultural complex of the municipality of Athens, named Technopolis, in successfully functioning since 1999, and turn a part of it to a museum. Visitors can walk through a "path" of 13 stops, that we created and also visit some additional points of interest, like the old forge, the water gas building and some parts of the vast yard.

Presenting diverse aspects of the oldest gas factory in Greece by narrating stories about its production line as well as of the everyday life in the factory and the city of Athens, has been a complex and challenging, at the same time, task which opened to the public in 2013. Both the remaining in situ machinery and the production line are highlighted, whereas objects of the museum's collection and various topics regarding life in the old factory and its links to the city are addressed. A brief history of artificial lighting and the future of natural gas, are all topics that the permanent exhibition talks about.

Industrial Gas Museum, Athens

Some challenging aspects of this project were the co- existence of the museum's functions together with the various other, quite popular artistic events, as well as the discrete and distinct at the same time intervention of the exhibition inside a historical complex, already rehabilitated some decades ago. The main scenographical characteristics of our design are:

- Repetition of exhibition structures, such as lightboxes and showcases, screens and graphics, in order to offer visitors a necessary pace in a rather busy enviroment. A more theatrical approach, as variation to this repetition, offers an unexpected wit in the old forge' s case.
- Cinema-size projections of rare footage, documenting the factory's production line in use, from the early 1950s, act as a story evolving in many chapters, throughout the museum path. This cinema feeling is yet another "texture" to be added to the final atmosphere created.
- Interactivity, hands-on discovering information, 3d animation videos explaining the obscure production process and graphic design plus signage, the language of which adds to the final atmosphere, are some other valuable tools of the design.
- Finally, inserting contemporary art inside the museum's scenography and storytelling was another important decision made by our team. The existing work of an important contemporary greek photographer, a lighting installation as well as the tailor-made metal constructions for the museum stops in the yard, by a renowned greek industrial designer, helped to give some added value to the project, mainly by connecting the museum to today' s artistic reality.

All museum constructions are environmentally friendly and totally reversible.

4. "People and Factories; Industrial Elefsina" – temporary exhibition

The temporary exhibition attempts to create a flashback in the history of the city's industry, from the late 19th century to 1974 and the restoration of Greek Republic. Through the unfolding of the separate story of each significant factory of the area, there emerge stories of people who worked there, whether being industrial workers or entrepreneurs. Rare exhibits, accessible to the public for the very first time, along with oral testimonies, theatrical soundscapes and audiovisual material welcome visitors to reconstruct history, in an interactive mood.

"People and Factories: Industrial Elefsina" exhibition

Furthermore, visitors are invited to reflect on important issues such as working conditions and entrepreneurship today, through the example of significant yet unknown moments of the past of a historical place like Elefsina that holds a deep connection with cultural activities, yet at the same time remaining one of the most important industrial cities of Greece.

This temporary exhibition was the first public presence of the new Museum of Modern History of Eleusis, which is currently taking its first steps of formation. The exhibition was under the auspices of Aeschylia Festival 2016, a leading cultural institution in Greece.

5. "Made in Greece: 160 years of Greek industry and innovation" – upcoming temporary exhibition

The "People and Factories" exhibition produced an unexpected success, which led to the idea of creating a temporary exhibition demonstrating the whole of Greece' s industrial history. The Industrial Gas Museum and Technopolis, in Athens, now undertake the task.

It is scheduled to open to the public on January 18th and an interdisciplinary team of historians, curators, 2d and 3d designers, is currently working on it. By now, we have come down to about 100 enterprises, of which some have long ceased their operation and others are still in production, counting more than a century of presence in the Greek industry. The show will present these enterprises by category (metal, construction, chemicals, energy, food and beverage, textile, tobacco), via 3d archival objects, be it machinery or packaging and 2d archival objects, such as stocks, price lists, books, photographs etc. A lot of hands-on activities as well as digital projects will help make the visitors' experience an enriched and diverse one, or so we hope.

Models for the upcoming exhibition "Made in Greece: 160 years of Greek Industry and innovation",at the Industrial Gas Museum, Technopolis, city of Athens, coming up on Jan. 18th 2018

Still, we feel that the most important thematic unit of the upcoming exhibition is a space that will host an interactive timeline table, as well as different aspects of the industrial and economic history of Greece, through a human-centered lens. This room will provide the necessary context for decoding the rest of the exhibition and provoke the necessary questions regarding Greece's industrial prime and fall, the present economic crisis and our ways out of it.

Epilogue

So, what about industrial heritage and its particularity in the museum world? Well, let me share 5 conclusions to which we have come up with:

1) An industry is made not only by buildings and machinery, but also by the work force behind it, a chain of employees, from the owner and the director to the last unskilled worker. And in this chain of people each one is as important as the next one, in order for the company to be viable and thus useful to the society it participates in.
2) A factory is much more than its production line. It is the lives of people working there; it is the interaction with the city and the society where it finds itself situated. The socio-economic and cultural context is of vital importance in the interpretation and reconstitution of its stories.
3) In the world of industry nothing gets wasted. You can use economic and social circumstances to get to the sources of raw material, to the use of waste in the form of by-products and in incorporating contemporary innovation.

4) Greece' s industrial prime has only lasted for brief periods of time, because of the State's reluctancy to create institutions and adopt policies that would protect and support industrial activity. Moreover, societies proved to be very slow to adapt to new data, by re-investing their profits to cutting edge technology.
5) Today, turning industrial complexes to museums of themselves, does not seem to be of any importance to people's lives,

-unless you present the story of the enterprise through a socio-political and economic lens of its time,

-Unless it explains the way it worked in easy to understand and interactive ways, using a contemporary language,

-Unless, finally, the story you want to tell involves today's main reflections on economic growth, social sustainability and values, environmental issues, creativity and innovation.

So, apart from simply restoring deserted buildings and attributing new uses to industrial relics, the necessity of the use of a vivid museological interpretation implementing its full band of contemporary tools clearly arises. The spirit of such an interpretation can be best summed up as the recognition of the important role industry plays in our society and cities, in their social and financial function, its planning and history, and thus our commonfuture.

Villa Petrolia – Nobel Brothers Heritage in Baku

Amina Melikova

Azerbaijan National Museum of Art

Winston Churchill once said that "*If oil is a queen, then Baku is her throne*". Azerbaijan's oil wealth has a long and storied history enough for several museums.

Almost every country has a certain "brand" for which it is known. And for Azerbaijan the unmistakable, internationally known "brand" is oil. It is because of oil that Azerbaijan and, in particular, its capital, Baku city is known throughout the world. The existence of oil in Azerbaijan has been known since time immemorial. It is impossible to imagine the general history of both ancient and modern Azerbaijan without its oil history. And while in the early twentieth century, Azerbaijan acted as a major exporter of oil, at the beginning of the twenty-first century Azerbaijan is a strong exporter of not only oil but also gas. Let's make a little digression into history. How did the city of Baku look in the middle of the 19th century?

Prior to 1844 oil on the Absheron peninsula was extracted by hand, i.e. it was drawn from wells in leather bottles, and raised by hand windlass. In 1844, ten years before the wells of Colonel Drake were drilled in Pennsylvania, the Russian engineer Vasily Semyonov began drilling in the Bibi-Heybat, near Baku. And in 1848, the first oil was extracted using wooden drill rods. From then on, the oil boom took off as the field of oil production expanded immediately. In a relatively short period Baku turned from a small province in the Russian Empire into an industrial, fast-paced city with its own unique atmosphere and cultural life.

The names of Robert, Ludwig and Alfred Nobels are well known to many people in the word. For the majority, they are primarily associated with the Nobel Prize.

However, a few of us would think that the major part of the Nobels' heritage is composed of the capital gained as a result of activities in one of the largest companies of the past – the Nobel Brothers Petroleum Production Company. In this regard, 7-12% of the Nobel Fund is formed thanks to the capital earned by these oil barons in the oil field of Baku and Absheron. Thus, it would be fair to say that the history of the Nobel Prize is closely linked to the oil production history in Azerbaijan. Most importantly the importance of the Nobel brothers in the development of oil production at global level is obvious for anyone. The first oil tanker, the first oil pipeline in Caucasus, the whole series of other innovations linked to the oil and gas industry: all these elements were brought by the Nobel brothers and their activities in the Absheron oil fields.

Many interesting stories have been told and untold us by historians about Nobel Brothers in Baku (scenario for a brilliant movie) but the real evidence to the live history became a building that was restored after decades of years and turned into a unique museum in 2004. The building is restored by the owner of Nobel Oil Club Dr. Togrul Bagirov, passionate historian for Nobel History in Azerbaijan.

"Villa Petrolea", which was well known as a "green haven" or "green oasis" among the oil derricks. It long attracted the interests of oil industry executives, workers and visitors.

"Villa Petrolea" was, in fact, not a single villa but a planned community located in the village of Keshle on the outskirts of Baku. The "Villa" was established on the initiative of Branobel's founders, with Branobel funding. The community was built especially for the employees of the company.

The community occupied a considerable area, well over 20 acres, with a series of substantial houses for company employees. One building, especially designed for entertainment, consisted of a huge hall for performances and concerts, a restaurant, billiard tables and a library.

Entrepreneurs made a considerable contribution to modernizing the environment (with the construction of buildings, roads, postal stations, telegraph, etc). By implementing Western standards and taking into consideration the employees' health, Branobel aimed to improve conditions in the very tough environment around the oil fields. The plan proved noble but difficult to realize. The natural conditions around the industrial region were very harsh. Alfred Nobel himself conceded that he never wanted to visit the Baku Oil fields given the depressing environment.

Branobel did not limit its activity to the construction of houses. The most distinguished feature of Villa Petrolea was the transformation of the site into a luxuriant garden with rare and valuable plants, hothouses and a nursery. The company's systematic efforts led to observations from many contemporaries that "the houses were sinking in the greenery".

The Baku Nobel Heritage Fund's first project was restoration of Villa Petrolea. 'To be more exact, it wasn't restoration work, it was reconstruction work, because at that time only the walls remained, everything else had either been stolen or destroyed,' there was nothing here at all. The house was home to stray dogs and cats and the homeless. There was no roof. All that Dr. Bagirov managed to find were beams from that time, the cast-iron staircase and two out of three of the original fireplaces. They kept the exterior as it was, restored it step by step, worked in the archives looked at photographs. Of course interior changed, because it was a residential house and now it isn't. It took two years and was finished the project in 2007; it took almost a year to find the exhibits. Some came from private collectors, antiquarians in St Petersburg and Baku. Others came from Batumi, where there is another Nobel house. It's also a museum. The architecture is similar but the house is smaller than Villa Petrolea, as the family did not actually live there. A few items were given by the Nobel family and brought from Sweden. Villa Petrolea is the first Nobel family museum in the world, because there is a museum dedicated just to Alfred Nobel, whereas this museum is dedicated to the two other brothers, and their descendants, i.e. Robert, Ludvig, Ludvig's son Emanuel, who ran the business empire, and the other Nobels. So BNOC practically restoring historical justice because to keep quiet about the other brothers and to concentrate on Alfred alone, isn't right.

Although it was Robert and Ludvig Nobel who played the major role in developing Baku's oil, Alfred was involved too. 'Alfred Nobel was a shareholder in the Nobel Brothers' Baku Oil Company, a major shareholder, and at the very beginning of the project he gave the start-up money, i.e. he played a no less important role,' 'But it was Ludvig who realized at that moment that Baku and the oil industry were something fundamental, that they

would change the whole world. Ludvig was not simply an industrialist and a businessman; he was a systems man, a researcher and a scholar too. He was a member of the Russian Imperial Technical Society, a technical academy of sciences. He was a friend of Mendeleyev, creator of the periodic table, and was presented to the tsar. It was thanks to Ludvig's efforts that the monopoly on Baku oil was lifted.'

The Nobels and Baku's first oil boom

In the 1860s and 70s oil extraction was still a novelty and many people did not understand the value of oil and its potential as a resource. Those who did understand tried to make money out of it. At that time, there was a monopoly on the oil industry in the Russian Empire and Baku was not developing. Kerosene was imported here from America – this was Rockefeller. Although oil was first produced industrially here, in 1848, Pennsylvania in the USA was the second place where production began in 1853. And the Americans were more entrepreneurial and they worked quickly; they began to produce kerosene and kerosene was imported to Russia. Russia was a very promising market at that time, kerosene was used in lamps and so on. Thanks to the efforts of Ludvig Nobel this monopoly was liquidated. Through Mendeleyev he gained access to the tsar and the tsar took the decision to lift the monopoly and signed a special decree.

At around that time Robert Nobel travelled south from the Nobels' industrial base in St Petersburg looking for timber to make rifle butts for the Nobel armaments factory. He went to Baku and Lankaran, in the south of Azerbaijan, but wrote to his brother, 'This place is desert, I've found wood, but I've also found oil. Everything is burning all around Baku.' Robert visited the Atashgah, the Fire Temple outside Baku, and was impressed by it, 'That's when he had the idea of making the Atashgah the symbol of the company. He wrote to his brother Ludvig, who although he was two years younger was head of the Nobel's industrial empire in St Petersburg. Ludvig, told him to invest the 2,000 gold roubles he had given him for timber and Robert bought a small oil refinery and a small plot of land where there was oil. After this Robert came to Baku only once more because he was rather fussy and didn't like the desert, the heat, the humidity. At that time Baku had not been developing because of the oil monopoly, it was the back of beyond.

Thanks to their efforts, Ludvig's and Robert's, did the first oil boom begin. The first capitalists appeared and big money came with them, bringing architectural masterpieces. Everything that was built during the first boom by Taghiyev, Asadullayev and other oil barons The brothers set up the Baku Nobel Oil Company in 1879. The company became known as Branobel, an abbreviated version of the Russian name, Bratyev Nobel, meaning Nobel Brothers. 'In Russian it was called a Tovarishchestvo or partnership, 'They didn't call themselves pure businessmen, pure capitalists, because their lives show that they had a social conscience. They gave a lot away. They built houses, schools, hospitals for ordinary workers. They were the first to do this. It's still very rare.

Villa Petrolea and this whole park were created in two years. In 1882 they spent almost six months on the architectural plans; Swedish and Italian architects were involved. The French created the park. Soil was brought from Lankaran; fresh water was

brought from Astrakhan; trees and shrubs came from Italy and France. A corner of paradise emerged here, an oasis, with 10 buildings. The house was the central building. This is where they lived and received guests. They held all kinds of Swedish receptions here. They had an air conditioner, as they brought in 800 tons of ice and in the summer the climate here was like in Sweden, plus 15 or 18 degrees Celsius. They had the first telephone in Baku here, a Bell. Many books have been written about the Nobels – in Sweden, England, the USA, Russia and Azerbaijan, including a book by Brita Asbrink which dedicates a whole chapter to Villa Petrolea.'

'The Nobels devised the first oil pipeline, the first oil tanker, called the Zoroaster. Thanks to their innovations and new technology they improved oil refining and the Nobel Company was the only one in the world that was vertically integrated. That's when everything from wells to distribution is part of one company,' they had an oil pipeline, tankers, a refinery, distribution. All of Russia and all of Southern Europe were supplied from here. Kerosene went via Russia to Finland and Sweden. The oil was here, nowhere else. Oil wasn't found in the North Caucasus and Tatarstan until early last century.

At the start of the 20th century, 50 per cent of world oil extraction was centered on Baku and some 40 per cent of that belonged to the Nobels. The remaining 60 per cent was divided between the Rothschilds and the Rockefellers. They were also rivals. Standard Oil of New Jersey, Rockefeller's company, was the largest in the world, like ExxonMobil today. The Nobel Oil Company was the second largest, 10 million tons in 1900, 76 million barrels per year. The Rothschilds, Shell, were third.

'In 1888 Ludvig died in Cannes. He had lived in Baku, but unfortunately after building Villa Petrolea in 1884-85, he was ill. He had practically sacrificed himself to his work and died young. His oldest son became head of the oil and industrial empire. It did not go down all that well here, because both Alfred and Robert thought that they should head the empire, not 29 year-old Emanuel. But clearly they decided not to disobey their brother's will, especially since Ludvig had trained his son as his right-hand man. At the age of 29, Emanuel became head of the most powerful industrial empire not only in Russia but throughout the world. He was presented to the tsar, received Russian citizenship and a passport, spoke Russian very well and could even have become a state secretary for his services to the fatherland and to industry. But Emanuel preferred Baku to St Petersburg, especially at the start of the 20th century. He was frequently here and oil was now the most important part of the Nobels' business. There were the armaments and so on, but these were less important. In Baku there was constant competition, the Rothschilds, Rockefellers, etc., the great countries were here, Great Britain, Persia, Russia. Everyone was fighting for Baku oil. And Emanuel was practically a patriot for Azerbaijan and Baku.

Emanuel loved Baku, he loved Villa Petrolea, because here he felt growth. St Petersburg was already a museum centre; it had its palaces, its society life, but all this was just beginning in Baku. The main years of the oil boom were 1900, 1905, 1910, when enormous luxury houses, theatres and so on were built. Baku was also becoming a centre of entertainment, a city of pleasure and even of debauchery, because of course with money came everything else – luxury goods, cars, clothes, high fashion, ladies including ladies of the night. Emanuel Nobel liked to visit his friends. For example, he would go to see Haji Zeynalabdin Taghiyev who had built a fabulous palace which is now

the Academy of Sciences. Taghiyev gave the palace to his first wife, held balls there where Emanuel was a frequent visitor. Emanuel fell in love with Taghiyev's daughter Leyla, who was an Eastern beauty. But the age gap was too great, he was 51 at the time, she was just 21, I think, and nothing happened. Who knows, if the revolution hadn't happened, maybe something would have come of it.

Revolution

Emanuel was to some extent a romantic, he was naive, and he lost almost everything, because he did not believe that people could be so destructive. He did not appreciate what the Bolsheviks were, although by 1914 he had already experienced for himself the disease of Bolshevism. Stalin was in Baku and led labour unrest, sabotage at enterprises and so on. Emanuel wrote to his sisters that he thought common sense would triumph and people would not destroy each other. He thought that the workers were too well paid to opt for revolution, while Rothschild and Rockefeller were the opposite, more pragmatic and cynical. They managed to sell up and leave, but Emanuel Nobel lost everything. When the Bolsheviks came to power, the Nobels' industrial empire was destroyed; both in Baku and St Petersburg, and all the oil fields were expropriated. Anyone who had money was arrested. The Nobels tried to go through the courts and to make contact with Lenin, but they got nowhere. They were left with hardly anything – a house, and some minor accounts in Western banks.

Emanuel Nobel left Baku in 1919. He and the oil company's chief manager were saved by the workers, who told the Bolsheviks and Red Army soldiers not to touch them as they were good bosses. They left Azerbaijan via the North Caucasus, through Yessentuki. According to one story, Emanuel and the manager left St Petersburg dressed as women and crossed the Finnish-Russian border to reach Europe. Another theory is that Emanuel somehow managed to get out via Poland and reach Germany and went from Germany to Stockholm. Emanuel was not broken, strange as it may seem. He continued his life as a bon vivant, something of a playboy. Emanuel had many girlfriends, but never married. He died in 1932, when he was almost 73, having lived nine years without oil and his business empire. All this time he continued to fight and created an entente against Bolshevik Russia to stop the supply of new technology and equipment.'

The other Nobel prizes

'Alfred Nobel wrote to his nephew, Emanuel, to say that he was proud of him and his achievements as head of the Nobel empire,' Alfred was very unhappy in his old age, depressed practically all the time, as he realized the harm his invention of dynamite had caused. Alfred bequeathed everything to his foundation, the special foundation in Stockholm. Many people think that this was because he wanted to redeem himself somehow. I agree, but his brother Ludvig's fate also pushed him to take this step. Ludvig died in 1888 and the first Nobel Prize was established in his honor in St Petersburg, under the auspices of the Imperial Russian Technical Society.

The Ludvig Nobel Prize was funded with money from the Baku Nobel Oil Company. A Gold Medal and some 100,000 dollars in today's money were awarded for the most outstanding invention or scientific achievement with a practical application in the oil industry. There was an independent jury and Board of Trustees.

'So Alfred knew about this, when he bequeathed all his money to his foundation. The family, his nephews and nieces, were categorically opposed to this. Alfred's nephews had expected to inherit this money and started a campaign in the press. It was Emanuel, who as head of the empire, spoke in favour of his uncle's bequest and convinced his cousins that the will should be respected. It was Emanuel who transferred the first money to the foundation. Alfred had been a share-holder in the Baku Nobel Oil Company, with approximately 25 per cent, and received dividends and lent money to his brother and to his nephew Emanuel. So the first 18 million pounds were transferred by Emanuel Nobel to the foundation's account. The prize was not awarded until 1901, so there was a battle for four years after Alfred's death. We have only recently begun to investigate this in the archives in St Petersburg but we can say that between 20 and 30 per cent of the funds which Alfred left to his foundation he either received from Baku in the form of dividends or after his death as contributions from Emanuel. This makes Baku, Azerbaijan, a co-participant in this great venture. That's the second Nobel Prize.

'Then there's a third Nobel prize, which not many people know about at all. This was a purely Azerbaijani, Baku prize. It was created in 1907 in honor of Emanuel Nobel, while he was still alive, which is very unusual. This was a prize for development in the oil industry, rather than for scientific achievement. The prize could be awarded to specialists, managers and soon. It was founded here in Baku, initiated by the Rothschilds and funded by their company Mazut, under the auspices of the Baku branch of the Imperial Russian Technical Society. The prize was awarded four times before the revolution, and like the prize in honor of Ludvig, it was awarded with some intervals, presumably because money was not always available.'

Reviving the Emanuel Nobel Prize

'Reviving the Emanuel Nobel Prize for the Oil Industry is another objective of the Baku Nobel Heritage Fund, 'The Nobel family is supportive. The Nobel committee and foundation understand that we are restoring a historical prize, not inventing a new one.

The restored Villa Petrolea was officially opened on 25 April 2008. The ceremony was attended by 25 members of the Nobel family, led by Michael Nobel and Thomas Tyden, the current chairman of the Nobel Family Society, and by a special representative of the Swedish Foreign Ministry. Dr Bagirov and a delegation of 12 family members were received by President Aliyev. During the meeting it was agreed that the Baku Nobel Heritage Fund would work on various projects – the museum, the Emanuel Nobel Prize and a project to recreate the medical centre that was established at Villa Petrolea by Marta Nobel, one of Ludvig's daughters from his second marriage. Marta was a famous doctor and health care philanthropist.

Visiting Villa Petrolea

Visitors are advised to telephone the museum in *advance.* Entry is free. The ground floor of the restored Villa Petrolea is home to the museum and a conference centre, while upstairs is the Baku Nobel Oil Club. It is an exclusive private business club with membership service, international and national cuisine, wide choice of fine wines, whiskey and cognacs, great cigars and kalians.

Post-Medieval Agsu Town Industrial Heritage

Dr. Fariz KHALILLI

Azerbaijan State Pedagogical University,
Shamakhi Branch

Introduction

The name of Post-Medieval Agsu town, near Ulguj village of Agsu region is known since 16-17th century. Ottoman traveler Evliya Chalabi writes about Agsu as a prosperous settlement. In 1735 Nadergulu khan (after 1736 he is called Nader shah) moved the population of Shamakhi city which was damaged from earth-quakes and wars, to Agsu and re-built the city on the basis of serious design.

Zaki Velidi Toghan, who wrote the history and geography of Azerbaijan, notes that "after the capture of Shamakhi in March, 1735, Nader shah moved central power (city) of Shamakhi to the settlement of Agsu, 30 km southwest of Shamakhi city and moved the people of Shamakhi to that place. In 1767 the power center was recovered from Agsu to Shamakhi for a short period of time, but in the same year it was brought to Agsu and remained here until 1795" (A.Z.Validi 2009).

Local authors lived that time and afterwards - Hashimi Shirvani, Zulali Shirvani, Agha Masih Shirvani, Shakir Shirvani, Haji Zeynalabdin Shirvani, Abbasgulu aga Bakikhanov, Seyid Azim Shirvani and others named this city Agsu as a rule in their works.

Mainly Russians, especially Russian merchants named the new city Yeni Shamakhi after the city's removal as they had been previously in Shamakhi and made trade. Because the expressions of "Yeni Shamakhi" (New Shamakhi) and "Old Shamakhi" are sounded in the Russian sources, including the works of European authors, inspired of them and Azerbaijani authors. However, Persian sources show Agsu with "Jalalabad" name.

The formal name of the town was Agsu during the reign of Nader shah, Haji Muhammadali khan, Mohammadsaid khan and Mustafa khan. The city's name is not Kharaba (meaning ruins) as it was entitled after becoming ruined. Yeni Shamakhi has no formal importance since was said relatively with Shamakhi.

Agsu name's relation with Oghuz tribes is associated with mention of Sinjan name like Eastern Turkistan and Anatolia. In fact, it is known from official documents that Sinjan abode existed near Agsu settlement till early 20th century. Agsu is presently one of the largest cities in Sinjan-Uygur Autonomous Republic of China.

So, Oguz Turks brought Agsu name to this region and used as toponym because of its fluid water in summer.

Archaeological explorations in Agsu

The first archaeological explorations were led by Fazil Osmanov in 1983 in Post-Medieval Agsu town by Agsu-Ismayilli expedition. The explorations showed Agsu town is one-layer (18th century) monument and very important from aspect of studying khanate period.

Agsu archaeological expedition under guidance of Prof.Dr. Gafar Jabiyev launched wide-spread archaeological explorations in Post-Medieval Agsu town since March, 2010 and lasted till late 2012. 1,5 hectare field was displayed as a result of 3-year archaeological excavations and interesting finds for Azerbaijan and the world history, were revealed. Though being built in a short while, town-planning was applied there in the highest level. During the excavations, planked roads and streets, water and sewerage lines, special wells for garbage, craftsmanship shops, etc. were revealed.

Upon elaborating topographic plan it became known that there is 10-meter height from the sea level between north and south of the town built in rectangle form and towards Mecca. Archaeological explorations in the town showed this difference played important role in supply of houses and estates, with water.

Slopes canals through bath houses prevailed in the town's communication network. Such a line was displayed in 4th excavation site and defined to be laid up from public underground bath to north and outside from the town's fortress walls. Drinking and useless water lines are laid up with river stones from side walls and consist of wells sand poured and planked large raft stones over that. Water lines joined large and small wells and large store-houses.

3rd excavation site, Post-Medieval Agsu Town

All roads of the city are planked with river stone. The roads are laid up paralel with one another in east and west direction. A large street was fixed in one place in north-south direction. Along with the streets, the small and large squares paved with the river stones were also revealed. The squares were displayed in 3rd excavation site in front of the dye shop, in 4th excavation site near the bath house and in 5th excavation site near Juma Mosque. Hollows of trees grown one time and havo no root were revealed in the squares.

The basis of all houses of the city is built of the river stone and walls from raw bricks. Rostrums or hearth were revealed in one corner and in the middle of the houses. All contours of one room of the two-room house adjacent to the northern fortress walls are clearly defined. A well supposed to keep food and having 6 meter depth was revealed in the middle of the other room. It is known that the well's wall and room floor are firmly strapped. The roof of all houses are tightened with wood and reeds and solid soil was laid on them. The soil roof was strapped with stone beads in various seasons. Some of them were displayed during the excavations. The house's inner and external walls, floor, roof, tendirs and hearth are dyed with the solution got from special rock and called shaft in Shirvan. Gray dye stuff gives special beauty to houses and created a layer to protect them from rain. This dye stuff is clearly seen in northern wall of the decorated houses.

Crafstmanship shops are built mainly in the form of houses and had sometimes attics. One of them was fixed in 3rd excavation site in blacksmith workshop. There revealed rather many ovens, hearthes, stone machines. Along with these devices, there collected over 150 kg iron items in the excavation site that shows the intensive functioning of the workshop. Small brazier workshop and bone shop were revealed near this large blacksmith shop. It was defined that blacksmith masters had prepared splinters for copper coins along with articles. The masters making bone used mainly bovine animals' spout bones, horns of gazelle and deer. Comb, knife and dagger handle, decor items, bottons, etc. were made of bone. One of the most interesting workshops is a dye shop. This find verified written tax documents proved that tax from the rural population came from dyeing. The revealed dye vessels and dye dusts shattered around were sent to Marmara University to Professor Receb Karadagh to be analysed. The analyse showed that the dye was of natural origin and called madder (in Latin Rubia Tinctorium L.). Production and export of madder are important even in 18th century and it is thereby called madder century.

4th excavation site, Post-Medieval Agsu Town

Large public houses with interesting architectural solution were revealed along with houses and shops of the city. Underground hamam, Juma Mosque and cooler can be especially noted. Entrance door of the underground hamam, the hamam staircases, cobbled way, subsidiary rooms adjacent to the hamam, a stone planked wide square opposite the rooms and pool were explored. The hamam consists of pool in the middle, recreation room with cell-like sections, wardrobe and bath-houses. The hamam has perfect heating system trimmed under the floor. A network of accurately hewed mine stones and raw brick for movement of smoke and heat. The heating system taking its beginning from the hearth on the hamam's eastern edge and covered up in arch-like form stretches from the bath-rooms till western wall of wearing room and two little smokes raised on the building. The bath-room's upside is almost knocked down. Only existence of some building rests says that the building is covered with coverage like arch from raw brick. The upper side of cells around the pool in recreation room, also other parts of the bath complex were tightened with vault made of raw brick. The upper part of passage from wardrobe to resting room is also tied with raw brick in vault form. The hamam was illuminated via sun light through the windows-hollow carved in stone cupol over that. One large, one small stone dome were displayed in the bath-complex from the explorations. The explorations, observations, comparisons and analyses substantiate saying that bath complex with perfect architectural solution, inner structure, pool inside, recreation room, elite buldings around and the square found in 4th site belong to rural elite.

5th excavation site, Post-Medieval Agsu Town

General capacity of relatively grand building, which we conditionally call Juma Mosque of the city revealed in 5th excavation site, is 576 sq/m (36x16 m). This is larger construction remnant revealed in Agsu so far. The base of the mosque walls was built from river stone and the walls from raw brick. The size of the raw bricks used in the construction is 20x20x5 cm. A number of wooden materials were used in the construction of the mosque. During the searches there fixed the remnants of wooden column of the mosque, door soles and many rests of wooden materials consisted of stools. Wooden materials are tightened with big iron nails and hooks. The mosque building was erected on wooden columns in 2,3 meters distance along with magnificent walls. This is proved by stone column soles revealed inside the mosque. Let's note that, 56 columns soles hewed accurately were found from mine stones. Column soles consist of main part, small nest where there is smooth part along the whole wooden column and the columns' projection. According to experts, the columns of the mosque were from the oak tree. In Shirvan region, indigenous residents also use more oak, lime, and pine materials for columns to build individual houses. The floor of the mosque was well forged and plastered accurately. The altar was revealed along southern wall of the mosque. The mosque windows are like arch form and built mainly of baked brick and alabaster. Upon continuing the excavations a number of tiles remnants were displayed along the outer walls of the building. All of them are like gutter. The tiles were shattered around the building upon destroying the mosque. Though there are few complete tiles, there are thousands of broken ones. The weight of the tiles is 800-950 gram on average, length 30 cm, width is 12 cm in wide part and in narrow part 8 cm. The thickness is 2 cm. To note, the mosque building is the first building found in Agsu city area and covered with tile from upper part. Approximately estimations indicate that 60 000 tiles were used for

covering Agsu Juma Mosque. This means 50 tones load. As it is seen, it is not so easy thing to build such a magnificent building from engineering-technical aspect. Existence of this building proves high-level of engineering and technical solution of construction civilization in Agsu in 18th century.

Upon excavations in 5th excavation site a large yard of the mosque opening to the north side was revealed. It is interesting that the yard was planked with large plates hewed from limestone. The mosque's yard was enclosed with limestone and baked brick in west and a fence built from river stone in east and north sides. There was fixed a special well in the middle of the yard for ablution of those coming to the mosque before divine. A grave stone of the mosque mollah was revealed in a little north of the mosque. There are some children graves around that.

Ice store ruins. 7th excavation site, Post-Medieval Agsu Town

Cooler was revealed during the exploration conducted in the hollowest part called 7th excavation site. That site is clearly followed in the photos taken from the space. Total length of the cooler is 30 meter and width 8 m. There are many stone remnants inside. All of them were used in the construction, i.e. they are stones at least only one side of which was hewed. It was known during the explorations that eastern wall of the edifice was accurately plastered with alabaster from inner part. The ruins of stone stairs belonged to building's entrance was revealed in north part. The number of the cleansed stairs is 20. The width of the staircases is 1, 3 meter. The ruins of the wall were revealed in the west and south directions during continuance of excavation work. We must consider that wooden pipeline was done in some sites to provide solidness of the building

walls. Later when the wall was plastered, that pipeline was remained under that plaster. Firstly, the building's inner part was cleansed up to the floor in the north part. Upon continuing the cleanse work, it was displayed that the construction's floor consisted of the baked brick. Sizes of the bricks are 22x22x4 cm and 22,5x22,5x4 cm. A silt layer of 70-80 cm thickness was fixed on the brick floor when excavations continued in the north of the construction. It was defined that silt layer covered the whole area in other stages of the research. It means that the building was filled with slimy water in late 18th century as a result of heavy rains and streams. After water drawn out, sediment of thick silt layer remained there. Rather much amount of cannon-balls and bullets were found from the construction and its surroundings prove that the building was destroyed thoroughly during attack of the Russia troops to Shirvan.

Golden Dukaat Holland Coins. 7th excavation site, Post-Medieval Agsu Town

Naturally, the expedition staff could hardly cleanse the ground of the site covered with magnificent walls from 4 sides, being in 7 meter depth from the earth and also the rabble and bricks. After the inner part cleaned thoroughly the general view and all capacities of the cooler were defined totally. Thus, general capacity of the building is: 243.3 sq/m. inner length 30 m, outer length 34.6 m, inner width 8 m, outer width 11.7 m, thickness of the walls 1.9 m. Generally, 4318 bricks were used on the floor in arch row cobbled 34 bricks on width and 127 units on length. It is supposed to be main cooler of the khanate and was used for keeping strategic products, also foodstuff, under disposal of directly the city or khanate. As is known, Agsu is situated in the area with sufficiently mild climate. In summer it is especially hot there. It is very difficult to keep foodstuff especially daily food in such a hard climate place. It is known that in antique and medieval age in order to keep food of this kind such underground edifice and devices were widely used. The cooler

of 18th century uncovered in Agsu is the hugest and the most perfect construction type in Azerbaijan.

Copper pot, coppery bucket with sides pressed in, basin, tray, bowl and a narrow jug are of particular interest among the finds of the ice store-house. People controlling them used mostly these things as the dishes of measurement. Two golden and silver coins treasures found in ice store-house.

Conservation and coverage

Though archaeological explorations were conducted in Azerbaijan for long years, conservation and restoration work remained beyond attention. Thus, the archaeological explorations had no traces today in large cities like Gabala, Ganja, Beylagan, Shamakhi where archaeological explorations conducted. Big grooves displayed by the archaeologists turned to sites which economy and household wastes are sometimes thrown.

Post-Medieval Agsu town archaeological tourism complex created the opportunity to study medieval history of which importance was not paid attention from archaeological aspect in Azerbaijan and to bring to agenda the issue of covering and conservation of archaeological sites of edifices, main part made of raw brick.

In the first stage Turkey's Chatal-Hoyuk sample is taken as a basis, project was worked up and it was decided to cover 3rd excavation site, i.e. handicraft estate. As compared with Chatal-Hoyuk, concrete belts and plastic coverages are excluded in the excavation sites; iron-concrete columns and metal constructions were used. The recommendations of known architects and engineers were taken into account, all projects are agreed with the Cultural Heritage Department of Ministry of Culture and Tourism. Handicraft estate project created the opportunity to show archaeological building remnants, as well as archaeological finds. The visitors following the exposition along the wooden floor can get information about the panels, too.

4th excavation site was covered with metal construction in 2012 included hamam. The purpose was to bring to notice the grandiosity of the excavation site and to introduce graphically the rural topography being conserved edifices uncovered. The remnants are as though presented on one plane from houses till craftsmanship shops, parallel streets till small blind alleys, quarter walls till northern wall, drinking water supply till sewerage lines, underground hamam till city square and public catering institutions.

3rd and 4th covering site. Post-Medieval Agsu Town

In order the soil layer not to be made dusty where excavation ended in the whole area it was mud plastered, lounged and glazed. This approach created the opportunity to present ethnography of the region to visitors.

The wall of the bath house is made conservation with participation of members of Conservation and Restoration Department of MIRAS Organization with Italian Professor Luigi Scrinzi's advice. The walls were cleansed due to modern conservation methods and the parts inclined to etching and destruction were tightened with solution.

In late 2012 Juma Mosque was covered up with metal construction and it is intended to prepare exposition entitled "Culture in Post-Medieval Agsu Town" inside that.

The raw brick wall of the mosque is fortified with the solutions and river stone basis, and mine stone columns are kept as original. The edge of the mosque yard is trimmed with alabaster and water resistant and transparent and Germany made solution is made over that.

The conserved sites being main part of Agsu experience of MIRAS Organization, also created the need for the preservation and management of the complex. Special workers were defined to keep conserved and non-conserved parts of the complex, they carry out cleanse work regularly there.

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Industrial heritage in central Serbia and its Museum repurposing

Djordje Milovanovic

Cultural Heritage Preservation Institute Kragujevac, Serbia

Material traces of industrialization roots in Serbia are related to the first half of the 19th century and the central State regions (Šumadija and Pomoravlje). Military industrialization, along with the development of the mining sector, were accompanied by a series of compatible activities and expansion of related crafts, thus textile mills, carpenters' workshops, tanneries etc. The Cultural Heritage Preservation Institute Kragujevac (CHPI) is the regional institution in charge of heritage protection and conservation which territorial competence is spreading on the mentioned districts, comprises of the city of Kragujevac and 12 more municipalities. Proud to be a caretaker of such exceptional industrial and technological heritage, this institution is also aware of its responsibilities in this respect. Moreover, following the latest trends concerning the conservation and protection of such heritage it is important to mention that industrial archeology, as a relatively young scientifc discipline, and the practice which included special treatment of industrial heritage as a cultural monument of exceptional value, were early introduced in Central Serbia. Research and legal protection of industrial heritage, matches in time with the same processes in most developed countries of the world. As a consequence, several facilities in different locations were conserved in integrative way between 1953 and 1980, when this activity was most intensive. The best examples that illustrate this, are:

- The Old Cannon Foundry (Museum building) with the Tall Chimney and the Old Cartridge Case Plant were declared as cultural monuments by the offcial Government decision in 1953, then in 1979 categorized as the monuments of exceptional importance, and finaly in 2015, enactment as the heritage of the highest value for the State.
- Alexander's Shaft (belonging to Senje Coalmine), declared as cultural heritage of exceptional importance in 1975, together with other facilities - Museum of coal mining and Mechanical workshop .

The CHPI Kragujevac fosters modern approach to conservation and protection practice. During the '90s molinological heritage was gaining more and more importance in the world, and being aware of such trend the Institute quickly joined this mainstream. In this context, a number of watermills, fulling mills and sawmills still stand on the riverbanks as the material witnesses and the crown jewels of this heritage. After the year 2000, the CHPI has expanded its studies to the conversion of facilities classifed as the industrial/technical heritage in terms of their sustainability. The following examples should be mentioned as the most recognizable:

- Revitalization of Senje Coal Mine, a project funded by the European Commission; this old coal mine will be converted into an eco-museum;
- Military - Technical Institute of Kragujevac - some buildings within this historical complex belongs to Old Foudry Museum and other will be converted to suit the needs of the Faculty of Arts.

The most valuable pearl of the Serbian industrial heritage is the Military - Technical Institute, the oldest preserved urban industrial landscape complex in this part of Europe. It is unique for its pioneering character (from the historical, sociological, architectural and esthetic point of view). A complex of custom, administrative and residential buildings was built in the second half of the 19th century and first decades of the 20th century, with a visually distinct evolution of the architectural concept. Those buildings, as the most powerful symbol of late industrial revolution in this part of Europe were categorized as a cultural monument of highest importance in 2015 by the Decision of Serbian Government. This complex is spreading on the 52 hectares, but only the frontal line of buildings that verge the City center is open for the public.

This invaluable industrial compound, offers an extremely wide range of opportunities for future repurposing. Consequential in 2011, CHPI Kragujevac launched activities for its preservation and put into practice strategic documents for reusing some buildings in the context of self-sustainable development, into a university center, museum compound, cultural-tourism attraction etc…

Old Cannon Foundry ("Old Foundry Museum")

This is the most valuable building inside the complex of the Military Technical Institute. Original building where the first cannons were cast was built between 1851/1853. Thanks to the benevolence of French Emperor Napoleon III, who made Army Major Charles Loubri the factory's first director, Serbia forged strong ties with modern European states and embarked on a path of technological progress. Replaced by the present one structure in 1881/83, it was mainly done in the same architectural style with slight modifications, designed by the Serbian engineer Todor Selesković. The new building is in the distinctive

architectural style characteristic for the developed industrial centers of Europe (The famous Austrian travel writer of that time Felix Kanitz informed us about that), with the use of new materials - iron, concrete and glass combined with decorative elements. The organization of the interior is defined by the form of the hall with high central nave, which receives daylight through skylights overlooking the playful roof area. The building formed almost basilical shape, and often was called on the part of researchers - ”Temple of industry”. The eastern ”main” facade with wooden staircase and two stores high vertical sides upon which two chimneys rely is visually the most impressive part of the building. The facades represent successful composition of red brick, wooden beams and plastered walls while decorative elements are - columns, pilasters, decorative elements made from brick. The foundry is connected under earth with an **Old Chimney** installed in 1882, which is confirmed by the inscription on the frontal side. It is an unavoidable element of industrial scenery. The Foundry was in operation until the 1968, than, after the relocation of the manufacturing processes, the building **was converted into the museum** which displays the industrial heritage of the factory. The present exhibition was created as the composition of Nikola Kusovac - art historian, curator of the National Museum in Belgrade. Exhibition was installed in 1971, and consists of:

1. Weapons and Equipment - 440 items
2. Machines and Tools - 202 items
3. Photos - 3527 items
4. Archive material object - 1548 items
5. Art Works - 18 items
6. Seals - 87 items
7. Medals, badges and dies - 46 items
8. Bowls and plates - 80 items
9. Charter, plaques, diplomas, letters of thanks and other items – 534 items

After decades, the Old Foundry Museum needs modernization and active participation in public life through attractive exhibitions, as well as through interaction with Art faculty students (eg. hands-on workshops, fostering old trades and crafts and open-air exhibitions). Other possibilities are related to the revival and development of traditional crafts and trades linked to the core function of the site. Here, we primarily refer to the art of engraving and gun smiting, manufacturing of harnesses, of optical equipment, blacksmithing and others. Many of the most skilled craftsman are now retired, but willing to pass their knowledge on to the younger generations.

Another immediate structure is the **Old Cartridge Case Plant.** The original building, although of important historical and technological significance, was short-lived. The first electric power plant in Serbia was installed here in 1885, even before the Royal palace in Belgrade. It was the 5 h.p. dynamo steam engine, made in ''Suker fabrique'' in Nuremberg. The existing, architecturally far more accomplished building was built on the same site between 1909/1911. Complete planning documentation for the building was provided by the French engineers. Architectonic is based on the aesthetic of non-ornamental industrial design of neighboring ”Foundry” building, but with atypical applications like attic roof and other ornaments that reflected general trends of civil society. The edifice is efficiently merged into the ambience with which it creates an inseparable whole. According to the mentioned strategic plans, the future purpose for this building will go toward the transformation into the exhibition space, modern gallery, concert hall etc.

The last one building of interest is the **Machine Workshop** built completely of bricks during the last decades of the 19th century. All the facade plastics, wreaths, roof cornices, as well as pilasters are made of the same material. The massive architectural structure located on the circumferential line of the factory complex, encompassing the most impressive buildings with which it forms an integral and unique ensemble. According to the records previously mentioned travel writer F. Kanitz from 1897, this plant for production of rifles and shells looked very modern for its time with a glass facade of the ”drawing room” and specific shed roofs. Machine workshop is one of the most representative and in the term of reuse most valuable building. Its 6300m² will be transformed into the Faculty of Arts.

There is genuine public interest in opening a Car Museum other vicinity buildings, considering that the Military Factory in Kragujevac is also the founder of the car industry in this part of Europe (factory owned a workshop for the manufacturing and repair of cars even before World War I; between the two wars *Chevrolet* trucks; after World War II – Zastava/*FIAT*).

Attractive as the film location, served as the scene for the drama series Titanic: Blood and Steel which was filmed here, generating a 2 million euros investment into 12 weeks. Some facilities have already been listed in the database of film locations (www.filmlocationserbia.com). The unique environment with splendid museums, as well as the energy and circulation of students, will further attract general population to access public galleries, bookshops, theatre, artistic ateliers, craft shops, cafes, restaurants, etc.

Senjski Rudnik (Senje Coal Mine)

Senje Coal Mine is the oldest mining complex in Serbia, established between 1853/1860, distance 87km eastern from Kragujevac The construction of "Foundry" in Kragujevac, and the military industry at all, could not develop without essential raw materials, so efforts were made to discover exploitation deposits of coal as the most powerful fuel known at the time. Those two activities started almost simultaneously in 1853, due to skillful organization of that time Government. It is the first mine with organized exploitation, unlike other pits of the time, characteristic for totally primitive and anarchic ways of production. Ore was at first transported to arms factory using wagons towed by cattle. Later, tendency towards more efficient provision of production facilities with raw materials led to the construction of narrow railroad in 1892 (completely closed during 1960's).

Over the time this mine has become an important center and focus of numerous mining families from all over the Balkan Peninsula, who had brought there all the characteristics of their entities. Eclectic, multi-cultural cohabitation of workers families created a specific community which has survived up to the present day. The final effect of such historic and ethnographic circumstances was creation of folklore, social and aesthetic ambience, specific in every sense of the word. As a result of such a comprehensive, some of the facilities were listed as cultural monuments by the decision made in 1975:

- First administrative building of the mine above the entrance into the Aleksandar's Shaft (1853);
- Workshop and Smithy Building (1900);
- Old Depot (1930), nowadays the Museum of Coal Minig;

In addition to the mentioned facilities, legal protection also covers the Steam machine for transport of people and material J. Korosy Gratz MHT with tower and steam installation constructed between 1871/73, registered and recorded as a piece of technical culture by the Museum of Science and Technology in 2005. The elevator with mechanical installation – most important steam machine which permanently and highly reliably drives mining elevator – is the only functional one in the world, representing a rarity which fascinates every visitor.

At the beginning of this century, the Senje Coal Mine industrial complex, amongst the oldest ones and closely related to the mining beginnings not only in Serbia, but all over this European region, was recognized as such through studies developed by national and international expert teams – especially by perceiving it within international frameworks. Based on the conducted evaluation of individual facilities and urban structures formed in this area between mid-XIX and mid-XX century, beside previously mentioned, the following structures have been detected: Mine Director's Building – "Hofman's Villa" (1898-1900), St. Prokopije Church (1900), Restaurant "Proleće" (1900), Railway Station (1905), Elementary School (1905-1907), Old Directorate – Administration Building (1910), Solidarity Fund Building (1928), "Sokolski Dom" - Cultural Centre (1930), Local office (1947) and Workers Street (1898 – 1910).

The Museum of Coal Mining was opened in 1980, and settled in the building of Old Depot constructed in 1930. The Museum was established for the presentation purpose of the mineing historical development in Serbia. Inside the 550m² display areas, the visitor can view storage simple mining tools from ancient and Roman times, several collections of lamps for lighting in coal, machinery for mechanized coal excavation, geological mining map, collection of photographs from mining motifs and collection of archival material. At

the display shows a documentary path of development of the mine, the workers and the syndicate union movement, postwar socialist self-management and construction.

The European Parliament selected the project for renewal, restoration, revitalization and technical equipping of these facilities for eco-museum, as well as development of institutional human capacities which should manage heritage of this area in the future, especially upon the full stoppage of coal exploitation. This project is internationally supported as pilot project based on exclusive orientation to service providing industries, primarily to cultural and creative tourism.
The focus for interpretation of the Senje Coal Mine, both tangible and intangible heritage, is through the restored museum and workshop buildings. Mechanical Workshop and Depot (Museum of Coalmining) are transformed in museum exhibits through current project, while third one – free areas, used as the open air museum. It is important to say that numerous machines, tools and other industrial artifacts relevant for exploitation processes are accumulated within the unit, and give tremendous contribution to overall industrial – archaeological valuation of this place. Tourist information center provide the ”gateway” to the settlement and wider surrounding. Postcards, books, souvenirs and other promotional material is available and attractively displayed. Technical status of old Aleksandar’s shaft, which has been planned as a specific touristic treat of Senje Coal Mine, goes towards an abstract setting which would run along the whole underground tunnel, then it would continue by exiting to a vertical axis of currently functional mine shaft, wherefrom further transport to the surface would be carried out by the means of unique steal elevator. Unfortunately, in safety terms only 70 meters of the shaft have been cleaned and are in good condition. Access to the remaining 450 meters is closed due to various barriers and problems. Farther exhibit circulation would be going all along the shaft (main accent on the mine shaft authentic atmosphere), fully equipped with helmets, lamps...etc. The end of exhibit would be in existing shaft, from whence the visitors could be able to come up with steam engine.

The reconstruction of narrow railroad which opened this area to the world in 1892 could do that again, thanks to a couple of conserved steam locomotives, which could be possibly rehabilitated. Another possibility of reuse 5 kilometers long trace, going toward the recreation path, as for example – cycling, hiking and networking with existing routes are much more realistic. This railway network was also an engineering achievement, with several specific construction structures enabling access to trains in such a difficult terrain, with inclination of even 46‰ in certain sections. Railway network by itself is the basic value of international importance, and its role was described in numerous academic articles from all over the world.

The uniqueness of such landscape experience, created in combination of human and nature activity, fully meets the meaning of term – Cultural Landscape. The co-existence of sublime and low structures, are strongly creating contrast between sophisticated mechanical structures and poor workers’ sheds and buildings of their social life. None of the significant facilities within the unit is not a replica, but the authentic segment of settlement.

Senje Coal Mine distinguished itself as an example of good practice – thanks to funds from the European Commission, it entered into the program for development of re-arrangement project which should turn the place into a museum site. In this way the

rehabilitation and the conversion of the Senje Coal Mine into a museum complex become one of the most successful and transparent projects in this part of Europe.

Also worth mentioning is another special unit which is considered as the potential museum and exhibition space, and at the same time it is the valuable part of Serbian industrial heritage network:

Sokolana Complex of the entity "Old Workers' Colony" (Kragujevac)

It was founded between 1924/1931 as a war compensation that arrived from Germany in the form of building material and the mapping of the first 296 flats. Old Workers' Colony was a unique example in both the Kingdom of Yugoslavia and entire region. Global planning with the concept of compounding of daily activities within a community and making a direct contact of a man and nature, opposed to Modern urbanistic style of the time. Within the context of cultural heritage, only a few, the most representative buildings survived until today. Pictorial and architectural value of these central edifices is undoubted, as well as their authenticity, socio-economic, and urban uniqueness. Acording to such values they were declared as cultural heritage by the offcial Government decision in 2014.

In the context of their future reuse, many solutions in the term of the self-preservation are planned. Some of them refer to the opening of new museums. As for example *Sports Museum* in "Sokolana Building", *Museum of Old Workers Families* inside the "House of

the Colony Director", as well as the *Pedagogy Museum* in the "House of School Caretaker".

Another valuable cultural heritage which reflecting the technical and agrotechnological culture are transformed in museums and exhibition space.

Kings Winery in Oplenac

The town of Topola with the Oplenac slope, are 40 km northern from Kragujevac. They have always been known as a quality wine-producing region, even in the Ancient Romans times. Alongside the construction of the Royal Mausoleum, King Peter I commissioned a small winery to be constructed behind the church. One item was preserved from that first King's Winery until the present times – a huge barrel of over 4 000 litres from 1909. King Alexander I continued his father's and grandfather's enterprise by planting over 50 hectares of seeds purchased in France, but also local sorts. In time, famous wines were created and they were served at the official visits by European heads of states and found their way to the dining tables of foreign courts.

"Wine cellar" was built 1927-1931 in cooperation with the German company *Adolf Abel und K. Boehringe*r according to the French model. The building has been preserved and it is still an extraordinary example of a modern wine-cellar. It is 45m long and 15m wide and has a ground floor and two underground floors, with constant temperature of 8°C. There are 99 oak barrels, including three in the ground floor museum exhibition, received by King Alexander in 1922, as a wedding gift from the people of the Serbs, Croats and

Slovenians. Each barrel has capacity of 2 000 liters, and on the front side carved inscription of the national anthems' first verses.

The museum exhibition has some of the bottles from the period of the Winery's foundation, as well as the equipment that was used in the wine processing (mash tanks, presses, crushers, and apparatus for preparing bottles). The King's Winery also contains archive wines, which are certainly the oldest national wines in Serbia. Among others the White Burgundy from 1931, in uniquely shaped bottles with the Royal coat of arms. All the structures on the Oplenac hill was categorized in 1979 as the monument of great importance together with other amenities in complex.

Old Watermill in Despotovac

Old Watermill is situated in the beautifully landscaped park-like setting of the Despotovac, small town 67km eastern from Kragujevac. The exact year of the construction is unknown, however, this watermill was included in an inventory list dated 1836 as the propertie owned by *Manasija Monastery* (from the beginning of the 15th century). It represents valuable architectural achievement and during its long history minimal modifications of both its exterior and interior were made which, fortunately, did not affect its authenticity. During the two-century long history, watermill became an integral part of the identity of the local community. Old Watermill has regional significance in historical, architectural and ethnographic terms, so he was declared as the cultural monument by the decision of the Government of Serbia in 2001.

It was built from rubble stone above the rectangular base of 7.8x18.5m, with five water wheels, three arched openings on the upstream side and another two on the downstream side. The roof is gabled and covered with *ćeramida* (clay roofing tiles). Four millstones (out of original six) were preserved, as well as large wooden chest where the flour used to be stored. Grinding apparatus was positioned along the upstream wall and placed upon two massive longitudinal beams.

Watermill was in operation until the 1960s, and in 1996, after extensive rehabilitation works, was converted into exhibition space. Municipality of Despotovac is the owner of the Old Watermill, while the users are local Cultural Centre and the Association of Visual Artists. The space is also used for organizing literary events, theater performances etc.

However, as a society, in terms of the general attitude towards industrial heritage and the awareness of its importance, we are still lagging behind developed countries where the factory chimneys have long become acceptable elements of visual perception in urban environments. All efforts of industrious and progressive people of those central Serbian provincies, who had a clear vision of the future and to this end built, developed and introduced innovations in industrial production, are still trapped in numerous material evidence waiting to be explored and preserved for future generations. This script aims to reveal all the beauty and strength of the buildings built by our ancestors and passed to us as an exceptional legacy which to our great fortune was spared from the destruction so frequently caused by the turbulent ”Balkan’s fate”. Although rather late, efforts and aspirations of the people from this region to catch up with modern trends and accede to the progressive nation’s are undeniable.

Makhana: Witnesses of an industrial heritage recognized yet unvalued

Abdoulaye Camara
Cheikh Anta Diop University of Dakar

Industrial heritage in Africa

The African territory is strewn with wasteland of various industries (railway, agricultural, agro-food...). If not recovered for reuse or recycling, they are discarded, or ignored. Most are therefore in a state of abandonment and advanced decay.

This communication focuses on an industrial heritage found in Senegal; A West African country bordering Mauritania to the North, by Mali to the East, Guinea to the Southeast, and Guinea-Bissau to the southwest.

The industrial heritage examined in this presentation is located in Makhana (16.0877780 N; 16.3705560 W), a small village of 900 to 1000 inhabitants, in the region of Saint-Louis, a former French colonial city, in northern Senegal. The Makhana site houses an architectural and industrial heritage that witnesses the technical and manufacturing prowess of Europe in the mid-nineteenth century and the (diverse and varied) striving of governors, engineers who have helped the people of the colony to benefit from new technologies. Makhana is indeed the first steam factory in Africa.

Saint-Louis: birth and transformation of a counter in colonial city

Founded as a French colonial settlement in the 17th century, Saint-Louis was urbanized in the mid-19th century. It was the capital city of Senegal from 1872 to 1957 and played an important cultural and economic role in the whole West Africa.

Located at the mouth of the Senegal River, the island of Saint-Louis consists of a narrow strip of land, 2500 meters long by 300 meters wide, surrounded by both arms of the river. On the topographic level, its relief is characterized by a flat surface, just above the level of the sea and the river.

In 1633, the French founded the first "Company of Senegal", and in 1638 was built the first dwelling on the island of Bieurt. From this date, they developed the trade of gum, slaves, gold, leathers, wax, and ivory. To protect this trade, they built a fortified post in 1659 around which was born the city of Saint-Louis.

An Order of November 29, 1815, endowed the Colony of Senegal with a Governing Board to assist the Governor for administrative and commercial matters.

The importance of trading around the fort was going to promote the settlement of migrants who came to take advantage of the economic situation and the protection of the place. From 3018 individuals numbered in 1779, the population grew to 12011 inhabitants in 1837.

Census of the population (Brigaud F., 1966)

Years	1779	1794	1818	1832	1837
Number of inhabitants	3018	3398	6000	9030	12011

In 1853, Father David Boilat "counted in Saint-Louis about 12336 inhabitants including 177 Europeans…" (Boilat, 1984: 207)

Between 1817 and 1854, 32 governors succeeded one another in Senegal. In spite of the instability of the governors, ambitious projects made it possible to endow the city with lasting buildings and adopt a plan in 1828 which gave the city its rigorous alignment.
These constructions and developments created coherent sets. The island was covered with two-storey houses, with a garden inside and a balcony outside. This urban homogeneity which is the product of the colonial heritage, earned it the inscription, in 2000, on the World Heritage List for two criteria (II and IV) by UNESCO:

- Criterion (II): The historic town of Saint-Louis exhibits an important exchange of values and influences on the development of education and culture, architecture, craftsmanship, and services in a large part of West Africa.
- Criterion (IV): The Island of Saint-Louis, a former capital of West Africa, is an outstanding example of a colonial city, characterized by its particular natural setting, and it illustrates the development of colonial government in this region.

Policy of colonial expansion and first metal infrastructures

The French who have been staying in Senegal since the 17th century remained in the fortified islands of Saint-Louis and Gorée. But on September 7, 1840, a Royal Ordinance reorganized the settlements and created administrative structures. Thus, with the institution, by that same Ordinance of a Government of Senegal and Dependencies, French governors undertake to extend the influence of France in Africa by conquests and sustainable development emphasizing the territories. One of the artisans of the creation of the colony of Senegal, Louis Faidherbe, governor from 1854 to 1861 and from 1863 to 1865, develops a policy of colonial expansion materialized by the creation, on July 1857, of the first battalion of Senegalese riflemen, the conquest of Sudan, the creation of shopping centres to promote peanut cultivation, the installation of the first bridges over rivers, and equipment of colony:

Figure 1: 20 tons steam crane, 1883

Figure 2: Faidherbe Bridge, 1897

In 1880, France decided to build a railway connecting Kayes on the Senegal River to Bamako on the Niger River. It was essential to have a lifting tool in Saint-Louis that could raise very heavy burdens, like locomotives.
For the raising of heavy parts, a first crane was sent but the ship carrying it sank on Banc d'Arguin in Mauritania. A second one was sent; it arrived at its destination in spare parts and was assembled in 1883 by two soldiers: Peyssoneaux and Tellier... It is one of the rare steam catamaran in the world in perfect state of conservation (Fig.1)

- Between 1883 and 1885: construction of the Dakar-Kayes and Dakar-Saint-Louis railway lines that reach distant regions (more than 700 km to the East).
- Functional, from 1885, the railroad carried the same year 24438 tons of goods and 100.877 travellers. In 1894 he transported 67,492 tons of goods and 206,787 travellers "after Villard (quoted by Brigaud, 1966: 61).

- The Faidherbe Bridge, a steel bridge, was inaugurated in 1897. This bridge, crossing point over the river to reach Saint-Louis, measures 515 meters long, for a width of 6.20 meters (Fig. 2).

Water Issues in Saint-Louis

The population, growing from year to year, faces the situation of an island where the river regime is characterized by the alternation of a period of flood (fed by the rains from July to November) and a seven months dry season. During this period, salt water sometimes invades the lower reaches to Dagana. Thus, for seven months, the water that is available to the population is brackish.
Various methods have been used to supply fresh water for the island of Saint-Louis:

- Recovery of rainwater in tanks,
- Drawing water from the holes dug in the sand of the beach,
- Transport of water brought upstream of the river by boat or canoe...

In 1859, the French governor of Senegal, Louis Faidherbe, began studies and worked on the implementation of a water supply system for Saint-Louis by building a dam on the Kassak River. But the flood carries away the dam. Faidherbe could hardly solve the water problems of the island; and until 1866, Saint- Louis was fed fresh water during the dry season by the methods above mentioned.

The stages of construction and implementation

After a failed first attempt to water supply by Faidherbe in 1859, the Colonel of genius Pinet Laprade proceed with the construction of a dam on the Kassac in 1866, with a detachment of 100 men : « Tirailleurs sénégalais » (indigenous troops) and Navy infantry). To bring the water to Saint-Louis, a preliminary project dated 1879 describes the work to be done:

- a water intake is established at Kassak, near Lampsar;
- elevating machines at Makhana;
- a cast iron pipe twenty-five (0.25) cm inside diameter, from the lifting machines to Saint-Louis;
- Two reservoirs (one in Sor and the other in Saint-Louis) to ensure water distribution in island and its suburbs.

Two sketches show the preparatory works of a freshwater canal, which is to supply Saint-Louis

The excavation of a six kilometre long canal from Kassak, about three hundred meters above the dam, will lead to the foot of the hill, at the top of which is the fort of Diaoudoun.

By means of steam-engines, the water that arrives there will be raised on the hill, placed in reservoirs from which it will get out by pipes, to Saint-Louis, twelve kilometres from it.

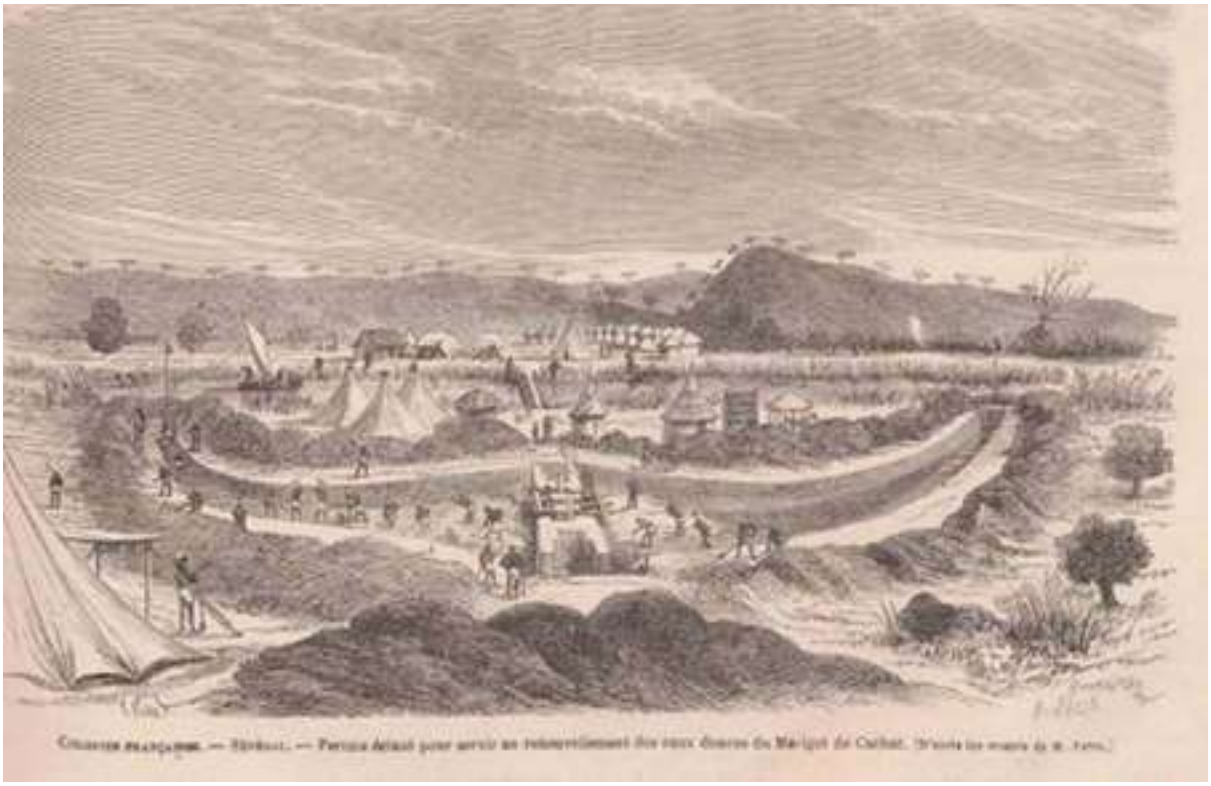

Figure 3 : Camp of the “tirailleurs”

The success of this project was guaranteed; and it was anticipated that before 18 months the city of St. Louis would be traversed in all directions by conduits that would distribute water in each house.

Figure 4: Sluice gate for fresh water renewal. Dam of Lampsar, June 29, 1868, according to Mr. Favre (in “Le Monde illustré, 1868, p. 85)

Work execution

In 1880, the pipes for the discharge pipe (400,000 kg) were manufactured by the Marquise in Pas-de-Calais (France).

In 1882, the seventeen kilometres of pipeline are laid; the machinery building is made, as well as the chimney. The boilers are installed.

In 1885, the two water towers, the standpipes and the taps on the way of the pipe are completed. The pumping machines are installed. Makhana's first pumping station, today known as the "old factory", was commissioned in 1885 with a daily flow of about 1500 cubic meters. This old factory is characterized by its vaulted ceiling, pillars with capitals, a brick floor in two colours, a spiral staircase, and cast iron gargoyles. It has a machine room of 120 m^2, three windows totalling 10 m^2.

In 1899, Malenfant, head of the public works department, proposed the construction of a second pumping station. The new factory, built in 1903, has a double-sloped tile roof, with straight masonry staircases, gutters, a 140 m^2 machine room, large windows and glass windows with a surface area of 42 m^2. It ran from 1906 with a daily flow of about 2500 cubic meters.

After several years of operation, the city's water supply system was completely modified by the adoption of the Dakar-Bango project developed in 1917 by engineer Aldebert. The project, aimed at improving the quality of water, provided for the creation of a new reserve located southwest of the kassak to prevent the contact of salt water from the mouth of the Senegal River.

The Makhana factory operated for 67 years before being finally shut down in February 1952.

Makhana site today

When the factories closed in 1952, the machines were in very good condition. Today, the two factories are much degraded and in ruins:

Pieces were taken and sold;

- Machines are completely rusty,
- Fireplaces and walls are cracked;
- Buildings are occupied by domestic animals...
- The cast iron spiral staircase of the first factory had been stolen (with the certain complicity of the inhabitants). It was then recovered in Holland and brought back today to the site;
- The 600 meters of iron beams constituting the roof structure of the new factory has been sawn and taken away.

Figure 5: Current view of the old Makhana factories

Figure 6: First factory

Figure 7: Interior of first factory

Figure 8: Interior of second factory

Figure 9: Second factory

For this industrial heritage of Makhana, a real reflection must be undertaken to ensure a restoration and a real tourist exploitation of the site.

How to preserve and promote this heritage taking into account the advanced state of degradation in which the factories are today? It's quite obvious:

- The local population does not know the importance and the usefulness of this industrial heritage, and as such, it contributes seriously to its degradation.
- The Makhana factories are part of Senegal's history heritage; but the people never perceive them to be an integral part of their cultural heritage.
- The Senegalese authorities, even if they have proceeded in the classification using historical, technical and architectural values, neglected to make the populations more aware in the context of a policy of valorisation, restoration, protection and conservation of this industrial heritage.

In the conclusion of his study on Makhana, G. Thilmans (1999) writes: *"The Makhana factory is the oldest in black Africa, and in Europe such facilities are centres of tourist attraction and are protected and emphasized by the authorities ... Makhana's machinery falls into the most interesting category, that is, machines with an original frame and not, as is often the case, isolated from their context and placed side by side in a museum. Their rehabilitation is then more than desirable."* The theme of the museums of site or outdoors can be used for a reconversion of this heritage witness of a technical and industrial history in Africa.

Acknowledgments: This work was carried out thanks to the work of Guy Thilmans (1922-2001), a Belgian researcher from IFAN who was the forerunner of industrial archaeology in Senegal. Thanks to the 3rd year students (2017) of the UFR Civilizations, Religions, Arts and Communication section Heritage Professions of Gaston Berger University of Saint-Louis for making reports on this site.

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Refunctioning of Industrial Buildings and Some Examples in Turkey

Nursah ATAMTURK

MSc. Architect

What is industrial archaeology

Industrial Archaeology is a discipline that aims to preserve the out of date mechanical systems which are established in order to produce merchandise or services and the authentic architecture which is developed with this aim, as a whole. (Tanyeli, 2000)

Industrial archeology studies the all buildings, settlements and urban landscapes, constructions and machines made for or made by industrial manufacture. It investigates all tangible or intangible remains and documents.

Therefore, industrial buildings are important not only in terms of their architectural and historical characteristics, but also in terms of technological development processes and their effects to the urban development. They are also important in terms of giving information about the economic, social and cultural history of the society. (Köksal, 2005)

Nonetheless, industrial archaeology is the common activity of the disciplines of history of technology, history of architecture, archaeology and preservation. The reason for this is that data is about each and every one of them, however is not directly relevant to any one of them. (Tanyeli, 1998)

Process of the emergence of industrial archeology

1955 – In Britain, during city renovations, a concept of Industrial Archaeology has emerged in form of an NGO, as a result of concerns for preservation of the remains of industrial revolution (Michael Rix)
1959 – Council of British Archaeology-CBA has established a research committee.
1963 – Industrial Monuments Survey Council has been established in Britain, with the aim of registering the industrial heritage. First records have been started under the name of National Record of Industrial Monuments-NRIM.
1973 – First Industrial Archaeology Congress has been held in Ironbridge.
1973 – The Association for Industrial Archaeology-AIA has been established.
1973 – The International Committee for the Industrial Heritage-TICCIH has been established.
1999-2001 – The European Route of Industrial Heritage-ERIH has been established with the aim of announcing the transformations of industrial areas, and to create tourist attraction.
2003 – Nizhny Tagil Charter has been prepared by TICCIH
2006 – ICOMOS has announced the subject of the World Monuments and Sites day for 2006 as "Industrial Heritage".

TICCIH is an international organization, which has been established with the aim of preservation, research and documenting of industrial heritage. The field of operation for

this institution includes; industrial buildings, machinery and equipment within these buildings, industrial products, and industrial settlements. (http://ticcih.org/about/)
The Nizhny Tagil Charter for Industrial Heritage, which has been prepared by TICCIH in July 2003, underlines that this heritage must be evaluated within a wide scope. In the declaration, it is said that industrial heritage composes of industrial ruins having historical, social, technological, architectural and scientific value. These ruins include; buildings, machinery, plants, production areas, factories, mines, processing and treatment plants, warehouses, places where energy is produced, transferred and consumed, transportation and all of its infrastructure, and besides these, places that are used for accommodation, worship, education, and etc. in connection with all of these industrial facilities. (http://ticcih.org/wp-content/uploads/2013/04/NTagilCharter.pdf ; 2017)

ERIH has determined a "route of industrial heritage" in the member countries and various "stop points" within this route. The route was completed in 2001. Although Turkey is not one of the member countries, Santralistanbul And Rahmi Koç Museum have taken their places in stop points within this route as samples which form the subject matter of this presentation. (http://www.erih.net/ , 2017)

In time many Eastern European countries, have started to give importance to their own industrial heritage too, as a result of their contact with Western Europe.

Voluntary and individual efforts in Europe and the United States, and institutions like TICCIH, ERIH, AIA, ICOMOS have important contributions for the preservation of industrial heritage.

Re-use of industrial buildings

By mid-18th century, there had been fundamental transformations in the lives of western societies, as a result of industrial revolution, and there had been drastic developments in production, and in transportation vehicles. Production has left plants, and gone beyond manufacturing and was shifted to mechanization. Production has reached vast quantities, which was unseen until that time. Great factories, industrial buildings and zones, and around these, habitat for workers have emerged.
(http://www2.aku.edu.tr/~**hozutku**/sayfalar/sanayi.ppt> ; 2009)

As for the situation in Turkey; in this period, while industrial buildings are developing fast in the west with industrial revolution, they could not develop in Ottoman Empire, due to economic, political and religious reasons. Few Industrial buildings which have been constructed during Ottoman era, were simple buildings, which were weak with relevance to their like in European countries as a result of many reasons like; deficiency of technology, limited number in choice of materials, time spent in production and assembly, drawbacks in workmanship and costs. They were usually masonry buildings where iron or wood were also used as building materials.

When the Republic Era has started, development of industry and protection of local industries was supported. The building system that was generally used in this period was concrete. (http://www.sanayiden.com/bilgi/turkiyesanayi.asp?kID=1, 2006)

However by the second half of the 20th century, this rapid industrialization had come to a halt. Reasons like; inadequate raw material and labor-force, ecological harm caused to the environment, changing social expectations, increasing wealth and technological development, industry has changed location and method. Thus, large scale industrial buildings and sites, which were left in the center of developing cities, turned into idle spaces.

Most important reasons for the re-use of industrial buildings may be listed as:

- Development of cities,
- Lack of useable empty spaces in city centers, increase in the land values of industrial buildings and/or sites which are dis-functioned, due to their central locations,
- Development of the social consciousness about that it could destroy the historic texture of city if the old industrial buildings are demolished,
- Development of the idea that preserving industrial buildings and/or sites would be possible by using these buildings through re-programming them,
- Appearance of concepts like "sustainability" and "transformation". (Atagok, 2000)

Re-evaluating all these industrial buildings and sites- from small/building scale to bigger scales, from an ancient flour mill to an industrial plant, within the concept of industrial architecture, would both answer the needs of the city in which they are located, would secure that the city would come forward in the international platforms, and also would contribute to the cultural tourism of the city.

Today, in cities where new spatial structures are in the agenda, transforming industrial sites with appropriate methods and providing new functions for them, contributes to the image of the city. Also when regarded from the point of view of competition between touristic cities, it would contribute to its differentiating from others with its authentic historical and cultural values, and step ahead of them.

In this direction; the below issues should be considered during preparation of functional transformation projects of historical industrial areas:

- The primary goal should be the preservation of industrial heritage. Intervention to the authentic texture, features and elements should be kept at minimum.
- Buildings should not be regarded as mere architectural components. Their industrial and cultural identity should be taken into consideration; and their historical, cultural and sociological backgrounds should be evaluated, too.
- The site that will be created after transformation should be well-integrated with the city. Requirements of the city and city plans should be taken into consideration during the process of re-functioning.
- All industrial heritages which the city possesses should be taken into consideration, and design should be carried out with a wholistic approach.
- Applications chosen should increase the quality of urban life, and should form new focal points.
- Functions which would serve only to a limited section of the city should be avoided. Transformation should aim creation of recreation zones open to public.
- Joint interdisciplinary study environment should be maintained with local administration, NGO's, societies, building owners, citizens and experts from various relative disciplines. (Atamturk, 2008)

Examples in Turkey

Re-functioned examples

These transformations which have been evaluated with the building and its equipment, are from İstanbul, which is the most prominent city of Turkey in terms of industrialization.

Haskoy Shipyard and Lengerhane (Rahmi Koc Industry Museum)

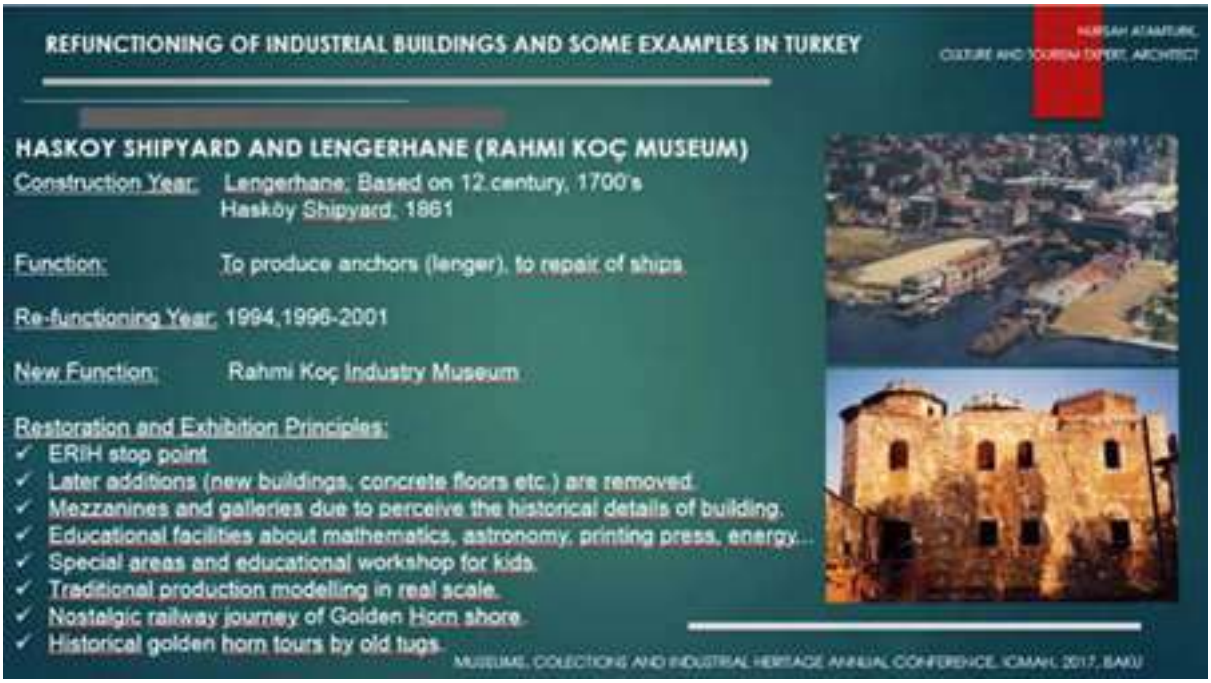
In Istanbul Province, Haskoy district, two industrial buildings, one of which has been constructed to produce anchors (lengerhane), and the other has been constructed for ship building, were redesigned as an industrial museum. Both buildings have ceased production with the development of relevant technology, and relocation of the industry at the outskirts of the city. Museum is composed of two complexes.

Lengerhane Building; has been constructed in 1700's, over 12th century Byzantine foundations. Its restoration has started in 1991, and in 1994, it was re-functioned as museum. Lengerhane Building, a small building with wooden roof, and a courtyard which is surrounded by stone walls are situated within a 2100 m^2 land. Restoration work was tried to be applied without intervening the characteristic features of the building and its environment. The mezzanine floor of steel frame construction has been constructed as a floating floor, without touching the stone walls. When existing exhibition areas were insufficient, Hasköy Shipyard too has been renovated to be added to the museum complex.

Shipyard of Haskoy; is a U-shaped building complex which is composed of 14 buildings, and which was built with the function of maintenance and repair of ships in 1861. The shipyard covers an area of 11,000 m2 area. It was functioning with steam power in 1884, while it was transformed to electrical power in 1910. Turn Benches, a construction plant and a carpentry plant were established.

In 1996, restoration of the shipyard was started. In 2001, it was opened for visit. It is located in between two buildings, in Haskoy Street. Its connection to the primary museum was maintained at basement level, through a transparent gallery, which is connected to the shipyard.

During the re-use project of the building, later additions like reinforced concrete floors were moved. Mezzanine floors were designed as galleries, and in this way, scale of the building and roof trusses could be perceived from lower floors. Stone-brick masonry system of the walls were revealed, wooden trusses were kept as they are. Functions of the museum were chosen later on, adequate to spatial qualities (area and height) of buildings. In the museum, old automobiles, locomotive, plane, submarine, and etc vehicles are exhibited in real scale. Apart from this there are exhibitions telling about production processes and mechanical hardware The museum has been awarded with a success award by Union of European Museum. (*T+ Müzeler*, Tasarım Publishing, 2003 ; http://www.rmk-museum.org.tr/default.aspx, 2017)



Silahtaraga Power Plant (Santralistanbul)

Silahtaraga Power Plant has been established in 1911 by Ganz Electricity, a Hungarian company, with the aim of providing electricity to the European side of İstanbul. It is located at a 118,000 m2 area by the mouth of Alıbeykoy and Kagıthane Streams, considering that transportation of coal would be easier through water ways.

The plant has first provided electricity for the tram line of the city in 1914. During the process of manufacturing, new engine rooms have been added to the plant, while some sections were removed out of function. In 1931, the plant started to provide electricity for the whole city. Big industrial plants too were provided electricity by Silahtaraga Plant. In 198 3, it has been closed down because various reasons like; water for raw materials and cooling processes could not be acquired, technical hardware was old, production was not efficient and electricity could be provided by new Power Plants which were established at the outskirts of the city. (Ensari Kara, 2001)

The plant is an important heritage of history of technology, because it is the first thermic Power Plant of Turkey, and its authentic equipment were intact. Besides this, it is also important in terms of social history and architecture with its characteristics like; the new identity and quality of life that it had provided for the area, the fact that it is the second building of the country which was constructed with foundation piles, and with its architectural style.

The plant has been given to Bilgi University in 2004. Prominent architects of the country like Nevzat Sayin, Emre Arolat and Han Tumertekin played a role in the transformation project of the Power Plant into a space of culture and art. The buildings which compose the plant are listed below.

Museum of Contemporary Arts (Architect - Emre Arolat): It is a space which was constructed in place of two furnace structures which were pulled down after electricity production was ceased. It covers an area of 7,000 m2, and previous form of buildings was preserved.

Energy Museum (Architect- Han Tumertekin): The museum is in the main building of the Power Plant. This building has been preserved mainly as how it was when the plant was in function. Here, an energy-game room too has been located, where visitors could produce electricity themselves.

Library and Information Centers (Architect- Nevzat Sayin): Old furnace rooms of the Power Plant were transformed into library and information center.

International Residence: Staff Houses (lodging) of the old Power Plant have been transformed into residences where artists, architects, designers and philosophers could stay for various periods of times.

Education Zone (Architect- Nevzat Sayin): It is the space which has been established for locating departments connected to Science, Literature and Communication Faculties of Bilgi University.

Recreation Zones: Gardens and cafeteria areas which answer the rest and recreational needs of visitors of Santralistanbul.
(http://www.santralistanbul.org/pages/index/about/tr/,2017)

Cibali Tobacco Factory (Kadir Has University and Rezan Has Museum)

Kadir Has University has chosen the dysfunctional Cibali Tobacco Factory as its campus, due to its location, advantage of transportation, and it's appropriate structural

characteristics. They have restored and re-functioned the factory complex as a university campus.

The factory was constructed in 1884, with the aim of producing tobacco produces. The complex was a small-scale city in its own, with its own police officers, social officers, hospitals, social building, shops, schools, a fire department, syndicate building and restaurants.

The factory lost its function in 1970, when factories producing cigarettes with advanced production technology started functioning in İstanbul. In 1995, it was cleared out of its services completely, and was given to Kadir Has University with a build- operate-transfer model to be re-functioned as an educational institution. Today, the Tobacco Storage Building near the factory complex too was restored and it is being used by the Fine Arts Faculty and at the same time Rezan Has Museum. Also, The Tobacco Storage Building has the remains of the Byzantine cistern, which depends on the 12th Century under its walls.

The factory complex reflects the architectural styles and construction techniques of its time. Post industrial revolution materials like brick, iron, pig-iron columns and glass, which were used in the western states, were used in these buildings. It is thought that authentic roof tiles of Marseille, pig-iron columns and INP steel I-beams which were used for floors were brought in from France and applied. Their spatial qualities and dimensions and neo-classical architectural style, differ the complex from classical period buildings.

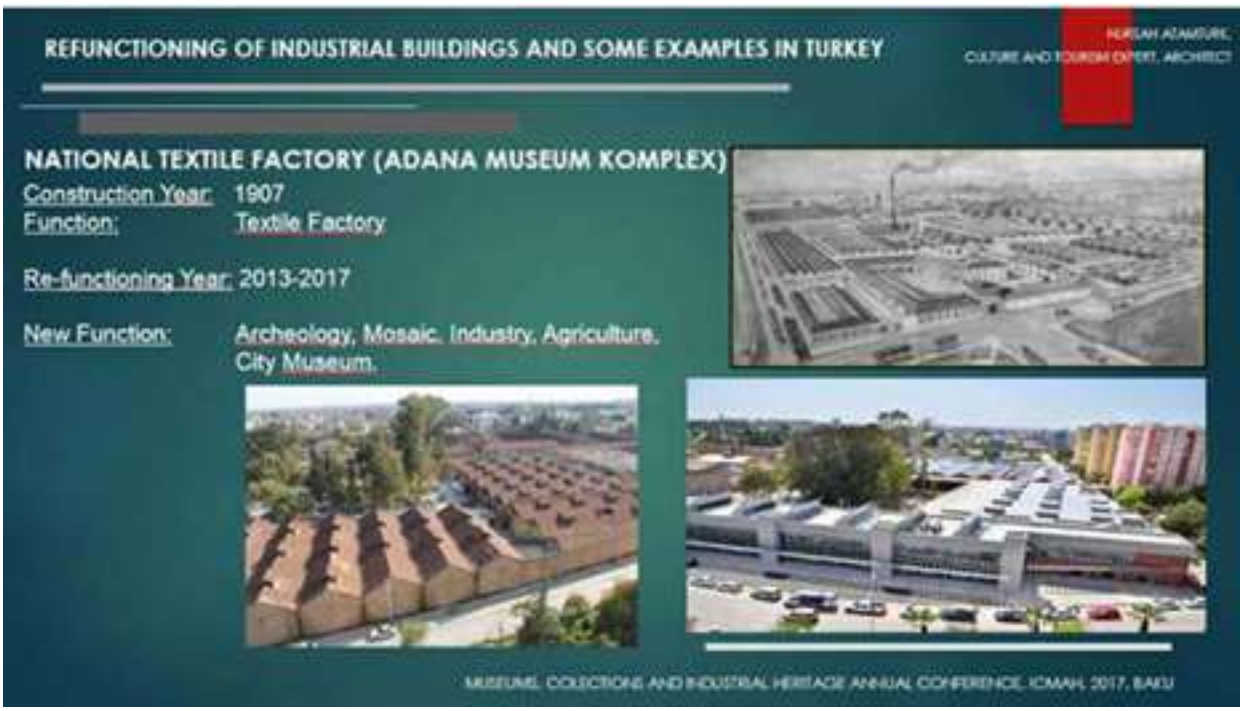
The first local cigar in Turkey (1947) and first local cigarette brand, Samsun (1959) were produced here. The re-functioning criteria of the building are listed below:

- First of all, determination of the historical accumulation of the building. Use of the building parts with authentic style, material, and technical properties without pulling them down.
- Purging unauthentic and poor quality annex which do not possess any values.
- Furnishing the building with high technology in accordance to its new function, with minimum intervention.
- Consolidation of the structure.
- Reminding the original of the building with details used (globe lambs and tobacco colored walls) (Alper, 2004)

National Textile Factory (Adana Museum Komplex)

The National Textile Factory of Turkey was established in 1907. The restoration was initiated in 2013 by the Ministry of Culture and Tourism of Turkey. In 2017, the Archeology and Mosaic Museum of the Museum Complex was completed and opened.

When all is finished, the museum complex will be consisted of archaeological museum, city museum, agricultural museum, industrial museum and mosaic museum. İt is planned to be among the biggest museum complexes in the World with its 68.500 m2 area.



In-situ protected examples

These examples which were preserved in-situ and turned into museums are selected from the Aegean area, where culture of olive goes back to ancient times.

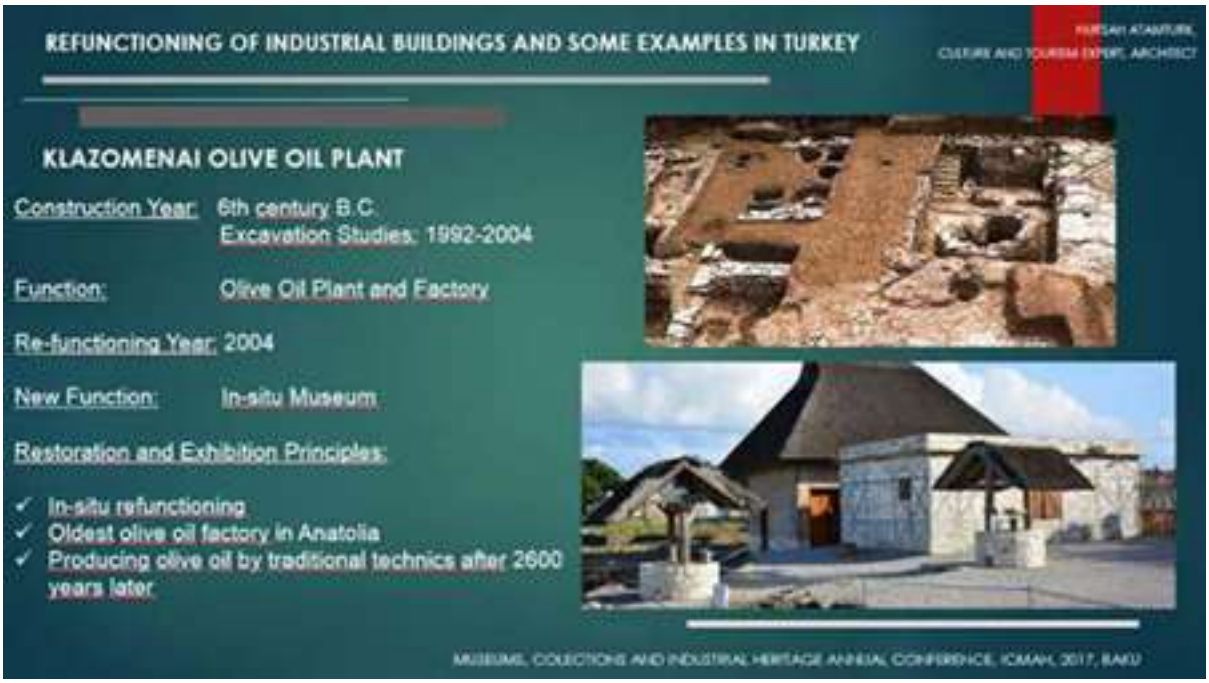
Klazomenai Plant Of Olive Oil

Klazomenai Olive Oil plant is a unique sample of evaluation of industrial heritage dated before industrial revolution. It is the oldest olive oil factory in Anatolia and it is dated back to 6th century before Christ. The ancient olive oil plant was constructed and used by Ionians living in Klazomenai city. Having different architecture than other ruins in the Klazomenai ancient city, it has stone walls with mud plaster and flat roof covered by reeds. After archaeological excavations, the factory has been reconstructed in 2005.

The plant section of the Klazomenai Olive oil plant is constructed by carving the bedrock. The entrance is by steps take down inside the plant. 16 holes with various depths and forms were detected at the bottom of the plant. As a result of interpretation of these holes, it was concluded that there were a olive mill, an olive oil segregation system with three wells, crane and two separate press tables (polima). It is detected that an oil segregation system which functions according to combined container principal.

Plan scheme of the olive oil plant, location of rooms and similar data reveal production of two different techniques at two different periods. The first period of use of the plant is 600/580-546 B.C. The second period of use is dated at 530-500 B.C. While in the first period production was aimed for answering the needs of the city and nearby vicinity, second period the plant had started mass production, and had become a factory. In this respect, it has an important place in the history of olive ail production.

After the reconstruction of Klazomenai Olive Oil Factory, traditional techniques were carried out with success, and after 2600 years, olive oil was produced here again. (http://www.klazomeniaka.com, 2017)

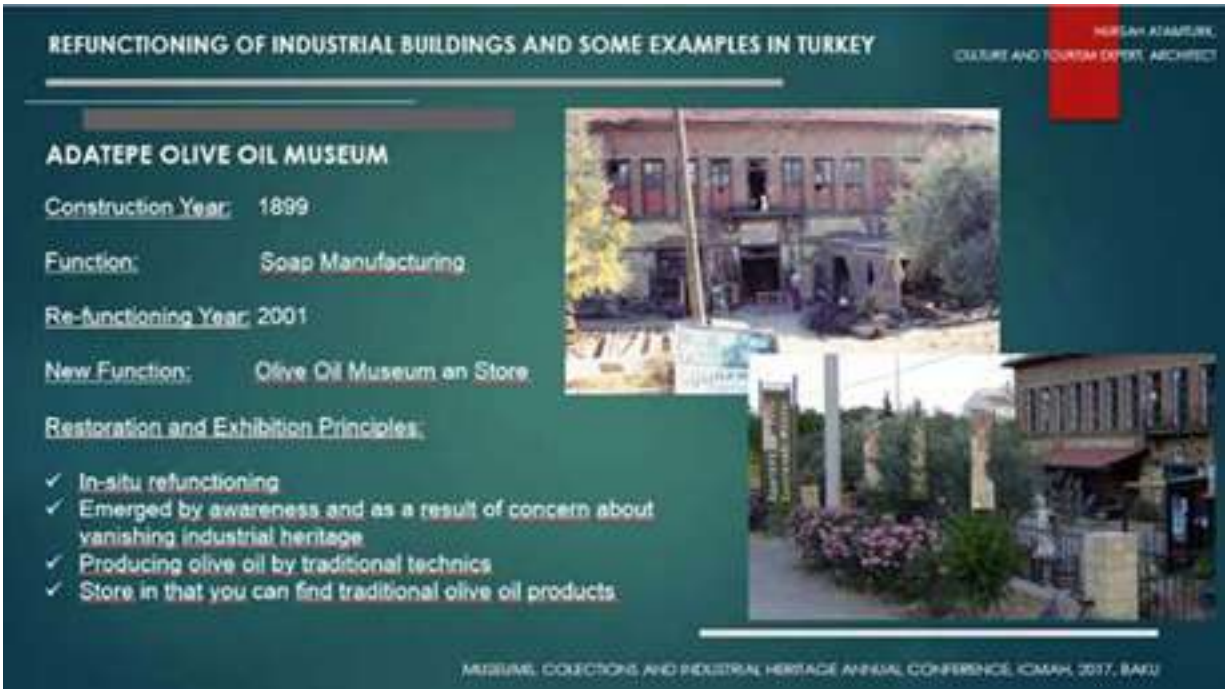


Adatepe Olive Oil Museum and Store

The museum is established in a two storied stone masonry building which was constructed but had never used as soap manufacturing building in 1952. In 2001, the owners of the traditional Adatepe Olive Oil factory have restored their abandoned antique soap factory building and re-designed it to serve as a traditional cold press olive oil factory which will also display various precious artifacts related to olive culture, collected from the local villagers. Those fortunate visitors who stop by the museum in late autumn and winter months will be amazed at the very simple procedure of olive oil extraction by the traditional methods.

The museum was emerged by awareness and as a result of concern about vanishing industrial heritage. So it is an important re-functioning sample in terms of being a non-governmental organization. It had been the most important reason to establish a museum that; many machinery and equipment used in traditional olive oil production were rapidly disappearing.

Various equipment and tools used for olive, olive oil and soap production were gathered from nearby villages in time and they have been exhibited in the factory building. In the museum, production of olive oil, keeping, transportation filtering, and etc. phases are explained. Besides, olive oil production with dry press technique is continued. The fresh 'extra virgin olive oil' and hand-made olive oil soaps are sold in the store. (https://www.adatepe.com/StaticPages/adatepe-zeytinyagi-muzesi/145/, 2017)



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The Stone Chronicle Museum: From Industrial Facility to a Museum

Dr. Shirin Melikova

Director of Azerbaijan Carpet Museum
President of ICOM Azerbaijan National Committee
Docent of the Azerbaijan State Academy of Fine Arts

The era of industrialization, which began with the invention of the steam engine of James Watt from Glasgow, forever changed the course of human history. This invention strongly influenced the formation of not only a new architectural and engineering solution for buildings but also the emergence of a new artistic language, which was capable to reflect unprecedented changes in people's lives and the rapid development of society as a whole.

In Azerbaijan, the era of industrialization began with the drilling of world's first oil well in 1847 at Bibi-Heybat oilfield. This iconic date became the beginning of the new era in the life of the city in the history of Baku. In those years on the wave of starting oil boom was created the catchy beauty of bourgeois Baku: inconceivable decorative and constructive solutions reflected the era, which was full of contradictions. The new ambitious generation of Baku, dreaming of worldwide recognition, claiming independence, invited prominent architects of that time. Within a few years, palaces and profitable houses, the first building of the Opera and Ballet Theater (architect Nikolai Bayev), gymnasiums, green squares and parks, as well as a Seaside Boulevard that outlines the arc of the Baku bay, made Baku the most beautiful city in the region. Famous painters and artists, billionaires and art patrons came to Baku. The Rothschilds, the Nobel brothers, the brothers of Siemens and many others have multiplied their capital here; the local elite sought to integrate with the European.

The energy development was connected with the rapid growth of oil production in that period. At the end of the 19th century, in Baku was established a joint-stock company named *Electric Power*, the owners of which were the daughters of Karl Siemens. This joint-stock company filed a petition for permission to build a power station in the Bayil settlement. In 1900, the director of the *Electric Power* join-stock company and the head of Baku oilfields electrification project Robert Classon, the Russian and Soviet engineer-technologist, inventor, and also one of the biggest Russian power engineers of his time, invites Leonid Krasin to Baku to build a power plant in Bayil. In 1901, the Bibi-Heybat power plant was completed and put into operation. The State District Power Plant (SDPP) supplied the electricity to shipyards, oil rigs and residential building. The Bibi-Heybat power station was one of the largest in Russia.

After the revolution in 1920 the station was nationalized. In 1923, it was named in honor of the revolutionary Leonid Krasin (SDPP named after Krasin). The expansion of the Bibi-Heybat power station in those years allowed Azerbaijan to increase oil production. In the 1940s, new power capacities were put into the operation at the state district power plane. During the Second World War, Baku was the main supplier of fuel to the front. In 1941, more than 40% of the consumed electricity was produced at the Krasin's SDPP. Hence, the station played an invaluable role, providing uninterrupted electric power to all industrial facilities.

Postwar years are characterized by a rapid increase in the consumption of electricity by the national economy. According to the published statistics, the station increased electricity production by reducing the degree of expenditure. Workers of the station were awarded orders and trophies. The station was a forge of cadres.

Until the end of the 1980s, the station operated uninterruptedly, providing power to mills, factories, the oil producing and residential sectors.

After the collapse of the Soviet Union, most of the productions fell into decline. By 2000, this territory turned to the abandoned industrial zone. In 2012, single preserved enterprises were transferred outside the capital, and in their places were decided to build a park. It is important for us that far from being demolished, the surviving buildings were kept in authentic form. Thus, the former berths of ships, shipyards and abandoned power plants became a part of a new architectural landscape. Museums and restaurants were placed here. This part of the seaside Boulevard acquired a completely new look, becoming a zone of cultural rest. Three industrial buildings after restoration and partial reconstruction appeared in a new guise: indoors of the shipyard named after the Paris Commune was arranged a Museum of Painting of the 20th - 21st centuries, within the walls of the State Power Station named after Krasin was opened The Stone Chronicle Museum, and the warehouse for military ships of the Caspian flotilla was turned into the Center for Contemporary Art – YARAT.

Two more energy-industrial buildings were redesigned – now they contain the club restaurants, such as Enerji and Elektra. The industrial heritage of the Baku bay is also reminiscent of the exhibits preserved on the Boulevard: elements of SDPP power plants, the old locomotive, transmission lines that harmoniously fit into the modern architectural and park ensemble. The works of sculpture are also placed here. For example, on May 17, 2015, in the framework of the 3rd World Forum on Intercultural Dialogue was held the opening ceremony of the monument *The Tree of Peace* by famous sculptor Hedva Ser, the UNESCO Artist of the World. The opening ceremony was attended by Mrs. Mehriban Aliyeva, First Vice President of Azerbaijan, President of the Heydar Aliyev Foundation, UNESCO and ISESCO Goodwill Ambassador; UNESCO Director-General Irina Bokova and a number of guests who arrived in Baku to participate in the 3rd World Forum on Intercultural Dialogue.

This sculpture, symbolizing the peace and tolerance is also considered the official symbol of tolerance, the world of UNESCO. The sculpture is located opposite the entrance to The Stone Chronicle Museum, which will be discussed in this speech.

The Stone Chronicle Museum opened on the eve of the 1st European Games in June 2015, occupied the building of the former power station. On the initiative of the Heydar Aliyev Foundation, it was decided to arrange the museum and exhibition area here. The project's curators are Emin Mammadov and Shirin Melikova, experts in the art field of the Heydar Aliyev Foundation. The design belongs to the Austrian architect Christian Sturminger. A group of companies "A + A" and "Azimport" were engaged in all the reconstruction works of the building.

The architecture of buildings represents a typical example of industrial architecture of the early 20th century. The buildings are executed in Art Nouveau style with elements of Eclecticism. The special character of the hulls sliding looks very interesting. Massive stone walls without any decorations, stylized semi-circular arched windows, gable roof with high forceps, metal roof trusses with glass lanterns, round dormer windows – all these are characteristic features of the industrial architecture of that period.

A bright, spacious space is two-level in plan and consists of two zones, for which is provided with a separate entrance. At the moment, as an exposition is used one zone with a central entrance from the avenue's side. The entrance from the side of the Boulevard is not used. These two zones have different interior design. The zone

involved in the museum consists of two levels of the same size. The floors are joined by an iron staircase, branched into two spans. The second floor is a spacious, bright room, with an area of 688 square meters and a height of 13.5 m, with wide opportunities for exposure. The left part of the building is temporarily not operated under the exhibition area. Here, the center of the first floor is divided into two parts by a series of concrete pillars. The floors are joined by an iron staircase, a spacious premise of the second floor, with an area of 366 square meters, in the plan is smaller than the hall on the right side of the building. A beautiful panorama opens on both sides of the building: on the one hand – to a rapidly developing metropolis, on the other – to the space of the Seaside Boulevard.

The architects were tasked to preserve the industrial spirit of the building in the interior, so they kept the ceiling iron structures, construction hooks, ventilation system. The museum exposition area is used for various kinds of events: fashion shows, as well as the presentation of the Islamic Games in 2017.

These premises have colossal exposition possibilities: voluminous installations, sculpture, and contemporary artworks can be installed here. This is an excellent platform for contemporary art projects.

The placement impresses with its scale. The industrial past that managed to be preserved in architecture and partly in the interior can be an excellent example, which is already widely used in the world for the reconstruction of abandoned and collapsing industrial buildings that are given a new life, new functions. Thus, several tasks are being solved at once: preservation of the industrial heritage, development of ecologically unfavorable territories, and creation of new exhibition and museum spaces.

In this case, this project in Azerbaijan is the first successful project in this direction. And we hope that this is not the last one, because our country has always been and remains to be one of the largest industrial zones in this region.