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The University Museums and Collections Journal (UMACJ) is a peer-reviewed, on-line journal for the proceedings of the International Committee for University Museums and Collections (UMAC), a Committee of the International Council of Museums (ICOM).

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This sixteenth-century armillary sphere was part of the Cabinet of Physics of the University of Padua. It was bought in the 1820s by Salvatore Dal Negro, professor of experimental physics, to illustrate his lectures on early astronomy. It is a very rare model, which demonstrates the trepidation and precession of the equinoxes through the motion of two inner spheres – the eighth and ninth spheres of the geocentric universe – within the outer, or tenth sphere. The trepidation theory was proposed in the Middle Ages and rejected at the end of the sixteenth century due to Tycho Brahe's works. The horizon ring and the tripod stand of the instrument are nineteenth-century additions.

Dimensions: height 50 cm; diameter 36 cm

Museum of the History of Physics, University of Padua (Italy), cat. n° 30280

Photo (detail) by Franco Zannini

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Introduction

Re-Evaluating the discourse on University Museums

Marta C. Lourenço, Barbara Rothermel & Andrew Simpson

University Museums and Collections (UMAC) was founded in 2001 as an international committee of the International Council of Museums (ICOM). From the start, UMAC has organized one conference a year and published a series of topical papers based on the proceedings of each of these meetings.

The initial proceedings from the 2001 meeting in Barcelona and the 2002 meeting in Sydney were carried by the journal *Museologia* based at the Museum of Natural History and Science at the University of Lisbon. The following 2003 conference was published independently by the conference host, the Sam Noble Oklahoma Museum of Natural History at the University of Oklahoma. Proceedings from the UMAC conference in 2004, part of the triennial ICOM conference in Seoul, were combined with the proceedings from the 2005 Uppsala meeting and published as volume 15 of *Opuscula Musealia* by the Jagiellonian University Museum Collegium Maius in Krakow. The 2006 meeting in Mexico City produced a volume of thematically arranged papers published in Spanish and English by the host university for the meeting, the National Autonomous University of Mexico under the title “New Roads for University Museums”.

It is fair to say that during this period, not much literature about university museums and collections was published in academic journals. Apart from the occasional exception, much of the writings on this seemingly specialised subject matter were found in what is generally referred to as the ‘grey literature’. This included reports and commissioned studies, reviews and the unpublished studies of higher education staff and student researchers. So while these early UMAC conferences were producing a diverse cohort of presentation offerings on many wide-ranging topics, the UMAC Board and more specifically, the UMAC Publications Working Group were simply glad to find some outlets willing to support their ventures by producing printed conference proceedings as output. The disciplinary and geographic diversity of the early conference proceedings not only showed the unique international perspective of the UMAC enterprise, but was also a portent for an increasing global interest in the materiality of the higher education enterprise.

With authors and editors in many countries, hard copy publications became difficult and expensive to produce and distribute meaning UMAC members and other interested professionals and researchers found them hard to access. This unsatisfactory situation stimulated UMAC to establish an electronic journal: the *University Museums and Collections Journal* (UMACJ) for many years hosted by the University of Humboldt as an open source journal publication. The main business of UMACJ was still conference proceedings. The site also carried the earlier more diverse set of proceedings thus coalescing much of the writing about university museums in the one place. It aimed to and achieved the provision of global, inclusive accessibility to, and distribution of, UMAC's conference proceedings. This period covered annual conferences in Vienna, Manchester, San Francisco, Shanghai, Lisbon, Singapore, Rio de Janeiro and Alexandria, again testament to the international nature of many of the questions and issues that surround university museums and collections.

But even during this more recent period it has become apparent that the output covered by the journal could easily be expanded beyond the boundaries of the annual UMAC conference. In fact, UMACJ has already done this by publishing some material that was not presented at a UMAC annual conference, including, for example, selected papers from the 2013 "Future of Academic Heritage" conference at the University of Ghent. The nature of UMAC's annual conference was also changing. For example, the 2014 conference in Alexandria was a joint undertaking with CECA (Committee for Education and Cultural Action) another of ICOM's many international committees. It is obvious that there will be further opportunities for a range of collaborations with other ICOM international committees as the scope of discourse about the university museum expands.

Ever since the start of UMAC, that saw a couple of editions of *International Museum* tangle with university museum issues, we have seen an expansion in the number of scholarly papers about university museum and collection issues published in mainstream, established, museum journals in recent years. Also a number of specialist publishers have compiled and released books focussed exclusively on university museums and collections.

It seems to be clear that the increasingly complex operating environment of higher education has prompted greater institutional interest in their museums and collections (SIMPSON 2014), not only among the senior leaders of institutions but also among the scholars (staff and students) at those institutions themselves. The current UMAC Board has as part of its strategic remit, the aim of consolidating UMACJ as the principal academic reference journal for university museums and collections in the long-term. This will involve many steps including; expanding the scope of the journal beyond the proceedings of the annual conference, revising the editorial policy of the journal and expanding the editorial committee. We aim to build our credibility as an academic publisher, attract high quality written submissions and become the publication venue of choice for those writing on/about university museums. Significant changes will be visible in coming issues.

For the moment, UMACJ continues to present a selection of papers from its annual conferences. This issue (9) of UMACJ covers the 2016 UMAC Conference, devoted to the theme 'Museums and Cultural Landscapes'. It took place in Milan between 3 and 9 July, coinciding with ICOM's 24th general conference. The exception is the article about the *Musée des Arts et Métiers*, in Paris, which was not presented at the 2016 UMAC Conference, yet already anticipates the diversity and scope of the future non-proceedings approach/model.

Literature cited

SIMPSON, A. 2014. Rethinking university museums: Material collections and the changing world of higher education. *Museums Australia Magazine*, 22(3): 18-22.

UMAC Proceedings Milan: Museums and Cultural Landscapes

University cultural heritage of Cuba: A methodology to preserve and promote the collections and landscape of CUJAE university campus, Havana

Carina Marrero Leivas

Abstract

Many universities in Latin America and the Caribbean are engaged in projects that indicate an encouraging future for university cultural heritage. Cuba is in the initial stages of regarding the conservation and promotion of this kind of heritage. A general vision of Cuban university heritage and the proposition of a methodology to preserve and promote the cultural heritage of the university campus José Antonio Echeverría (CUJAE) in Havana are presented in this paper.

Introduction

Cuba, the largest island of the Antilles and the Caribbean, is located between the Gulf of Florida and the Gulf of Yucatán. Havana is its capital of about two million inhabitants. Cuba has a rich heritage in history, art, architecture, science and technology; these values have accumulated during the nation's historical stages: the Spanish Colonial period (1492-1898), the Neocolonial period with the American intervention (1899-1958) including American military occupation (1899-1902), and the Cuban Revolution of Fidel Castro (1959-today).

Decree 118 of the Republic of Cuba's Law on Protection of Cultural Heritage defines as cultural heritage of the nation, *that composed by movable and immovable goods, which are the expression and testimony of human creation or evolution of nature and which are of particular interest in relation to archeology, prehistory, history, literature, education, art, science and culture in general*¹.

In Cuba, there is remarkable interest in the cultural heritage of the nation. In 1977, the Law No. 1 of Protection to Cultural Heritage² was promulgated with the creation of the National Register of Cultural Goods. This institution undertakes to *establish, organize and supervise the general inventory of cultural property declared cultural heritage*³. In 1978, the National Monuments Commission was formed in Havana, (...) *under the legal guardianship of Law N. 2 of National and Local Monuments*⁴. In 1995, the National Council of Cultural Heritage was founded. *This council works for the protection, preservation, restoration, exhibition, research and disclosure of the cultural and natural heritage, as well as for the training of professionals in the field*⁵. Cuba has hundreds of museums distributed throughout the territory, between national, provincial and municipal museums. They are supported by the Law N. 106 of National Museum System of the Republic of Cuba, developed by the ICOM Cuba Committee in 2009, in Havana. Despite the difficult economic situation for many years, Cuba has obtained good results in the management of historic sites and heritage assets of the nation. However, much remains to do for the safeguarding of cultural heritage. For example, the theme related to university heritage is still little discussed in the national territory, notwithstanding the existence of universities throughout the country with a rich heritage. There is no law specified on the protection and conservation of university collections and museums in Cuba. The university heritage is protected by the Law N. 1 of Protection to Cultural Heritage of Cuba and the Law N. 6 Law of Museums. This law makes reference to national, provincial and municipal museums, but none of its articles takes into account the university collections, museums or historic rooms.

Cuban universities and university cultural heritage: Current situation and actions in favor of movable cultural goods

Cuba has a total of 60 universities distributed throughout the island⁶. The first university was the current University of Havana, founded January 5, 1728, with the name Royal and Pontifical San Gerónimo University of Havana. From its creation date, it is the third Caribbean university and the sixteenth in Hispanic America (TORRES-CUEVAS 2014). In 1842, the Royal and Pontifical institution ceased to be Catholic and become a University of secular and colonial character, with the name of Real and Literary University of Havana. Years later, during the American intervention in Cuba, it was named National University or University of Havana (TORRES-CUEVAS 2014).

1 Colectivo de autores, Protección del Patrimonio Cultural. Compilación de textos legislativos. Decreto 118, artículo 1.

2 Cf. <http://www.icom.ohc.cu/wp-content/uploads/2010/09/ley-1.pdf> (accessed May 4, 2015).

3 Cf. http://registronacional.com/cuba/cuba_bienes_culturales.htm (accessed June 3, 2015).

4 Cf. <http://www.cnpc.cult.cu/comision-nacional-monumento> (accessed May 4, 2015).

5 Cf. <http://www.cnpc.cult.cu/quienes-somos> (accessed May 5, 2015).

6 Gustavo Cobreiro Suárez, "La Educación Superior y la Investigación Científica en Cuba" (Conference by the Rector of the University of Havana, at the University of Padua, Italia, April 17, 2015).

The University of Havana (fig. 1) has witnessed almost all historical stages of Cuba from the Spanish colonization to present. Its history and development are closely linked to the personalities and historical events that tell the struggles for the independence of the nation, especially in the first half of the twentieth century. Today, the university is *a great complex of 18 faculties and 14 research and study centers dedicated to the natural sciences, education, social, economic and human sciences* (NÚÑES JOVER & BAUJIN 2014).



Fig.1
Main entrance to the University of
Havana (2015)
Photo: Carina Marrero Leivas

The University of Havana has accumulated a precious cultural heritage of historical, architectural, documentary, scientific, academic and artistic value during its almost 300 years of existence. Some of its movable cultural goods are part of collections integrated into the Natural History Museum Felipe Poey, the Anthropological Museum Montané, the Fragua Martiana Museum, the Astronomical Observatory and the collection of the herbarium of the National Botanical Garden.

The Natural History Museum Felipe Poey was founded in 1842 by the Cuban naturalist and scientist Felipe Poey, who was, at that time, the dean of the Science Faculty and Vice-Rector of the University of Havana. In 1939, the museum was moved to its current location, in a building that is part of the campus of the University of Havana. *This museum is considered the oldest public museum in Cuba and has about 500 000 pieces - animals, shells, fossils, bones, books, magazines, and more manuscripts and original drawings by Felipe Poey* (MONTERO CABRERA & ALONSO BOSCH 2014). The collections are associated with figures of science related to University and research by students of the Faculty of Biology. The museum's mission is *to protect and enhance the rich heritage that has this old university* (MONTERO CABRERA & ALONSO BOSCH 2014) *and to promote in the current generations the need to know and safeguard the natural values and to disseminate the importance of funding heritage of the University of Havana* (MONTERO CABRERA & ALONSO BOSCH 2014).

The Anthropological Museum Montané, also belonging to the University of Havana was founded in 1903 on the proposal of Antonio Bachiller y Morales, who had already launched the idea of an anthropological museum at the end of nineteenth century. Based on this intention, the Professor Luis Montané, Chair of Anthropology at that time, proposed the creation of this museum, which has archaeological collections related to pre-Hispanic cultures that populated Cuba, the Caribbean and America. Currently, the museum is "the center of research and archaeological exhibition which has the largest continuous tradition in our country⁷".

The Fragua Martiana Museum is the third museum of the University of Havana, founded in 1944. It is located in the old San Lázaro Quarry, where the Spanish colonial regime in Cuba had a political prison. This place has a great historical value for what it represents: Cuba's national hero José Martí was imprisoned there because of his thoughts on independence. Declared a National Monument in 1996, mainly for its historical value, the museum is open to the public and is a community center attached to the university.

⁷ Cf. <http://fbio.uh.cu/mmontane.php>

The University of Havana has another rich cultural heritage of scientific value in the Astronomical Observatory, located since 1939 in the Felipe Poey building of the same university campus. The goods that the observatory exhibits have French, German and American origin. Movable cultural assets include; astronomical, geodetic and meteorological instruments and didactic materials related to the academic function of the observatory. A collection of glass slides, planetary and celestial globes is a part of teaching materials useful for Higher Education at the university as well as for teaching in primary, secondary and high schools. In addition, the Observatory has a small collection of books, directories and astronomical catalogs of the XIX and XX centuries, basically from French and North American origin (MONTERO CABRERA & ALONSO BOSCH 2014). In July 2013, after a restoration that began in 2008, the observatory was open to the public. Through this work over a five year period, collector's items like clocks, barometers, anemometers, didactic models, celestial globes and telescopes over 150 years in age, have been saved (GÓMES BUGALLO 2013). Several institutions have contributed to this important task to safeguard a rich cultural heritage with essential scientific and academic value.

Another complex of goods that are part of the cultural heritage of the University of Havana is the herbarium of the National Botanical Garden, consisting of a collection of plants and fungi. The current herbarium has its origins in Havana's Botanical Garden, located in the Mansion of Mills (in Spanish language: Quinta de los Molinos) in the early twentieth century. In successive years, this collection increased with additions from Felipe García Cañizares, Professor in 1916 of the General Chair of Botany and Topography of the University of Havana (MONTERO CABRERA & ALONSO BOSCH 2014). Later, in the 1940s, a Herbarium was organized by Antonio Ponce de León and a group of students. Years later, with the triumph of the Cuban Revolution in 1959 and the massive exodus of professionals and teachers in the country, all goods that were part of the herbarium have undergone significant changes. The work of recovery and asset acquisition was developed in 1966. The result is the current National Botanical Garden Herbarium, transferred in 1968 to existing university buildings. Their collections of plants and fungi are *a scientific and cultural heritage of the Cuban nation, of obligatory consultation for all those who are related to the natural diversity of Cuba* (MONTERO CABRERA & ALONSO BOSCH 2014).

Moreover, the University of Havana, declared a National Monument in 1978 thanks to its historical, environmental, artistic and architectural value⁸, has a large number of movable cultural goods, evidence of almost three centuries of history. However, most of the university's artistic heritage is concentrated in the goods produced during the 20th century (FELIPE TORRES 2014), between painter's artwork, busts, reliefs, mosaics and classical archeology collections of renowned Cuban and foreign sculptors. One of the most valuable assets is all the paintings -oil on canvas- of the Cuban painter Armando García Menocal. These artistic panels located inside the Aula Magna, recreate allegorical subjects related to medicine, to science, to literature, commerce and justice in reference to the teaching and research of the University of Havana. Among the sculptures that the university has, the most emblematic is undoubtedly the Alma Mater (fig. 2), made in bronze in 1919 by the Czechoslovakian sculptor Mario Joseph Korbel.



Fig. 2
The Alma Mater sculpture of the
University of Havana (2015)
 Photo: Carina Marrero Leivas

8 Cf. <http://www.cnpc.cult.cu/patrimonio/162> (accessed June 23, 2015).

All treasure that is kept at the institution is managed by the Heritage Department of the University of Havana. The department, (...) *established in September 2010, aims to monitor, guide and advise management in its broadest sense about the cultural heritage of the institution. In addition, it develops studies of collections, proposals for cataloging and inventory goods, promotion strategies and different actions to encourage research in the field. The Department is the lead agency for the control and approval of all conservation and restoration activities, transfer or loan of any university heritage item*⁹.

Among the most significant actions of the university cultural heritage of the University of Havana, we can cite the research on cultural assets of documentary values that the department is in the process of developing and the integration of the movable cultural heritage of the university into projects¹⁰. The most recent action was the organization of the First and Second Seminar of University Cultural Heritage in 2015 and 2016, an initiative of the Heritage Department of the University of Havana under the auspices of the University College San Gerónimo and University Campus José Antonio Echeverría (CUJAE)¹¹, supported by the most prestigious institutions dedicated to the cultural heritage of Cuba. University College San Gerónimo, mentioned earlier, is another faculty of the old university. Since its founding in 2007, this center provides the university curriculum in preservation and management of Historic and Cultural Heritage. The College has a small university history museum, created from the recovery of assets of the old convent of San Juan de Letrán, headquarters of the foundation of the University of Havana.

On the 15 September 2016, the Department, Direction of University Cultural Heritage of the University of Havana, had a meeting with the Alcalá de Henares University about the university heritage of both institutions. *Today, this direction is working to obtain the registration of University of Havana as World Heritage and join the 5 universities worldwide that hold this condition: Alcalá de Henares, University of Virginia, Autonomous University of Mexico, University of Caracas and the University of Coimbra*¹².

The second official university founded in Cuba was the Eastern University (in Spanish language: Universidad de Oriente) in 1947 in the province of Santiago de Cuba (fig. 3). We emphasize its official character because, before 1947, there were few private universities that have remained outside the law 16, *Law of Official Universities, which formalized the Eastern University (...) and the Marta Abreu University of Santa Clara* (PÉREZ FRANCO 1996). As in the case of the University of Havana, the Eastern University has witnessed the historical facts of Cuba during the American intervention. Its students and teachers participated significantly in the opposition to the dictatorship of Fulgencio Batista, to the point that Batista himself ordered the closure of the university classrooms. In January 1959, with the triumph of the Cuban Revolution by Fidel Castro, the institution opened its doors again to receive students and teachers in higher education. From 1947 until 1958 the Eastern University hosted five faculties: Education, Philosophy and Literature, Law, Commercial Sciences and Industrial Chemical Engineering Industrial¹³. Today, the institution has 11 faculties and 13 study and research centers¹⁴.



Fig. 3

Rector building of Eastern
University (Universidad de Oriente)
(2011)

Photo: Carina Marrero Leivas

9 Cf. <http://portal.fayl.uh.cu/patrimonio> (accessed July 15, 2015).

10 Cf. <http://portal.fayl.uh.cu/patrimonio> (accessed July 15, 2015).

11 Cf. http://www.unesco.org/new/es/media-services/single-view-tv-release/news/se_inaugura_en_la_habana_primer_seminario_de_patrimonio_cultural_universitario/ (accessed June 24, 2015).

12 Cf. <http://www.uh.cu/node/3356> (accessed September 18, 2016).

13 Cf. <http://www.uo.edu.cu/historia/> (accessed June 25, 2015).

14 Cf. http://www.uo.edu.cu/documentos/libro-historia-27_uo.pdf (accessed June 25, 2015).

The Eastern University keeps movable cultural goods in the three museums that were created a few years after its founding. The first museum, founded in 1952, is the Natural History Museum Charles Ramsden, in memory of naturalist Charles T. Ramsden de la Torre, born in Santiago de Cuba. After his death in 1951, his family donated part of his collection to the Eastern University. In this way, the Natural History Museum was created with an exhibition room, a study room and archives, hosting a total of 15,180 specimens of animals and one of the largest collections of butterflies of Cuba, all representing the fruits of the intellect and labor of the naturalist, Ramsden (CARLOS NARANJO & LAURANZÓN MELÉNDEZ 2012). *The museum, which many students and university professors do not know, sees a critical conservation status of its movable cultural goods and building nowadays. The Museum lives now (and for years already) between oblivion and apathy, lacking in space, attending to the gradual deterioration not only of the property that houses it, but also of the values it possesses*¹⁵. The Eastern University has a Museum of Archaeology and a Museum of the History of the University. They are in a difficult situation, which endangers the cultural heritage accumulated over more than half a century. According to Sansó Fernández: (...) *the museums are not properly used. There are several reasons that conspire against this, in particular the lack of staff specifically dedicated to museums (...)* (SANSÓ FERNÁNDEZ, 2003). This publication's date means that the problem of university museums in general and the cultural heritage of the Eastern University is not a recent issue.

In 1952, in the central part of the island of Cuba, Marta Abreu Central University of Las Villas was created (fig. 4). It was the third university established in Cuba, which was formalized with the law 16, *Law of Official Universities*. Currently it has 12 faculties and 33 academic programs that cover the teaching of humanities, natural and technical sciences¹⁶. The university has a little museum dedicated to Ernesto Che Guevara, historical personality of the process of Fidel Castro's revolution and at the same time closely associated with the institution. The room occupied by the museum was Che's command post before the battle of Santa Clara in 1958. The museum was opened in April 9, 2014 with a collection of photographs of the commander and other revolutionaries who participated with him in the liberation of Santa Clara and the triumph of the Cuban Revolution¹⁷. Historic moments from the university are also presented in the exhibition space with original photos of handing the title Honorary Doctor Ernesto Che Guevara by the Faculty of Pedagogy in 1959¹⁸.



Fig. 4

Marta Abreu Central University of
Las Villas (2012)

Photo: José A. Chávez Hernández

The University also has a botanical garden with an area of 10 hectares, to which a scientific, historical and environmental value is assigned. In 2009, the National Heritage Council of Cuba declared the Marta Abreu Central University as a National Monument, classified as an important example of the architecture of the modern movement in Cuba and a significant scientific institution (GARCÍA SANTOS 2009).

15 Cf. <https://magnetismocnea.wordpress.com/2015/05/06/llaman-al-rescate-de-museo-de-historia-natural-durante-primera-jornada-del-foro-de-comunicacion-de-las-ciencias/> (accessed June 25, 2015).

16 Cf. <http://www.uclv.edu.cu/> (accessed June 28, 2015).

17 Cf. <https://cheguiayejemplo.wordpress.com/2014/04/10/dedican-al-che-sala-de-historia-de-la-universidad-central-de-las-villas/> (accessed June 28, 2015).

18 Cf. <https://cheguiayejemplo.wordpress.com/2014/04/10/dedican-al-che-sala-de-historia-de-la-universidad-central-de-las-villas/> (accessed June 28, 2015).

Cuba, and in particular its capital Havana, has other prestigious universities. For example, the National Schools of Arts (ENA) inaugurated in 1962 with the Higher Institute of Art (ISA) established in 1976 (fig. 5). This center, representing work by Italian architects Roberto Gottardi and Vittorio Garati and the French-Cuban Ricardo Porro, was declared as a National Monument of the Republic of Cuba in February 2013, due to its architectural and urban values of the Modern Movement of Cuban Architecture of 1960¹⁹. *The ISA is a real architectural jewel. It contains an appreciable furniture, crockery, recognized and legitimated works of Cuban plastic artists. In addition, its documentary is largely of academic and methodological production of eminent professors* (LIS FALCÓN 2015).



Fig. 5

National Schools of Arts (ENA)

Photo: <http://bechtler.org/Learn/Events/details/modernism-film-22>

Other examples are the university campus José Antonio Echeverría (CUJAE) founded in 1964, with the Higher Polytechnic Institute established in 1976, and the recent University of Computer Sciences (UCI) born in 2002. This new university treasured works by significant national and international artists, such as the sculpture of Brazilian architect Oscar Niemeyer.

The case study: university campus CUJAE (Ciudad Universitaria José Antonio Echeverría). Its movable cultural goods and its current situation

The university campus CUJAE, is located in the municipality of Marianao in western Havana. This institution has its origins in 1900 with the creation of the former School of Engineers, Electricians and Architects of the University of Havana. Years later, this school became the Faculty of Technology in the same University of Havana.

After the Triumph of the Cuban Revolution in 1959, several initiatives have been taken to improve the country's educational sector. The Faculty of Technology, formed in 1961 by the Faculty of Engineering and the Faculty of Architecture of the University of Havana, did not have sufficient space to accommodate the growing population of university students. For this reason, it was necessary to expand and modernize its facilities. That is why, in September 1960, Fidel Castro announced the construction of a new university: the José Antonio Echeverría University Campus, better known as CUJAE. Its inauguration was in 1964 with the first five completed buildings. In 1976 with the creation of the Ministry of Higher Education, the Higher Polytechnic Institute José Antonio Echeverría (ISPJAE) was established in the university campus CUJAE (fig. 6).



Fig. 6

The Higher Polytechnic Institute (ISPJAE) in the José Antonio Echeverría University Campus (CUJAE) (2012)

Photo: Carina Marrero Leivas

19 Cf. http://www.unesco.org/new/es/media-services/single-view/news/conjunto_de_escuelas_de_arte_de_la_habana_monumento_nacional/#.V_Ulo4-LTIU (accessed September 18, 2016).

Nowadays, it is considered as the main center of Technical Sciences of Cuba, and its campus one is of the most significant works of the Modern Architecture Movement in Cuba during the 1960s thanks to its architectural and urban values, together with the National Schools of Arts of Havana.

The ISPJAE has 7 faculties and 9 study and research centers. Each one of these faculties and centers produce movable cultural goods. It means that not only the oldest universities have a rich cultural heritage, but also the newer institutions, because the university continually generates valuable assets. Throughout the 52 years of the CUJAE and the 42 years of ISPJAE, a university cultural heritage of historical, academic, scientific-technical, artistic and documentary value has been produced. In 2006, the Extension Department of the University established an inventory of cultural property, in different parts of the campus, for easy recognition. From this study, 9 goods were declared as cultural assets of the institution and the nation by the National Office of Cultural Assets Records of the Republic of Cuba (PORTERO RICOL & MARRERO LEIVAS 2012). Part of this heritage is exposed in the historic room of the CUJAE, the only institutional museum space. There are goods with a remarkable historical value related to the construction, at the inauguration of the university campus, and in the foundation of ISPJAE. There are also assets acquired by university success, such as awards, certificates, medals, trophies. The small room is located in the senior administration building, but this does not mean that it is in good condition or has been conserved well. It is just the opposite. Today, this exhibition space is closed to the university community and the general public, due to its precarious condition, in particular from inundation by a rainwater filtration system.

On the other hand, the Faculty of Architecture has, in the Dean's office, the *Móviles* sculpture (fig. 4), made by the famous American sculptor, Alexander Calder, and donated by him to the center. This faculty also has original furniture more than 100 years old from when architecture studies began at the University of Havana (fig. 7). These assets, however, do not receive maintenance and conservation and are in poor condition. Some of them are used as ordinary furniture, without recognizing their historic value.



Fig. 7

Movable cultural goods located in the Faculty of Architecture: *Móviles* Sculpture by Alexander Calder, furnitures containing slides vetro from when the architecture studies began at the University of Havana, chair that belonged to architect and writer Joaquin Weis (2012)

Photo: Carina Marrero Leivas

Artworks by renowned Cuban artists such as the *Relámpago* sculpture by José Antonio Díaz Peláez, the mural paintings as *Por un mañana* by Raúl Martínez decorate the university landscape. A large part of these movable cultural assets are totally integrated into the architecture and in general into the landscape of the university's campus.

All movable cultural goods of the institution and the campus should acquire more value by virtue of the fact that they belong to an institution of great prestige at national and international level, and because they are part of the urban-architectural whole of CUJAE, one of the most significant works in architectural conception, planning and campus institution that experienced the Cuban Revolution. That means we must see movable goods with a broader view, considering not only the value, which has itself as object, or piece, or to be a work of a recognized artist, but also for the physical environment, for the landscape and the history, where it belongs and to the accumulation of cultural values during its years of existence.

Unfortunately, the CUJAE's cultural heritage faces several serious problems, for instance the lack of conservation and promotional activities. In 2010 the Group for the Protection and Conservation of CUJAE Cultural Heritage was born, thanks to the concern of its current director, the professor and architect Ada Esther Portero Ricol. This group of three specialists is responsible for promoting, protecting and preserving all material that is easily recognised as part of the cultural heritage of the university. But, like many other higher education institutions, the campus CUJAE and its institute, ISPJAE have unknown movable cultural assets dispersed throughout the campus. There are many yet to be discovered in faculties, departments, offices, laboratories and centers of research within the institution. Taking into account that the university was not really born in 1964 during its inauguration, but several years ago, in the University of Havana, many goods can still stay in the building of the former School of Engineers, Electricians and Architects and Faculty of Technology, becoming the current Faculty of Physics. Therefore, this group has two important tasks to develop: firstly to protect, preserve and promote the identified university cultural heritage and secondly to search and identify the unknown university cultural heritage, for future protection, preservation and promotion.

Since its creation, the group has worked on practical aspects with the community and the production of texts in favor of the protection of university cultural heritage in case of war and/or natural disaster and in the creation and application of diverse activities that involve the whole university community. In 2012, the specialists with the Provincial Direction of Cultural Heritage of Havana, developed the dossier for the declaration of the campus CUJAE as National Monument or Protection Zone (PORTERO RICOL & MARRERO LEIVAS 2012). It is important to emphasize that the National Monuments Commission of Cuba and ICOMOS-Cuba Committee showed, and still show, a great interest in giving a declaration to the campus CUJAE, because they recognize the institution's values very clearly, especially the architectural and social values.

The survey

The work presented in this text has as its starting point the results obtained by the Group for the Protection and Conservation of CUJAE Cultural Heritage, of which the author was a member for two years (2011-2013).

During 2011-2012, a diagnosis and a survey of identified cultural heritage of the campus CUJAE was realized through data sheets. This work indicates problems such as:

- inadequate spaces for keeping assets as the storage room, which has a poor state of conservation, where there are goods officially belonging to the Registry of Cultural Property of the Republic of Cuba;
- departments and offices that keep goods without any conservation and promotion actions for objects; and
- a lack of interest by authorities to conserve and preserve the movable cultural property of the university.

As part of the research conducted before arriving at the proposal, during 2013-2014, a survey was realized with the collaboration of 271 persons of the university community (between authorities, teachers, researchers, students and employers).

This survey detected the following results (fig. 8):

- 60% of respondents do not know what are the movable cultural goods that constitute the University Cultural Heritage of campus CUJAE;
- 68% of respondents do not know of the existence of movable cultural goods officially registered as cultural heritage of the university and of the nation; and
- 71% ignore that these assets are officially registered.

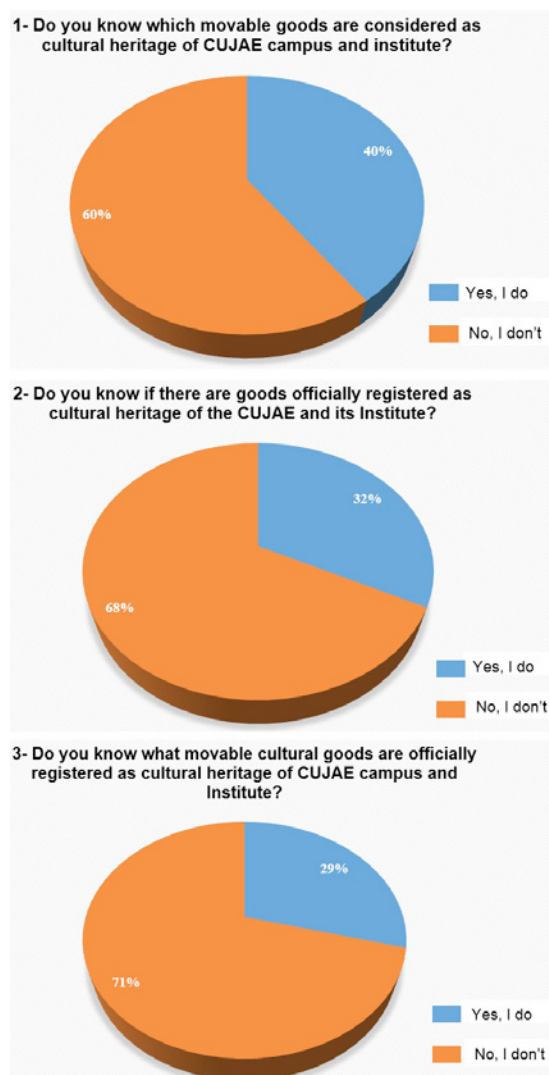


Fig. 8

Questions and answers of the surveys

Scheme by Carina Marrero Leivas

These results demonstrate a higher percentage of ignorance about its cultural heritage due to: lack of promotional activities of the university heritage mainly due to the disinterest of the authorities to preserve and promote the movable cultural goods of the campus. The ignorance of the university community regarding their cultural heritage, influences the conservation of the material goods, because it is almost impossible to preserve heritage if its value is unknown. And this is what happens in the CUJAE campus and in most Cuban universities.

That is why a methodology for the conservation and promotion of movable cultural goods of University Campus CUJAE is proposed²⁰, based on the study of current trends in Cuba with the University of Havana and in Europe with three case studies²¹.

The methodology

Starting from the current situation of university cultural heritage of campus CUJAE, there is an urgent need to act in favor of this heritage that has been overlooked for many years.

Considering the trends in conservation and promotion in European and Cuban universities, as well as the current situation with regard to the University Campus at CUJAE, the strategy lines were established. These lines are the starting point for the development of the methodology and are part of an emerging actualisation. As a first line strategy, this research proposal that the Group for the Protection and Conservation of CUJAE Cultural Heritage (GPCC) is the responsible group for applying the methodology, as well as directing all actions that are derived from it. Currently, the group is composed by three architects (two teachers and a technician). Teachers work for the Teaching Department of University Extension and the Faculty of Architecture. Therefore, they do not have enough time for the work that is required for this group. So it is necessary in the first place, a reinforcement of dedicated full time staff that are specialists and researchers without teaching responsibilities. Also, it is essential to guarantee a fixed staff location in the historic room or in a future museum where they can receive the daily visits of students, professors, researchers and all those who are interested to know more about ISPJAE and its university campus.

In the same group of already strengthened staff, we propose the creation of a commission that can make important decisions on the evaluation, cataloging, inventorying and registration of artefacts with the advice of experts and institutions of high national level (National Heritage Council, Provincial Chair of Cultural Heritage and Committee of ICOM Cuba). The involvement of the university community in all actions of the methodology, that is, all integral to the university case study: the authorities, professors, researchers, students and administrative staff and service are very important. Also, more the general public involvement in some actions that will be appropriate to strengthen the link between the university and the community, or the city, the country and abroad is another strategy under consideration. It's fundamental to make people aware of the importance of university cultural heritage, where the conservation and development can contribute to sustainable development. We must start educating the highest level of ISPJAE so that the authorities, professors and researchers have an influence on students. In this case, it is essential to show institute authorities that the conservation and promotion of university cultural goods is a necessity for the future of the institution.

Another strategy is the creation of a management system to raise funds, taking advantage of resources and potentialities of the university, for example: the realization of projects and international conventions, the dissemination of Technical Sciences of Cuba since ISPJAE (the Rector Center of Technical Sciences of the country); and the utilization and rental of recreational areas, for example, theater and sports arenas. For this strategy, it is important to generate and promote scientific tourism. Also, it is important to make ISPJAE and its campus an attractive place for Cuban and foreign visitors who want to know about the history of over a century of education in Engineering and Architecture in Cuba, the main results, current and future projects, and also about the rich history of 50 years of the university campus CUJAE.

²⁰ This methodology was based on the study of the current trends in some European and Cuban universities. For the development of this research, we analyzed the different definitions and classifications of university cultural heritage, we identified actions and examined current trends in conservation and promotion of university cultural heritage in Europe, based on three universities; we established the variables of study and compare the three cases of European universities studied; we analyzed the current state of the university cultural heritage in Cuba and characterized and diagnosed the current situation of movable cultural heritage in our case study - the university campus CUJAE.

²¹ To learn about the actions for the conservation and promotion of university cultural heritage in Europe, the various experiments conducted by three universities were also studied: the University of Padua, the Complutense University of Madrid and the Higher Technical Institute of Lisbon. To study the actions made in these three European universities, a study was realized of two museums of the University of Padua and two museums of the Complutense University of Madrid, given the large amount of university museums they have. In the case of the Higher Technical Institute of Lisbon, the three museums that include the University Cultural Heritage Institute were considered. Following completion of the interviews, visits to university museums and bibliographic consultations, a comparison between the three European case studies selected according to the study variables was made. With the results of comparison, the strengths and weaknesses on the conservation and promotion of movable cultural goods belonging to the European universities studied were established. The results were used to develop the proposed methodology for the campus CUJAE, in Havana, Cuba.

Based on the proposed strategy, the phases of the methodology are presented below:

- Search for movable cultural goods, research into movable cultural goods hidden in all areas of ISPJAE and its campus. It is very important to consider that the origin of the institution is in the University of Havana. Therefore, this first phase included research in the old School of Engineers, Electricians and Architects and the Faculty of Technology. It is important to research information from a multidisciplinary perspective in all areas of the campus, including faculty, departments, offices, classrooms, workshops, laboratories, deposits, archives;
- Information collection and evaluation (involves the realization of an information collection and extensive research on the properties found, using bibliographic and oral sources. After the group of experts committee will evaluate the goods and select those that can be considered movable cultural goods of ISPJAE);
- Cataloguing, inventorying and registration (is to catalog and inventory all assets evaluated and considered movable cultural goods of ISPJAE. The cataloging and inventory will be realized from the official document by the National Council of Cultural Heritage of the Cuban Ministry of Culture. Later, the assets must be registered in an internal university control register book);
- Enhancing knowledge and training of staff of the university community of ISPJAE, which is unaware of its cultural heritage. Also, the development of knowledge of those who are not far from this area. This phase is one of the largest of the methodology and a more challenging because the main goal is to educate a particular community of engineers, relative cultural heritage;
- Conservation and promotion projects and their implementation for the recovery and conservation of all cultural assets and to the landscape (all architectural and urban university). For some actions of this phase we propose:
 - . The creation of a virtual exhibition or website for the dissemination of movable cultural goods of the institute and university, in a step to medium term actualisation;
 - . The creation of a university museum with new collections of movable goods. The museum will be dedicated to teaching and research in Engineering and Architecture in Havana (since the early 1900s have started when the Architecture studies, up to the present). This phase will be over a long term;
 - . Ensure cultural promotion everything about the university cultural heritage of ISPJAE and the campus CUJAE.

This methodology is applicable not only to the case study presented here, but is also applicable to other higher education institutions and other universities.

Discussion

There are several problems that affect the university cultural heritage of Cuba. The main one is the economic aspect, considering that Cuba still suffers the consequences of an economic and financial embargo imposed by the United States since 1960. The effects of this embargo reach universities with the lack of basic resources for development of the daily activities of their community. This situation means that most universities do not receive a budget for the preservation and promotion of their cultural heritage, so the authorities do not see the importance that it has for the development of the institution. Therefore, many of the university heritage assets are in a state of neglect, mostly unknown to the university community. Despite these problems, about 6 years ago some universities in the capital have taken initiatives in favor of their cultural heritage, including the University of Havana and the campus CUJAE.

Although Cuba is a very different country in comparison with countries such as Italy, Portugal and Spain, studies in Europe, taking as cases of museum studies at the University of Padova, the Complutense University of Madrid and the Technical Lisbon Superior Institute²², tested positive and negative aspects regarding the preservation and promotion of its cultural heritage like some Cuban universities, for example by creating a group or department in charge of preserving and enhancing the university's cultural heritage. A common problem that directly affects this type of heritage is that its conservation and promotion depend exclusively on a small group of people and not on the entire university community. Authorities are generally disconnected from what happens with university heritage and processes that influence their safeguarding are too slow either due to lack of economic and financial resources usually because it is not a topic of interest for directors of universities.

With the application of the methodology proposed in this paper we anticipate a university community identified with its cultural heritage, making ISPJAE and CUJAE a point of interest and attraction also for the general public, the declaration of the CUJAE as National Monument of the Republic of Cuba, the creation of a university museum ISPJAE with the recovery and safeguarding of movable cultural property, which tell the history of teaching and research in technical sciences in Havana. Because to successfully conserve and adequately promote a university's cultural heritage, it is necessary to see it not as a thing of the past, but as an engine of development for the present and the future.

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Literature cited

- COLECTIVO DE AUTORES, Protección del Patrimonio Cultural. Compilación de textos legislativos. Decreto 118, artículo 1.
- FELIPE TORRES, C. 2014. Al abrigo del Alma Mater: obras de arte en la Universidad de La Habana. In: El patrimonio cultural de la Universidad de La Habana, ed. C. FELIPE TORRES & J. A. BAUJIN (La Habana: Editorial UH).
- FELIPE TORRES, C. Patrimonio Cultural Universitario, Facultad de Artes y Letras, Universidad de La Habana. <http://portal.fayl.uh.cu/patrimonio> (accessed July 15, 2015).
- GARCÍA SANTOS, N. 2009. Declaran Monumento Nacional a la Universidad Central de Las Villas, Juventud Rebelde, Diario de la Juventud Cubana, Edición digital. <http://www.juventudrebelde.cu/cuba/2009-11-16/declaran-monumento-nacional-a-la-universidad-central-de-las-villas/>
- LIS FALCÓN, N. 2015. Memoria atesorada: Patrimonio Cultural Universitario. Revista Alma Mater. Universidad de La Habana. <http://www.almamater.cu/revista/memoria-atesorada-patrimonio-cultural-universitario> (accessed Septiembre, 2016).
- MONTERO CABRERA, L. A. & R. ALONSO BOSCH. 2014. El patrimonio de la Universidad de La Habana en las ciencias naturales y exactas. In: El patrimonio cultural de la Universidad de La Habana, ed. C. FELIPE TORRES & J. A. BAUJIN (La Habana: Editorial UH).
- NARANJO LÓPEZ, C. & B. LAURANZÓN MELÉNDEZ & P. APORELA GILLING. 2012. Mariposas diurnas (insecta: lepidoptera) en la Colección Charles T. Ramsden de la Universidad de Oriente en Santiago de Cuba, Ciencia en su PC, N. 1. <http://www.redalyc.org/articulo.oa?id=181324066009> (accessed June 25, 2015).
- NÚÑES JOVER, J. & J. A. BAUJIN. 2014. La Universidad de La Habana como institución de conocimiento. In: El patrimonio cultural de la Universidad de La Habana, ed. C. FELIPE TORRES & J. A. BAUJIN (La Habana: Editorial UH).
- PÉREZ FRANCO, D. 1996. Los estudios de ingeniería y arquitectura en La Habana La Habana: Ediciones ISPJAE.

²² To learn more about the topic: "Le patrimoine culturel universitaire: une méthodologie pour la conservation et la valorisation des biens culturels mobiliers. Le cas de l'Institut Supérieur Polytechnique José Antonio Echeverría à la CUJAE – La Havane", by Carina Marrero Leivas, master's thesis of Erasmus Mundus program (TPTI Master – Techniques, Patrimoine, Territoires de l'Industrie), University of Padua, 2015. <http://dspace.uevora.pt/rdpc/handle/10174/18723>

- PORTERO RICOL A. E. & C. MARRERO LEIVAS. 2012. Expediente. Propuesta Monumento Nacional-Zona de Protección. La Habana.
- TORRES-CUEVAS, E. 2014. Itinerario de un alma mater. In: El patrimonio cultural de la Universidad de La Habana, ed. C. FELIPE TORRES & J. A. BAUJIN (La Habana: Editorial UH).
- SANSÓ FERNAÁNDEZ. 2003. Historia de la Universidad de Oriente: pasado, presente y futuro, s.l, s.d.
- Bienes culturales en Cuba - Registro Nacional de Bienes Culturales. http://registronacional.com/cuba/cuba_bienes_culturales.htm (accessed June 3, 2015).
- Comisión Nacional de Monumentos", en Portal del Consejo Nacional de Patrimonio Cultural. <http://www.cnpc.cult.cu/comision-nacional-monumento> (accessed May 4, 2015).
- Conjunto de Escuelas de Arte de La Habana: Monumento Nacional. Servicio de prensa. UNESCO, 2013. http://www.unesco.org/new/es/media-services/single-view/news/conjunto_de_escuelas_de_arte_de_la_habana_monumento_nacional/#.V__XUI-LTIV (accessed September 18, 2016).
- Dedican al Che sala de Historia de la Universidad Central de Las Villas. <https://cheguiayejemplo.wordpress.com/2014/04/10/dedican-al-che-sala-de-historia-de-la-universidad-central-de-las-villas/> (accessed June 28, 2015).
- Facultades, Universidad de Oriente. <http://www.uo.edu.cu/historia/> (accessed June 25, 2015).
- Ley No. 1 Ley de Protección del Patrimonio Cultural, Edición ordinaria, Número 29, La Habana, 1977. <http://www.icom.ohc.cu/wp-content/uploads/2010/09/ley-1.pdf> (accessed May 4, 2015).
- Llaman al rescate de Museo de Historia Natural, durante primera jornada del Foro de Comunicación de las Ciencias, Magnetismo Aplicado. <https://magnetismocnea.wordpress.com/2015/05/06/llaman-al-rescate-de-museo-de-historia-natural-durante-primera-jornada-del-foro-de-comunicacion-de-las-ciencias/> (accessed June 25, 2015).
- Museo Montané, en Facultad de Biología (accessed June 23, 2015) <http://fbio.uh.cu/mmонтane.php>
- Portal del Consejo Nacional de Patrimonio Cultural: ¿Quiénes somos? <http://www.cnpc.cult.cu/quienes-somos> (accessed May 5, 2015).
- Se inaugura en La Habana Primer Seminario de Patrimonio Cultural Universitario, UNESCO, Servicio de Prensa. http://www.unesco.org/new/es/media-services/single-view-tv-release/news/se_inaugura_en_la_habana_primer_seminario_de_patrimonio_cultural_universitario/ (accessed June 24, 2015).
- Universidad Central "Marta Abreu" de Las Villas, en Universidad Central de Las Villas. <http://www.uclv.edu.cu/> (accessed June 28, 2015).
- Universidad de La Habana, en Patrimonio Cultural Consejo Nacional de Cuba. <http://www.cnpc.cult.cu/patrimonio/162> (accessed June 23, 2015).
- Universidad de Oriente: Hitos de sus 60 años de historia, Departamento de Historia de la Universidad de Oriente. http://www.uo.edu.cu/documentos/libro-historia-27_uo.pdf (accessed June 25, 2015).

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Keywords

Cuba - Academic Heritage - Higher Education - Research and Strategies

University collections: An important part of the German cultural landscape

Cornelia Weber & Martin Stricker

Abstract

University collections are an important part of national cultural landscapes and form a cultural landscape in themselves. Thanks to a centralized web portal, it is possible to view the landscape of German university collections around the world. The Coordination Centre for University Collections in Germany recently used data from the portal to develop key indicators on the infrastructural situation of university collections. These key indicators can help investigate, characterize and define strategic perspectives, stimulate collaboration and encourage the creation of strategic alliances.

This paper describes the potential offered by the generation and evaluation of key indicators for university collections, which are seen collectively as a national landscape.

Introduction

The conference theme 'Museums and Cultural Landscapes'¹ addresses the relationship between museums and cultural landscapes. "Cultural landscapes are landscapes that have been affected, influenced, or shaped by human involvement."²

Following this definition, in a first analysis it can be argued that some university collections, such as botanic gardens, geological parks or sculpture parks, are cultural landscapes because they are intentionally created and designed by humans. A university campus, with buildings for museums and collections, can also be seen as a cultural landscape. In this paper, we would like to go further and identify university museums and collections as important cultural landscapes both in themselves and as an integral part of national cultural landscapes. Although distant from more literal definitions, here we will understand the term 'cultural landscape' in a broader metaphoric sense, one that includes cultural activities of individuals and communities in a particular geographical area. We will apply this broader sense to university collections in Germany, but a similar exercise can be done at local, regional or national level anywhere in the world.

In Germany, as in other countries, university collections were created and evolved as mirrors of the state of knowledge at a given time, in multiple aspects and dimensions. When we project university collections onto a map of Germany, we obtain a photography of the present landscape. However, if we consider that each university collection has its own singular development through time, reflecting local and global social and political dimensions, the map becomes an even more interesting and complex cultural landscape, encapsulating knowledge, culture and society, in time as well as in space.

In order to continue to strengthen the contemporary role of university collections, this landscape needs to be thoroughly studied and documented in its multiple dimensions and relations. The more information we compile about it, the stronger the identity of university collections as shared national heritage. Moreover, the more we know about this landscape, the more we will be able to explore, define and specify strategic perspectives, stimulate collaboration and encourage the creation of strategic alliances.



Fig. 1
Geographical overview of
universities with collections

¹ General ICOM/UMAC Conference, July 2016 in Milan, Italy

² About Cultural Landscapes. <http://tclf.org/places/about-cultural-landscapes> (accessed September, 2016).

The landscape of German university collections

The simplest way to capture or visualize the shape of a cultural landscape is to use available data to produce a map. Today, thanks to a central web portal run by the Coordination Centre for Scientific University Collections in Germany, the collective landscape of German university collections is visible around the world.

The Centre's objective is to further develop and integrate Germany's³ university collections as decentralised research, teaching and education infrastructures, with due regard for their diversity and specific local characteristics on an interdisciplinary, cross-site basis⁴.

The national web portal⁵ for university collections presents a range of information about collections as scientific and academic infrastructures, with information about the collections themselves, the persons and organisations involved in them, and their research, documentation and exhibition activities.

The underlying idea behind the national web portal was the digital presentation and accessibility of academic collections as essential infrastructure for current research, teaching and public education. The portal's visibility has already resulted in important partnerships between large research museums and small academic collections.

In July 2016, 989 collections in 82 universities have been catalogued and made available in the portal. In order to develop the topography of this landscape, it is necessary to connect the collections descriptions with various geographic data – geolocation and political geography like cities, states, and so forth.

In the Federal Republic of Germany, universities – thus, university collections – are the responsibility of the states. This map of Germany includes its sixteen states and depicts 82 circles of different sizes⁶, each representing one university with collections. A small circle represents a university with less than 10 collections, a medium circle a university with 10-20 collections, and a large circle represents a university with more than 20 collections. When users click on a circle, more information about the university and its collections is provided.

Key indicators

The characterization of the cultural landscape of university collections in Germany, as well as its infrastructural situation, requires the development and use of key indicators. Key indicators are a set of quantifiable measures enabling the analysis of available data and facilitating a diagnosis of the current infrastructure situation of collections.

University collections are extremely dynamic. The regular compilation of key indicators can assist in identifying relevant developments and changes in a given collection over a specific period, as well as comparing certain results – such as the institutional settings and framework conditions – across universities. Key indicators also allow the possibility to make solid statements about the relevance and the potential of collections and their usability and use. Thus, they can help key actors to develop strategies to strengthen the cultural and scientific role of the collections, win strategic partners for the future and inspire future policies for collections.

³ See <http://wissenschaftliche-sammlungen.de> (accessed September 2016).

⁴ Cornelia Weber, Sarah Link, Martin Stricker, Oliver Zauzig: Repositioning University Collections as Scientific Infrastructures. A New Approach in Germany. In: Enhancing University Heritage-Based Research, ed. by Gudrun Wolfschmidt, Hamburg 2016, pp. 31-43 (Nuncius Hamburgensis - Beiträge zur Geschichte der Naturwissenschaften 33).

⁵ <http://portal.wissenschaftliche-sammlungen.de> (accessed September 2016).

⁶ There are in total 107 universities in Germany (2015/16).



Fig. 2
University collections with
centralized coordination

The infrastructure situation of university collections in Germany

Today, 24 German universities coordinate centrally their collections, which account for about 72% of all collections in Germany. 'Centrally coordinate' means that the collections are coordinated by some working group or committee which meets regularly or by a collections officer, responsible for a university-wide policy, strategies and activities. Four additional universities are currently discussing hiring a collections officer. In 2012, when the Coordination Centre initiated its activities, only a few universities centrally coordinated their collections.

Given that work with collections should be based on clear and reliable policies, it is important for universities to develop university-wide policies for their collections. Unfortunately, to date, only four universities in Germany have completed and made available their policies; some are currently in the process of doing so. 27 universities present their collections, museums and heritage in an autonomous website. 62.5% of university collections are active. This means, for example, the collection is maintained and/or accessible and/or usable and/or involved in activities. 6.9% are not active and 30.6% did not provide any information in response to our inquiries.

Sammlungsarten

Die Kategorie Sammlungsart, die den Bestand und den inhaltlichen Schwerpunkt einer Sammlung charakterisiert, ist aus dem Museumsbereich übernommen. Sie wurde jedoch – in Anlehnung an die UNESCO-Klassifikation – für den Bereich der akademischen Sammlungen entsprechend modifiziert.

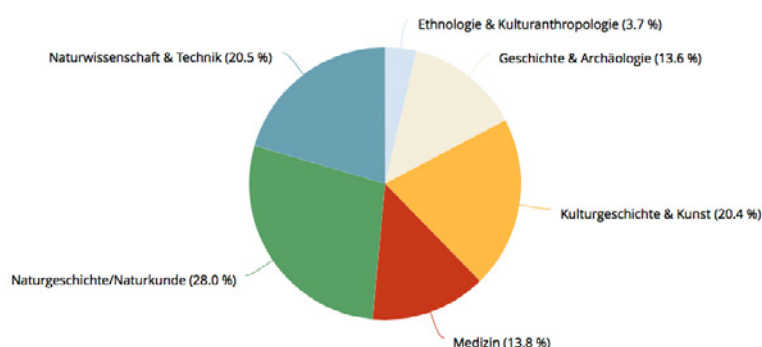


Fig. 3
Subject areas

University collections have been categorized by general subject area. The distribution of collections by subject area is as follows:

- o Natural History 28.0%
- o Cultural History & Art 20.4%
- o Natural Sciences & Technology 20.5%
- o Medicine 13.8%
- o History and Archaeology 13.6%
- o Ethnology & Cultural Anthropology 3.7%

In addition to the general situation in Germany, we also show the same key indicators for each of the sixteen German states. That is significant because in Germany higher education funding is provided by the states.

Universitäten nach Bundesländern

Die Tabelle zeigt eine Übersicht anhand der Bundesländer mit kumulierten Daten zu Anzahl von Universitäten und Sammlungen, Anteil aktiver Sammlungen, Sammlungskoordinationen, Sammlungsordnungen und Webportalen.
Durch Mausklick auf eine Tabellenzeile (bzw. durch Klick auf "Alle ausklappen") können die Überblicksdaten einzelner Universitäten aufgerufen werden.

Durch Klick auf eine Universität kann deren ausführliches Datenblatt aufgerufen werden.

[Alle ausklappen](#)

| Bundesland | Universitäten | Sammlungen | aktive Sammlungen | Sammlungs-koordination | Sammlungs-ordnung | Webportal |
|---|---------------|------------|-------------------|------------------------|-------------------|-----------|
| Baden-Württemberg | 10 | 141 | | | | |
| Bayern | 11 | 110 | | | | |
| Akademie der Bildenden Künste München | | 1 | | — | — | — |
| Friedrich-Alexander-Universität Erlangen-Nürnberg | | 30 | | | — | |
| Julius-Maximilians-Universität Würzburg | | 25 | | — | — | — |
| Katholische Universität Eichstätt-Ingolstadt | | 2 | | — | — | — |
| Ludwig-Maximilians-Universität München | | 27 | | | — | |
| Technische Universität München | | 7 | | — | — | — |
| Universität Augsburg | | 2 | | — | — | — |

Fig. 4
Universities (with collections) by
states

Clicking on a particular state – for example Bavaria – provides information about each university's collections. In Bavaria, there are 11 universities with a total of 100 collections; of these, 30 belong to the University of Erlangen-Nuremberg.

A further click on Erlangen-Nuremberg provides detailed information about the university's collections such as:

- Address
- Number of collections
- Number of active collections
- Contact of the coordinating officer or contact person
- Information about the existence of a university-wide collections governance policy
- Information about the collective presentation of the university's collections on the web
- Number of collections by discipline

This university page is complemented by a list of all collections, including the state of activity of the collection (active, not active, n/a), the availability of a contact person, and comprehensive publications (if available). Key indicators for a university are linked to further information in the portal with additional detailed information on the collections (e.g. subjects, type of objects, databases).

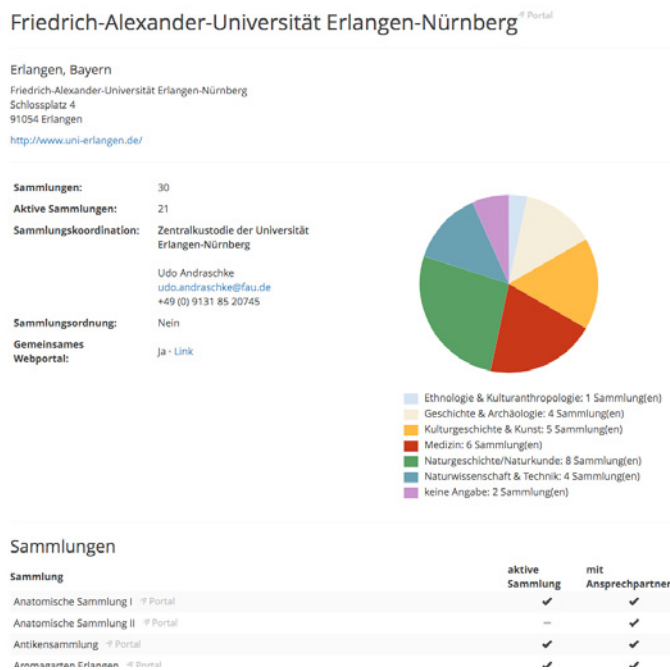


Fig. 5

Collections at Friedrich-Alexander
University of Erlangen-Nuremberg

Further analysis

University collections should be both digitally visible and digitally usable. The Centre has therefore developed key indicators on digital collections⁷. We have analyzed the general degree of digitization and the degree of digitization per collection type and discipline. Furthermore, we analyzed the type of digital reproduction (e.g. image, audio, video, 3D, animation, text) and their quality for scientific use. Using this information, it is possible to develop – in cooperation with the community – strategies and special programs for the digitization of university collections.

As a next step, the Coordination Centre will collect data on teaching activities. We would like to know more about the role of collections in academic teaching and learning. For example, are collections being used permanently for teaching activities? In which academic disciplines is teaching with collections part of the curriculum?

Concluding remarks

In Germany, it has proven effective to treat university collections as a collective landscape with a decentralized infrastructure for research, teaching and education. The more we know about this landscape, the more we will be able to investigate, identify and define strategic perspectives, stimulate collaboration, and encourage the creation of strategic alliances.

For this reason, we study and document the collections, and analyze the available data with the help of key indicators. With these results, we can develop specific strategies and in this way ensure the long-term existence and use of our collections.

To increase the visibility and use of university collections for research, teaching and education, it is necessary to collect and present relevant data. This is especially important for the numerous, yet often hidden, departmental collections. For example, the visibility of these university collections can lead to important partnerships between large research museums and small academic collections. We thus encourage universities and countries all over the world to conduct systematic surveys, to analyze the available data and to develop basic policies.

⁷ See <https://portal.wissenschaftliche-sammlungen.de/kennzahlen/digitale-sammlungen> (accessed September 2016).

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Scientific infrastructure - Key indicators - Strategies

University Museums Reflecting the Large Picture: A Case Study of the Museum of East China Normal University

Ying Hu

Abstract

University museums are cultural landscapes of the university themselves, they should extend beyond their walls throughout the campus to reflect the characteristics of the parent university and that of the community. However, a dilemma is that university museums are usually restricted by budget and space. This paper presents several cases outlining how East China Normal University (ECNU) museums solve this problem by making the best use of available resources by: considering the whole university campus as a playground of the museum; and considering each individual on campus as a “walking museum advocate”.

Introduction

The history of university museums in China can be dated back to the early twentieth century; however, they did not receive much attention until the beginning of the twenty-first century. The first few examples of university museums in China were established by domestic scholars who travelled abroad and Western scholars who came to China in the early twentieth century, when the concept of “museum” was introduced (WANG 2011). After decades of war and domestic turmoil, the museum industry started booming in China in the late twentieth century. The pace of museum infrastructure development was accelerated when it was no longer reliant on sporadic personal effort, but gained from significant government investment.

Among the museum types, university museums were the last to attract attention. In 2011, the State Administration of Cultural Heritage and the Ministry of Education issued the Announcement about ‘Strengthening the Construction and Development of University Museums’, which was seen as the national policy guidance for university museums (The State Administration of Cultural Heritage of People’s Republic of China, and The Ministry of Education of People’s Republic of China 2011). In the following year, the National Educational Alliance of University and College Museums was established, with more than 70 members¹. Other regional alliances of university museums were established soon afterwards. The founding of these alliances marks the shifting of interest from infrastructure to content development and from display to interpretation and participation.

Most university museums in China depend largely on the funding from the university. Even though university museums are usually gifted with precious historical collections, they still feel they compete as ‘neglected stepchildren’ with other campus departments for operational support and the attention of the administration (ALVORD 2012). However, since most university authorities are unlikely to ever put a museum as the priority, most university museums in China still need to struggle for survival. Hence, it is essential for Chinese university museums to align themselves with the aspirations of the university, to avoid being isolated, and they must reflect on the larger picture of their organizational environment.

At the same time, the practice of collecting and curating exhibitions is changing. Fiona Cameron has raised the concept of the ‘liquid museum’, in which museums are reformed as a series of practices as liquid, mobile, and relational (CAMERON 2015).

With this theoretical context, this paper explores new practices that a university museum system has adapted for flourishing with limited resources while fulfilling and reflecting the needs of a large community.

Governance System

East China Normal University was founded in Shanghai in 1951. It is a comprehensive research university, embracing an international diversity of students. One university feature is its training programs to develop teachers for all levels of schooling. The Museum of East China Normal University (ECNUM) is composed of five parts: the Numismatic and Antique Museum, the Biology Museum, the ‘Sea Wind’ Folklore Art Museum, the Mineralogical and Geological Museum, and the Museum of the Educational Image. All of these branch museums are developed out of the collection storages in different departments. The collections were only used for instruction and research within their respective departments until being drawn into the umbrella structure of ECNU museums.

The Numismatic and Antique Museum, under the History Department, collects ancient Chinese artifacts, including bronzes, jades, ceramic and porcelains, etc. It has a unique collection of numismatics, covering three thousand years of Chinese history. The Biology Museum located in the School of Biology Science holds a wide collection of plant and zoology specimens, the most precious of which are panda and golden monkey specimens. The Mineralogical and Geological Museum has a rich collection of scientific specimens. The “Sea Wind” Folklore Art Museum sitting under the School of Social Development has a featured collection of peasant paintings and also boasts a collection of paper-cuttings by local artists. The Museum of the Educational Image, still under construction and based on the collection in the School of Educational Science, will be the first of its kind, collecting and interpreting an audio and video record of the twentieth century educational history in China.

¹ The National Educational Alliance of University and College Museums, <http://museums.sjtu.edu.cn/Web/BWGLM/226001.htm>, accessed September 6, 2016.



Fig. 1

**The Numismatic and Antique
Museum**

Image courtesy of the Museum of
East China Normal University

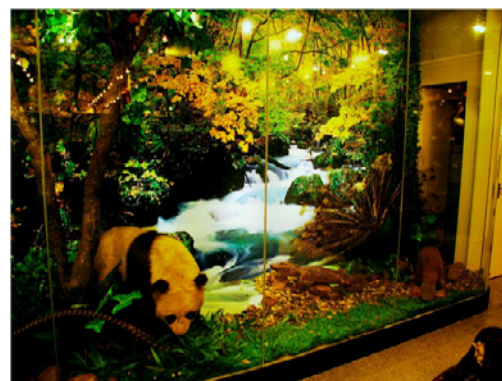


Fig. 2

The Biology Museum

Image courtesy of the Museum of
East China Normal University

Resource problems exist in many university museums; the ECNU museums have restricted space, low budget and small staff numbers. At one stage a plan was discussed to develop a brand new museum building, putting all these ECNU museums together to increase the combined influence of the university museums. If this were to be accomplished, more staff would be hired and all the collections would be given more space. However, this plan is currently suspended. The university authority is not putting the centralized museum as a priority, and they are concerned that this plan would involve a continually expanding investment of money.

Therefore, a compromise governance system has been created. Though museums are still separately located, a central museum management office is established to unite the collections and help them realize and develop their museum functions. It is the administratively converged model of Simpson (2012). The office makes strategic plans and sets annual goals, does fundraising, seeks support inside and outside of the university, and coordinates inter-collection projects. Also, with the employment of museum management specialists, the office gives professional advice for the running of the museums. The office reports directly to the Assistant President of the university, so it operates as a bridge between the museum and the university authority.

While reporting to the Assistant President of the university, the office also reports routinely to the heads of five offices (the Public Relations Office, Office of Planning and Policy, Office of Construction, the Archive, and the Office of Liaison) to seek their advice and support for the management of the museums on campus. Even though these offices and the museum do not have administratively subordinate relationship, the museum is glad to invite them to be involved in the development. In return, they help the museum overcome administration difficulties and help pull the threads together when it comes to money and space issues.

The office has established an advisory council to help run the museum. The council includes professors from each department where collections were stored, heads of several supporting offices in the university, and museum experts from outside of the university. These people are invited not only to advocate for the museum, but also help with projects and practical work. The professors represent their expertise in the study of the collection. Museum experts invited include a Vice Director from the Shanghai Museum, a government official in charge of the museums in Shanghai, and a peer museum professional from another higher education institution. By setting up the advisory council, more minds are focused on support for the museum, possible funding resources outside of the campus can be leveraged, and more attention, inside and outside the campus, is focused on the museum itself. Different committees are created based on projects or temporary needs. For example, when one of the museums is undergoing a thorough examination of the collection, a temporary committee is created, inviting professors in related disciplines but who do not work for the museum to join the project.

The council and committees bring funding to the museum, and ensure space is available when a temporary exhibition is needed. More importantly, this system helps the museum to think more about how to align its development with the development of the parent university, through which the museum would gain more support and attention from the university authority.

It is important to note that the advisory council system is a trial for establishing a sound museum management system in China. In 2015, the Chinese government issued 'Regulations on Museums', which is seen as the first national law about the management of museums (People's Republic of China, 2015). In the 2015 Regulation, it promotes the establishment of the board system in museums. The concept is borrowed from the United States and it aims at encouraging the public to participate in and supervise museum operations. ECNUM is among the first Chinese university museums to invite people outside of the institution to get involved in decision making and daily operation.

'Consumers' as well as 'Producers'

Public engagement in exhibition is not a new practice. (AHMAD et al. 2015) However, engaging the public in the whole process of museum work, from collecting to promoting, is not a widely accepted practice. It is more common in community museums, and university museums can be seen as belonging in this category to some extent. The merits of involving the university community members are more than inviting the involvement of more brains and hands, but are also an act of promoting the museum concept itself by asking people to 'participate'. People gain a sense of ownership in this process. 'People' are the biggest and most significant resources available to university museums, if we do not shelter ourselves away from the rest of the campus. Other than the limited number of people invited for decisions and policies, the whole body of the 'target market' (KOTLER & KOTLER 1998) of the museum is an untapped resource. Students, professors, faculties, and alumni, are not just consumers for the museum, they can also be the producers creating the museum 'landscape' of the campus, provided the museum openly invites participation. Apart from trying to unite a few people with various projects, every individual on campus can be 'a walking museum advocate'. That is, everyone can create the 'collection', contribute to the exhibition, interpret the museum, and finally, promote the museum in an unconscious way.

Museum landscape

The term 'landscape' can be traced as it entered museum discourse to describe a new technique of museum display based upon the principles of the picturesque in eighteenth-century landscape painting (RICH 2016). University museums are landscapes of their parent university, boasting the heritage of their featured collections and sometimes historic architecture. However, landscape is not necessarily just a physical witness; it is more than the material evidence, and includes the images and symbols with which we inherit and characterize it. In a university, landscape marks the identity of the institution. Thus, a university museum can express an identity that extends beyond the nature of its collections and can be a mirror reflecting the context that surrounds those collections.

Landscapes beyond the architecture

On the ECNU campus, there are blue flags with words of professors and students on each lamp installed on the main avenue. These flags talk about the spirit and culture of the university. When one walks along the campus and notices these flags one after another, it is like walking along with the professors and students; they talk with the visitor about their understanding and stories about the university. This adds to the impression the university makes on a visitor. Subtle things like these flags represent an important part of the landscape of the university. And this is what can be done by the museum to reflect the larger context of the university with little cost. Thus, by collecting, preserving, interpreting and presenting the landscapes on campus, university museums imbue themselves with the values of the parent institutions. The following are several examples that ECNU has done to enact the above philosophy.

To celebrate the theme of the 2016 International Museum Day 'Museum and Cultural Landscape', the Biology Museum of ECNU held an exhibition called 'Birds on Campus: Natural Landscape and Cultural Landscape'. The museum launched a contest calling for photographs and drawings of birds on campus. Teachers and students responded actively and many excellent works were gathered. Then an exhibition with selected photographs and drawings was held. It is worth noting that the organization of the contest and the small exhibition were all done by students themselves. The museum cooperated with a student society, the 'Life and Nature Society', and guided the students in developing the small exhibition. Also, a workshop about 'paper-cutting of birds' was also set up with the exhibition. A local paper-cutting master was invited to teach students Shanghai-Style Paper-Cutting, the workshop was not only an echo of the exhibition, but also intended to promote the inheritance of intangible cultural heritage.

Following the idea of 'the whole university as the playground of the museum', the second phase of the exhibition goes to teaching buildings, libraries, and the school cafe. The selected photographs and paintings were framed and hung in the teaching buildings; a short film about the history and stories of the collection in the biology museum was broadcast in the school cafe; and a book corner with the theme 'life and nature' was set in the library lobby for everybody to take a book about the theme and read. Furthermore, related derivative products were designed by students such as post-cards, pins and bookmark. In this way, the museum and its work is promoted, and carried to every corner of the university by everyone.

Museums beyond the walls

Another example is from ECNU's Sea Wind Folklore Art Museum. To align with the theme of International Museum Day, the Sea-wind Folklore Art Museum organized a series of activities about 'Landscapes on Paper-Cutting'. A large piece of paper-cut template including various scenic spots and historical buildings on campus was designed by the artist. Then another workshop was set, inviting students and teachers each to cut a small part of the large piece. All these small pieces created by students and teachers were joined together to present the large artwork about the natural landscape of the campus. Below the paper-cutting, all the contributing teachers and students signed to mark the moment the paper-cut was created. The artwork was included in the museum's permanent collection. The co-contributed paper-cutting is not only seen as an artwork, it is an artwork of landscape created by people in the landscape at a specific time. Here lies the collecting principle of our academic museum. We do not only collect history, but also preserve the present and save for the future. The current time would be a past, and it will one day be treated as a historical moment.



Fig. 3

Paper-cutting Workshop

Image courtesy of the Museum of
East China Normal University

The next plan of the Folklore Art Museum is to use paper-cutting, a kind of intangible cultural heritage form, to enforce the cultural landscape on campus. Another program called 'Masters' Image and Oral History', will record one-hundred famous professors and important alumni talking of their experiences in the university and the paper-cut master will cut their images. The paper-cut images and their recorded audio are then made into an exhibition. When people come to the exhibition, they will see the paper-cut images of their professors and their schoolmates. By scanning the QR code, the audience can see on their own smart devices a short video in which these people are talking about the history and stories of the university. The purpose of this exhibition is to revive the spirit of the university by presenting the 'living' landscape on campus.

QR codes will be adopted in the exhibition to increase user engagement. QR codes have been considered a good subsidiary technology for exhibitions, especially if the target audience is college students (PÉREZ-SANAGUSTÍN et al. 2016; DEMIR et al. 2015). Furthermore, QR codes are viewed by users as social spaces not just a means for information consumption (SHIN et al. 2012). QR codes adopted in an exhibit presenting a topic that is familiar to the audience who belongs to that particular community could introduce dimensions of entertainment and socialization. Hence, these QR codes would be employed as the extension of the exhibition beyond the physical space of the museum.

Landscapes beyond the Campus

As an academic museum located not only in the campus but also in Shanghai, an urban metropolis, the Sea Wind Folklore Art Museum held a forum, inviting craftsmen from all over China to discuss the inheritance of intangible cultural heritage. A tour of the Bund, the landmark of Shanghai, was offered and all the craftsmen were asked to represent the Bund in their own way, like paper-cutting, peasant drawings, embroidery, etc. In this activity, the landscape of Shanghai was presented in various art forms; diversified intangible cultural heritages were revived by presenting a popular urban landmark; and the diversity-welcoming spirit of Shanghai was expressed in a new dimension. It is worth noting that this forum would not have been undertaken without the support of the academic department. It was the reputation of the academic department that attracted all these craftsmen to come to the forum.

Another inception goes with the Numismatic and Antique Museum. The museum, working with the student society on campus 'Youth Loving History', launched a national historical drama writing contest for high school students, on the theme of 'the Silk Road and the Integration of Civilization'. The best scripts were by students for performance. The Silk Road was an ancient network of trade starting from China and stretching to Central Asia. Recently, the historical idea of the 'Silk Road' has been revived as 'The Silk Road Economic Belt', the new strategic development concept of China. The museum gave students lectures about the Silk Road, with topics covering both the historical significance and the economic importance. Objects related to the Silk Road were used to help illustrate the topic. The museum was invited by the students to be the judge for the performance contest. In return, the contest served as a mechanism for broadcasting the museum, showing a museum with global vision and focused on the participation of students. At the same time, the significance of the contest was that the historical cultural landscape concept 'Silk Road' has been refreshed with new meaning, and the museum has helped to interpret and reflect the image and concept of the Silk Road landscape.

There were discussions about whether museums should be involved in dramatic performance, concerns that it might harm the seriousness of history have been expressed (BURCAW 1997). Nevertheless, it is a trend that museums integrate fine arts with performance art. The Dallas Museum of Art offers an excellent example (PITMAN & HIRZY 2010) of this practice. This event also illustrates that public engagement of a museum does not have to happen inside the museum, and it can be tailored for the interest of a particular group. In China, there is now a rising trend for museums to cooperate with schools and students, and go out of the museum door and design curriculum or activities for a particular group, especially teenagers. This started after 2015, when the government issued a guideline paper about promoting the cooperation of engagement between museums and schools (The State Administration of Cultural Heritage of P.R.C., and The Ministry of Education of P.R.C., 2015). This guideline paper brings change for almost every museum, new ways of cooperation with schools and students are being formulated.

Future Steps: 'Creating' the Landscape

The ECNU Museum has done a lot as a focal point for gathering resources and by not only taking care of its own collections, but also the landscape of the parent university, the city and the country of location. In this process, it has achieved quite a lot of support. However, what needs to be done in the future? Broader vision calls for further steps. University museums can't stop at being a mirror reflecting or illustrating what already exists; they should be places that "create" landscapes in the university context. As landscape does not have to be a material manifestation, it can be about the academic atmosphere, professional pursuits and campus culture, which are the core of the development of the university. Even though museums are usually considered in a marginal place for these developments, we can pull threads together and be a catalyst for innovation. According to what is presently under consideration, there are three aspects that are worthy of focused effort.

First, as an academic museum, the ECNUM should put more effort into launching inter-disciplinary research. There is a wealth of expertise in different disciplines that can be tapped for research and interpretation. Academic museums can be campus leaders in fostering interdisciplinary collaborations and forging new directions in education. Since the collections in museums can be researched and interpreted in many different ways, academic museums should be the incubator for initiating cutting-edge research. In this way, the museum can make itself play a vital role in an academic mission. An inception goes with the Tsung Dao Lee Library & Museum located at Jiaotong University in Shanghai. The famous physicist Tsung Dao Lee initiated a Science and Art Foundation. Each year, the foundation holds a worldwide scientific seminar and a contest calling for artworks related to the scientific topics are held correspondingly. The selected works of the contest constitute an exhibition presenting the integration of science and art. It sparks new thinking about science and promotes new expressions of art. By holding such an annual exhibition and seminar, the museum initiates pioneering academic discussions and improves its role and stature in university research.

Second, as an academic museum in a campus and society embracing diversity, the museum can be more active in promoting cultural interaction. This can be achieved through holding exhibitions or workshops, embracing the participation of students from diversified cultural backgrounds and offering a platform for their varying forms of cultural expression. For example, one project currently being planned is called 'one object, one-hundred stories'. In this project, the museum will select one object at a time, and hold lectures and workshops for international students about the interpretation of the object in artistic, cultural or historical frameworks. These lectures and workshops are actually stimuli for inspiring students to give their version of stories. Students are encouraged to respond with objects or stories from their own cultural backgrounds that come to mind when seeing the object introduced by the museum. Their responses may be similar objects with different meanings; or different objects for similar use, or just some other threads that come to mind that they would like to share. All this feedback will not only be interesting stories to share, but can also be developed into a small focused exhibition representing the similarity and differences of diversified cultures. For university museums, small exhibitions like these are cost-effective, and may have as good an impact in the community as blockbuster exhibitions do for large museums.

Third, as a museum located in a "community" where the education of students is seen as the most important role, the museum should drive towards this main goal in many different ways. The Yale Center for British Art, for example, has offered an Enhancing Observational Skills (EOS) program to Yale School of Medicine, aiming to train students' observation techniques to help these future doctors to be more adept and accurate in formulating diagnoses. This program used fine art as a medium and as a formal training tool for teaching clinical medicine. The program was so innovative and successful that other institutions, such as Mount Holyoke College Art Museum, have also introduced this program (ALVORD 2012). This program offers an excellent example of integrating campus museums into the curriculum for students in various departments, and it inspires us to explore more museum-centered programs to take an active role in the curriculum. For the case of ECNUM, the main body of students would be teachers in the future; hence, the museum can be an ideal practice platform for the future teachers to develop their professional capabilities.

Conclusion

In summary, though ECNU is in its own unique situation, it offers some experiences for all university museums to share. Discussed above are small program examples that may look trivial to museums of large scale, but they represent our current thinking in response to making the best use of our museums within their institutional setting. We are in a time that academic museums are facing more challenges than ever in competing for visitors, reputation and support, and thus we have to deal with the situation using creative new solutions.

We need to always ask ourselves questions such as: how can we meet broad vision with a limited budget? How can we integrate ourselves more into the community and resonate with the development of society? How can we prove our value while facing questions about the need for maintaining campus museums? One thing is certain: we need to broaden our horizon and look beyond ourselves. An academic museum should not just focus on its own collection or isolate itself on campus, but try to engage, interpret and even shape the cultural landscapes of the campus and the community. By making these efforts, the museum shares more social and cultural responsibility and, in return, gains more attention and support for its development.

The paper also serves as an example that represents the current trend of museum development in China, where it is realized that museums should be broadly and proactively supportive of the needs of the community and the society. For the development of university museums, there is a shifting focus from infrastructure construction to content development, from being isolated within an institution to being tied directly to institutional aspiration.

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Literature cited

- ALVORD, E. 2012. Visual Literacy and the Art of Scientific Inquiry: A Case Study for Institutional and Cross-disciplinary Collaboration. In: *A Handbook for Academic Museums: Exhibitions and Education*, JANDL, S. & M. GOLD (eds) (Cambridge: MuseumsEtc), 144-165.
- AHMAD, S., ABBAS, M.Y., YUSOF, W.Z.M. & M.Z.M. TAIB, 2015. Adapting Museum Visitor as Participants Benefits their Learning Experience? *Procedia- Social and Behavioral Sciences*, 168: 156-170.
- BURCAW, G.E. 1997. *Introduction to Museum Work*. (Walnut Creek: AltaMira Press), 156.
- CAMERON, F. 2015. The Liquid Museum: New Institutional Ontologies for a Complex, Uncertain World. In: *The International Handbooks of Museum Studies*. 2, MCCARTHY, C. (ED) (Chichester: John Wiley and Sons Ltd), 17: 345-361.
- DEMIR, S., KAYNAK, R., & K.A. DEMIR, 2015. Usage Level and Future Intent of Use of Quick Response (QR) Codes for Mobile Marketing among College Students in Turkey. *Procedia-Social and Behavioral Science*, 181: 405-413.
- JANDL, S. & M. GOLD (eds) 2012. *Introduction to: A Handbook for Academic Museums: Exhibitions and Education*. (Cambridge: MuseumsEtc). 12-17.
- KOTLER, N. & P. KOTLER, 1998. *Museum Strategy and Marketing: Designing Missions, Building Audiences, Generating Revenue and Resources*. New York: John Wiley & Sons, Inc.
- People's Republic of China. 2015. *Regulations on Museums*. http://www.gov.cn/zhengce/2015-03/02/content_2823823.htm (accessed August, 15, 2016).
- PÉREZ-SANAGUSTÍN, M., PARRA, D., VERDUGO, R., GARCÍA-GALLEGUILLOS, G., & M. NUSSBAUM, 2016. Using QR Codes to Increase User Engagement in Museum-like Spaces. *Computers in Human Behavior*, 60: 73-85.
- RICH, J. 2016. Sound, Mobility and Landscapes of Exhibition: Radio-guided Tours at the Science Museum, London, 1960-1964. *Journal of Historical Geography*, 52: 61-73.
- SIMPSON, 2012. Modeling Governance Structures for University Museums and Collections, In: *A Handbook for Academic Museums: Beyond Exhibitions and Education*, S. Jandl, & M. Gold (eds): 178-218.
- SHIN, D.H., JUNG, J., & B.H. CHANG, 2012. The Psychology behind QR Codes: User Experience Perspective. *Computers in Human Behavior*, 28(4), 1417-1426.
- The National Educational Alliance of University and College Museums, <http://museums.sjtu.edu.cn/>

Web/BWGLM/226001.htm (accessed August 8, 2016).

The State Administration of Cultural Heritage of People's Republic of China, & The Ministry of Education of P.R.C., 2011. Announcement about Strengthening the Construction and Development of University and College Museums.http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/moe_1779/201106/120370.html (accessed October 16, 2015).

The State Administration of Cultural Heritage of People's Republic of China, & The Ministry of Education of P.R.C., 2015. Guidelines about Promoting the Cooperation of Museums and Schools, and Strengthening Museum Education Activities.http://www.moe.edu.cn/jyb_xxgk/moe_1777/moe_1779/201509/t20150915_208161.html (accessed August 14, 2016).

Tsung Dao Lee Archives Online, <http://www.tdleelib.info/> (accessed September 10, 2016).

WANGHONGJUN, 2001. *The Basics of Chinese Museology*. Shanghai: Guji Publishing Press.

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Key Words

University museum –Landscape–Interpretation

The role of University museums in the formation of new cultural layers: the case of Golden Horn, Istanbul

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Abstract

Museums play an important role in the conservation of cultural landscapes, their integration with the city and presentation to publicity. In this respect, the study focuses on university museums in the vicinity of Golden Horn, which is a historic-industrial region. This region has been transforming into a cultural and educational area through activities related with the foundation of universities and museums. Silahtarağa Power Plant and Cibali Tobacco Factories were renovated to be used as Bilgi University and Kadir Has University, they are two different examples that show us the importance of the university museums for creating a new cultural layer and social environment in Golden Horn. Contrary to the other cultural institutions, university museums play the vital role of integrating local community and new cultural layers of the region by providing educational landscapes.

'Cultural landscape' is one of the newest terms of the 20th century that has various definitions because of interdisciplinary studies. UNESCO defines cultural landscape as "combined works of nature and of man". Cultural landscapes "are illustrative of the evaluation of human society and settlement over time, under the influence of physical constraints and opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal" (Cultural Landscapes). According to ANTROP (2005), cultural landscape is a result of the reorganization process of spatial structure and usage of area in order to satisfy the changing social demands of community. This term can be summarized as intervention of human and culture with nature and their harmony of coexistence (ÖZSULE 2005).

Since cultural landscapes are related with physical, social and cultural components, they usually progress in line with the changing structure of societies. As an example, industrial landscapes that are generally located in rural areas covered by expanding cities because of changing city life, have assumed new functions and created new landscapes besides them. In this study, we will focus on industrial landscapes that affect the creation of a new environment and socio-cultural life.

We can say that there are three kinds of landscapes in industrial areas; before the foundation of industrial plant, after the foundation of industrial plant and post-industrial landscape. While wide, empty lands preserve their natural landscapes before the industrial revolution, foundation of industrial plants have changed both the ecologic and socio-cultural environments. These sites transformed into a centre of attraction for cities. The new built environment, social opportunities and transportation network create a new cultural landscape. However, when industrial sites lose their function, they are faced with the threat of becoming inert areas.

That is why the problem emerges related with the ways of protecting the industrial cultural landscapes. UNESCO has determined some principles to protect these areas; local community of the region should explain their opinion about the region, communication should be provided between stakeholders and the participating model of management should be carried out (UNESCO 2009, 35; 36). The Council of European states that the cultural and historical importance of sites should be announced to communities in different ways and controlled usage should be provided (MADRAN & ÖZGÖNÜL 2005, 37). Awareness of society, its demands on site is particularly important. In this respect, museums as a tool of communication play an valuable role in announcing the cultural landscapes to communities. They have potential to provide controlled usage of cultural landscapes, create awareness of society, articulate cultural landscapes to urban life and provide new cultural layers for industrial areas.

Together with the development of modern museology, the object-based approach has been changed. New museology includes a conversion process of people's living spaces and their activities into a kind of museum. Not just objects, but also every kind of intangible or tangible formations that arise from the human-nature-culture interactions are a part of musealization (KANDEMİR 2013, 137). While symbols, technologies and objects are tangible evidence of underlying norms and values, the intangible heritage should be regarded as the larger framework within which tangible heritage takes on shape and significance (BOUCHENAKI 2003). Cultural landscapes as a part of cultural heritage include both of tangible and intangible components. While landscape is a tangible formation itself, processes and practises that took place on landscape constitutes the intangible trait of the cultural landscape. That is why the association of cultural landscapes and museums offers the potential to diversify the presentation medium of intangible and tangible values and increase the interaction and communication between community and cultural heritage.

In addition to museums, the structure of the university that is composed of educational and cultural components raises awareness of cultural landscapes through educational activities. Especially university museums located in historical regions can help raise awareness by spatial experiences on historical structure, not just for university students but also for the local community. University museums as a part of university landscapes diversify the communication medium while bringing different social groups together, intersecting informal learning and academic studies and establishing a link between science and society. If these areas, consisting of universities, museums and their educational landscape, are founded on a historic landscape, they create new cultural layers that provide sustainability of the region.

This study focuses on the İstanbul-Golden Horn region with its industrial cultural landscape components, the transformation of the region via university museums, new cultural layers on Golden Horn, and the reflection of landscape components on the museums' collection and programmes. Golden Horn is a creek that is formed by indentation of Bosphorus into the European continent. Golden Horn has an important role in the establishment and formation of industrial areas because it is a sheltered harbour with an advantageous geographical position and topography.

The region was one of the most important trade harbours throughout history because of its geographical features. In the Ottoman period, 17th century, Golden Horn coastal landscape was shaped by Muslim, Greek and Armenian settlements and described as a promenade area with its trees, pools, fountains and rose gardens until the period of industrialization. The Industrial Revolution had been a major turning point for the landscape of the region. After the 18th century, Golden Horn transformed into an industrial landscape area with factories, small workplaces, stores and additional units. By the 19th century, the palaces and houses that were lined along the coast of the Golden Horn were replaced by shipyards, flourmills and anchor manufacturers (KOKSAL 1996) (Figure 1).

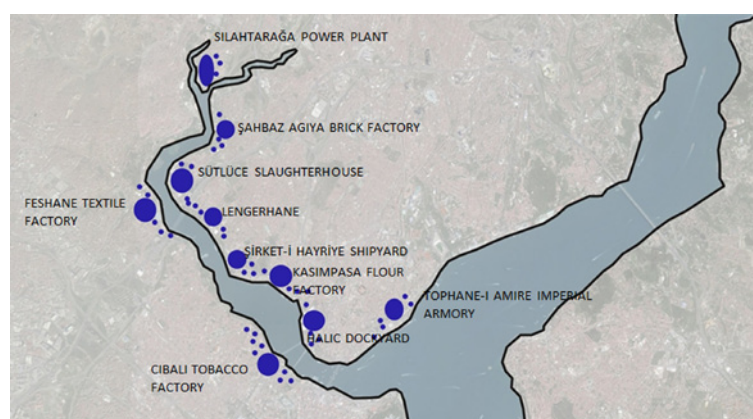


Fig. 1
Industrial landscape of Golden
Horn at the beginning of 20th
century
(N. Özdemir's own collection, 2016)

The industrialization period of the Golden Horn is proven by the Prost Plan that was prepared by the French urbanist Henry Prost in 1936. The plan aimed to preserve the picturesque silhouette of the city. Prost suggested creating open areas around the monumental structures of the city and designing the new arteries in a way to open perspective axes towards monuments, as in Haussmann's Paris (BILSEL 2011, 112). The fabric of the city's historic core was completely transformed; residential and commercial areas were removed from the Golden Horn, and the coastal strip was occupied by industrial buildings. After 1950, concentration of trade in the region and rapid growth of the population increased the slums in empty areas behind the coastal strip.

"The 1980s marked another turning point in the transformation of the Golden Horn into a heritage industry. Starting with the Golden Horn Waterfront Revitalization Project in 1986, several interventions have taken place to cleanup this very valuable area to provide a global city image. These include the reclamation and the beautification of the shores of the Golden Horn and the clearance of industries..." (GUNAY 2014, 102). At the beginning of 21st century, "the Golden Horn Cultural Valley Project has played an important role in the transformation of industrial heritage into sources of social and economic development. It had different dimensions including the processes of conservation of historical waterfront neighborhoods, transformation, and re-functioning of historic industrial facilities, and utilization of cultural amenities and landscape design" (GUNAY 2014, 102). After the 2000s, this process has continued through foundation of private universities with their educational and cultural existence in Golden Horn, such as Bilgi University and Kadir Has University. Universities accelerated the transformation of Golden Horn with their diversified facilities and user profile.

Golden Horn is an urban space having the feature of a natural harbor, then it was converted to a trade harbor and industrial area, and finally re-functioned as a cultural valley (ERDEN 2009, 10). During this process, most of the industrial buildings had been re-functioned as cultural centres, museums or universities (Figure 2).

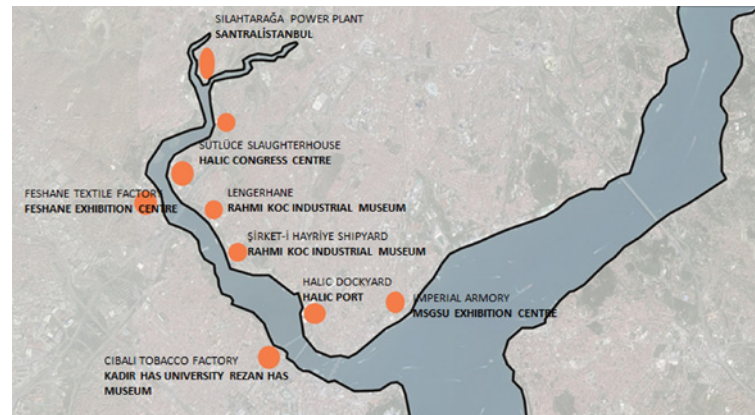


Fig. 2
Re-functioning industrial buildings
in Golden Horn
(N. Ozdemir's own collection, 2016)

Tophane-i Amire was used as a cannon-casting plant since the 15th century, it was transferred into Mimar Sinan Fine Arts University in 1993 to be used as an exhibition, culture and art center. The first textile factory of Turkey was established in the 19th century to produce fez for the Ottoman army. The Feshane Textile Factory was rearranged in 1998 for exhibitions, fairs and concert functions. Sütluçe Slaughterhouse was built in 1923 for the purpose of cutting and distributing meat. It was converted into the Haliç Congress Centre in 2006 to be used for congresses, meetings, fairs, exhibitions and film premieres. Lengerhane and Şirket-i Hayriye Shipyard, built in 19th century, were renovated to be used as Rahmi Koç Industrial Museum, in two phases in 1994 and 2001 (KOKSAL 2007). "The Golden Horn Dockyards, which were the oldest dockyards still operating, were recently closed to be transformed into a marina of entertainment and tourism" (GUNAY 2014, 103).

Apart from these cultural institutions, the main transformation has been realized through the foundation of Kadir Has University and Bilgi University in the 2000s. These universities constituted the educational landscape of the Golden Horn as a part of cultural valley. They aim to be an educational institute, not just for university students, but also for local community. In this process, university museums play an important role in the Golden Horn in terms of bringing about new cultural and educational layers. As a case study, Silahtaraga Power Plant and Cibali Tobacco Factory have different physical properties and landscapes, yet they draw attention to the industrial landscape of the Golden Horn with the transformations that they caused in the northern and southern shores. In this context, Energy Museum of İstanbul Bilgi University and the Rezan Has Museum of Kadir Has University will be evaluated with their transformative roles in the Golden Horn region and their effects on cultural landscape.

From Cibali Tobacco Factory to Kadir Has University

During the transformation process of the Golden Horn, Cibali Tobacco Factory was re-functioned as Kadir Has University, established by the Kadir Has Foundation. The factory was founded in 1884 and began to produce cigarettes in 1900. It was operated by the French government until 1925, and then transferred to the Turkish government. Its large production building housed both tobacco processing and cigarette production that produced the first local cigar in 1946 and the first filtered cigarette in 1959. The facility consists of several buildings that were connected by passages and courtyards. Cibali Tobacco and Cigarette Factory are significant in terms of reflecting the period's construction and construction techniques. The size of the spaces and the neoclassical architectural style are interesting examples of the era, separated from the classical period building art (ALPER 2008).

"The Cibali Tobacco Factory was, in fact, a small town with local police and civil servants, hospitals, a day care centre, grocery stores, schools, a fire department, sport facilities, trade unions, and restaurants." (Tobacco Factory website) This important institution changed the neighbourhood socially and economically. It continued to function until 1995 and then it was closed because of outdated technology. The building was purchased by Kadir Has Foundation and has been renovated to be an institution of higher learning between 1998 and 2002. Finally, the university started to offer education services officially in 2002 (ALPER 2008). The university project had been shaped to provide public benefit and to contribute to the cultural and historical sustainability of the Golden Horn by conservation of the site. Moreover, the central location and transportation facilities of the Cibali Tobacco Factory had been effective in determining the new function of the building (BUDAN 2008, 73). "The distinguishing feature of this project is being the first in the context of re-functioning an old industrial building as a university; unlike the others, it has created a refreshing effect in environment visibly" (ERDEN 2009, 8-9).

Rezan Has Museum of Kadir Has University

During the conversion process of Cibali Tobacco Factory, Byzantine cistern and the ruins of Turkish bath, which took place in the building basement and used as a tobacco warehouse, have been converted into a museum (History). Temporary exhibitions of high-quality art and historical artifacts constantly come and go, and thus the interest of the visitors is kept alive and the extensive collection of the museum is exhibited during extended periods. Past exhibitions have included works of painting, ceramics, jewelry, and photography. In addition to the collection, historic remains constitute the main attraction of the museum, and the majority of visitors come to experience the challenging atmosphere of the museum (Figure 3). The Theatre Department students prepare performance tasks in this area. However, the museum does not present anything belonging to the period of Cibali Tobacco Factory. Even though it was used as an industrial building for a long time, it's difficult to understand its previous function while visiting the museum.



Fig. 3

Historic remains constitute the main attraction of Rezan Has Museum

(N. Ozdemir's own collection, 2016)

It can be said that the cooperation between the university and the museum for preparing collections and events is inadequate. Only a few symposiums and panel discussions related with the subject of exhibitions have been organized and contributed to academic studies. That is why the museum facilities cannot reach wide communities. The museum, located in an improvable part of the city, has an important mission to integrate the university with the public, but it needs to interact with the university.

Not only the museum itself, but also the courtyards between the education buildings, have been utilized as exhibition areas. Education units and art galleries are nested in the university building (Figure 4). For example, in one of the courtyards, photographs, which show the Cibali Tobacco Factory, are being exhibited, and the other one is hosting personal effects and photographs belonging to Koç family. As a result, visitors have a chance to discover the whole university building. Moreover, students have the chance to experience this artful atmosphere during their education.



Fig. 4

Courtyards between education buildings are used as an art gallery
(N. Ozdemir's own collection, 2016)

İstanbul Bilgi University (Santralistanbul)

Another case is the Bilgi University founded in 1996. The university is aimed at social sensitivity and natural interaction with its environment and has set its campuses in disadvantaged regions of the city in order to offer various educational opportunities to the local residents. The University chose the Silahtarağa Power Plant, which was a brownfield area since 1980 and surrounded by slums in the vicinity, for its 3rd campus (OKANDAN 2016, 43).

"The Silahtarağa Power Plant is both the first power plant in the urban scale in the Ottoman Empire and the first thermal power plant that operated with coal" (AKSOY, ACIKBAS & AKMAN 2009, 11). The Silahtarağa Power Plant was developed and expanded in the course of forty years starting from 1910 until 1950s and supplied electricity for İstanbul. The Silahtarağa area was selected as the site of the power plant because of being a sheltered landscape as a harbor, its convenience to sea transportation, and the fertility of the surrounding soil. The power plant is one of the first examples of the entire modern industrial facilities in İstanbul with its structure including social facilities such as the cafeteria, lounge, residences, assembly hall, clubhouses, a sanitary bath for the workers and even a small football field (AKSOY, ACIKBAS & AKMAN 2009, 21).

After having completed its mission in 1983, the plant was taken under protection as an industrial heritage. In 2002, the İstanbul Metropolitan Municipality adopted the idea to assign new cultural functions to the area. In 2004, İstanbul Bilgi University undertook the task of conserving the facility as an educational, cultural area and museum. After conservation was completed in 2007, the five main buildings of the plant were converted into a contemporary art exhibition space, a museum of energy, and a public library. The workers residence has been renovated to be used as a boutique hotel and working space. As per initial planning, the production area of the plant was converted into educational units and museum and residential areas converted into social fields. Existing structures were preserved without changing, only essential interventions were made. The new campus of İstanbul Bilgi University is called 'Santralistanbul,' which reflects the name of power plant as 'santral'. "The primary objective underlying the conversion of the Silahtarağa Power Plant into Santralistanbul is to make most of the productive energy resources, namely information, culture, education and art, prevalent in the world of the 21st century with an approach analogous to the transformative role that the electricity has played at the beginning of the 20th century" (AKSOY, ACIKBAS & AKMAN 2009, 11).

The university would like to create a socio-cultural transformation, by means of connecting with the local community. When the Bilgi University took over the industrial site, it also took over the history and memories of place. Therefore, not only the physical space, but also the spirit of place should be discussed. Santralistanbul aims to serve as a center that satisfies the cultural and educational needs of all segments of society with cultural programs, information, documentation and archival resources, and science and art-oriented excursions and educational programs that are open to the utilization and participation of the public at large via its museums (AKSOY, ACIKBAS & AKMAN 2009, 53). That is why museums undertake the most important mission of the campus, namely, to realize all these aims and to preserve the memories of the place.

Santralistanbul Energy Museum

Santralistanbul embodies a cultural focus point by including museums that were converted from engine and boiler houses. A destroyed boiler room was reconstructed with a new approach to be Contemporary Art Museum and the engine houses were converted into the Energy Museum. The museum of energy is established in the electrical production units where the turbines and control room were located in the Silahtarağa Power Plant. It is describing the modernization process of the Ottoman Empire with turbine-generators, which reflects the advanced technology of the period. The aim of museum is to show the visitors how electricity was generated during the early 20th century. "The chance to closely observe the turbine-generator groups and the control room that were conserved without deformation provides substantial information about the operational logic of the formerly used technological systems and production processes of the plant" (AKSOY, ACIKBAS & AKMAN 2009, 52) (Figure 5).



Fig. 5

Turbine-generator groups in
Energy Museum, Santralistanbul
(N. Ozdemir's own collection, 2016)

Apart from the machines as an exhibition object, the building itself is also exhibition material. For this reason, the building is encircled with bridges, which provides circulation, in order to ensure that the visitors can perceive its industrial aesthetic and broad volume. While the museum is a space to exhibit machines and to hosts various events, the industrial landscape as a whole can be considered as an open-air museum.

The Energy Museum has a contemporary approach that uses multimedia presentation techniques and interactive methods in 'energy play area' to catch the attention of visitors (Figure 6). Visitors can produce electricity, build magnetic sculptures, and touch thousands of volts (Energy Museum). The museum also organizes various education programmes that provide an entertaining learning environment through experiences for children and youth. Along with the education programmes related to the theme of energy, museum educators give information about the history of the Silahtarağa Power Plant. The institution provides some education programmes for adults who have not enough financial income for education, and hosts seminars, national and international panels via a cinema / conference room. It plays a converter role in the campus and interacts with the environment by the help of education programmes for the public and schools.



Fig. 6

Interactive 'energy play area'
(N. Ozdemir's own collection, 2016)

Discussion and comparison of university museums

When we research the effects of these university museums on their neighbourhood to integrate with the cultural landscape, three components provided by the museums come to mind: integration of the university and local community; increasing awareness for cultural values, and protecting the spirit of the place.

The re-functioning of a settlement contains some risks such as integration problems of old and new. Transformation of the Cibali Tobacco Factory and the Silahtarağa Power Plant to universities caused some adaptation problems and increased social tension between the local community and the universities. "...most of the visitors are outsiders and the accessibility of the community is limited to participating in cultural activities in their neighborhoods" (GUNAY 2014, 105). According to the interviews with local community members carried out by the students (ENVIRONS 2015) of Bilgi University, the local community thinks that the university refreshed its close environment, but the campus is introverted because of the garden walls and iron bars surrounding it. They perceived it as a kind of gated community in which they could not participate. But education programs and various activities that Santralistanbul Energy Museum organized for adults and children aim to integrate the local community and university. In consequence of these constructive efforts, a part of the community has embraced the new educational and cultural area and begun to use the landscape of the university.

However, Rezan Has Museum generally organizes academic programs rather than educational activities for the local people. That is why the local people could not integrate with the educational landscape of the university. In a thesis study, the impact of Kadir Has University on the environment is evaluated (ÇETİN 2005). It is seen that most of the people did not participate in the activities organized by the university despite being informed about them. On the other hand, they expect the university to open more social spaces, to organize training for the community, to promote the region and to become more integrated with the public. As an extraverted face of the university, Rezan Has Museum has potential to put into practice these demands of the locals. It can organize educational and cultural activities for the community to provide interaction.

Another problem observed in Rezan Has Museum and Santralistanbul Energy Museum, is about integration of universities and museums. Although the museums were founded within the university, they are working as independent museums. Lack of interaction between the universities and museums influenced the communication between the university and community negatively. They need to organize common events to provide interaction between the universities and community. The museum plays an important role in the elimination of the gap between the university and the public.

Educational activities could be considered a tool to improve the awareness related with the protection of cultural landscape values for the local community and other citizens. Contrary to other museums, university museums have the potential to diversify educational mediums by integrating interdisciplinary studies. However, it seems that, these kinds of activities in Santralistanbul Energy Museum and Rezan Has Museum are insufficient. Because a part of the local community states that they do not have information about the history of the industrial landscape while the other part who is aware of the historical and cultural value of the buildings states that the community should be trained to discover the importance of the region (ENVIRONS 2015; ÇETİN 2005). In cases where the historical value of the building is unknown, the museum should organize activities to provide information about the history and architecture of the building.

In addition to their cultural landscape value, these post-industrial landscapes also have memorial value. Interviews with the previous users of the site indicate that they approve of the transformation of the plant since it provides them with a memorial place. But the museums need more effective exhibitions to reflect the previous functions. "The solution is more to do with the conservation of the 'industrial landscape' through the preservation of the 'spirit of place', as ICOMOS (2008) states.... The adaptation and reuse that respect the historical identity of industrial heritage is an appropriate and a cost-effective way of ensuring the survival of industrial heritage; on the other hand, the use of original patterns and the utilization of new uses by creating links to their own history may contribute to the sustainability of the industrial heritage of the Golden Horn" (GUNAY 2014, 106). While Energy Museum displays the previous function of the building via industrial machines, Rezan Has Museum does not exhibit anything belonging to the Tobacco Factory. The museum mostly reflects the spirit of Byzantine Cistern. It is important to convey information about the unique environment of the industrial structures such as sound, noise and smell in the museums. It is clear that the industrial process can only be understood by the machines used in the industrial structures (KOKSAL 2012, 21). Another missing point for both museums is the lack of objects and documents belonging to the socio-cultural life in factories. That's why visitors could not receive any information about the memories of the place and their cultural value to the city. Creation of new landscapes by cultural institutions have affected the whole Golden Horn landscape and introduced a cultural basin. However, there is a difference between industrial plants, which have a wide landscape and monolithic structure. Each of them affects their environment in different ways. As an example, Santralistanbul has a wide campus area, that is why, some facilities such as museum workshops and student activities occur on campus without influencing the close environment. Conversely, Kadir Has University has monolithic structure, so students and visitors need extra places for social facilities. That is why the close environment of the university has transformed into a recreation area, cafeteria, restaurant and similar socializing spaces. The local community indicates that craftsmen have moved into this region and new socializing places have opened after the foundation of the Kadir Has University.

Although Santralistanbul has a wide campus area consisting of Golden Horn creek, flora, fauna and topography that had an important place in the social life of the factory, during the conversion process architects mostly focused on restoration of the buildings and open areas in the vicinity. Nevertheless, the relation between buildings, transportation lines, stages and the creek that have an important place in the landscape was ignored. However, the region needs public places such as parks, concert and picnic places, as the locals indicate in their interviews. In addition to public spaces, these regions have potential to exhibit social life of the factory, if they are well organized and integrated with the energy museum.

Conclusion

During its history, the Golden Horn has hosted various cultures and has many historic and cultural layers. However, because of unplanned growth of the city with regional solutions, Golden Horn has lost its characteristic features. Later on, re-organization of the industrial landscape as cultural and educational centres has begun to change the atmosphere of Golden Horn in different way. The character of the Golden Horn changed to a 'culture basin' via cultural institutions, but the main transition was realized after the foundation of the universities and their museums. While congress centres, fairs and museums allow periodic utilization in certain times, university museums provide long term and intense utilization. Because of various activities supported by the universities, the density of users and the long-term utilization, they have important roles in the transformation process of the region.

Re-functioning projects causes some changes in the neighborhood. During the industrial period, the nearby environment of the plant was covered with worker's houses and supporting units. But when the function of the region is changed, the landscape is reshaped according to the demands of students and visitors. Cafeterias, student's dormitories, recreational areas etc. But the most important point is to provide integration of the university with the local community. In this process, university museums have an important mission as a tool between the university and community. They have supported the transformation of the region through providing new uses for the region and decreasing the social tension between the university and locals.

Comparison of Rezan Has Museum and Santralistanbul Energy Museum shows us the importance of activities devoted to local people and the negative effects of physical and mental borders. Some proposals can be developed to increase the converter role of the university museums in the region and enhance the relationship between the public and university to support transformation of the cultural landscape.

- Museum programs can be diversified with the aim of promoting participation of the local community in order to provide their adaptation to a new repurposed area.
- Activities for children, local community or university students can take place not just in museum building but also in wide landscape areas to build awareness of cultural landscape.
- Exhibition areas can be expanded to the whole landscape; natural landscape components also have a value for display.
- Some excursion programs can be organized to discover other industrial heritage areas via planning routes.
- Faculties of the university can use industrial landscape area/objects actively in their lectures to increase awareness of industrial heritage.

If Industrial cultural landscapes are supported with museums and universities, they could avoid being idle, and they could create a new educational cultural landscape. But they should be discussed on a broader scale. During the conversion process, the demands of the local community and relation between the community and university museums should be taken into consideration and be planned in detail. Not just buildings but also the whole landscape should be embodied in a museum concept. Sociologic and technologic trails in industrial landscape, usage of topography, transportation systems and recreation areas should be used to provide publicity and integrate with the surrounding environment. Otherwise, only few aspects of the heritage would be represented to the community and wide-ranging aspects of the area would be ignored.

Literature cited

- AKSOY, A., ACIKBAS, F. & AKMAN, A. 2009. The Silahtarağa power plant 1910-2004. İstanbul: İstanbul Bilgi University.
- ANTROP, M. 2005. Why landscapes of the past are important for the future?. *Landscape and Urban Planning* 70(1): 21–34. Elsevier B.V.
- BILSEL, C. 2011. "Les transformations d'Istanbul": Henri Prost's planning of Istanbul (1936-1951). *ITU. Vol.8 no.1* pp.100-116.
- BOUCHENAKI, M. 2003. The interdependency of the tangible and intangible cultural heritage. *ICOMOS 14th General Assembly and Scientific Symposium*.
- BUDAN, N. 2008. Kültür endüstrisi çerçevesinde Santralistanbul örneği. Master thesis, MSGSU. Cultural Landscapes. <http://whc.unesco.org/en/culturallandscape/#1>. (accessed May 10, 2016).
- ÇETİN, B. 2005. İstanbul kent merkezi yakın çevresindeki konut alanlarındaki üniversite kampüslerinin sosyal ve fiziksel çevrenin canlandırılmasındaki etkileri. Master thesis, İstanbul Technical University.
- ENVIRONS, 2015. Bilgi üniversitesi mimarlık öğrencilerinden Santralistanbul'un dönüşümü. <http://kot0.com/bilgi-universitesi-mimarlik-ogrencilerinden-santralistanbulun-donusumu/> (accessed October 26, 2016).
- OKANDAN D. G., 2016. İşletmecilik Tarihinde Modern'den Postmodern'e Bir Yolculuk: Silahtarağa Elektrik Santrali'nden Santralistanbul'a Süreklilik ve Değişim. *İstanbul University Journal of the School of Business*. 45, pp. 40-48.
- Energy Museum, <http://www.santralistanbul.org/pages/index/enerji-muzesi/en/> (accessed May 20, 2016).
- ERDEN, D. 2009. Haliç'te dönüşüm ve tarihsel süreklilik. *Osmanlı Bankası Arşiv ve Araştırma Merkezi*.
- GUNAY, Z. 2014. The Golden Horn: Heritage industry vs. industrial heritage. *Uludağ Üniversitesi Mühendislik Fakültesi Dergisi* 19(2).
- History, <http://www.rhm.org.tr/en/history/> (accessed May 20, 2016).
- History and Terminology. <http://whc.unesco.org/en/culturallandscape/#1>. (accessed May 18, 2016).
- KANDEMİR, O. 2013. Kültürel miras kapsamındaki yapıların çağdaş yaklaşımlarla müze işlevine adaptasyonu: 'yeni' mekânsal deneyimler. *Anadolu University*.
- KOKSAL, G. 1996. Haliç tersanelerinin tarihsel teknolojik gelişim süreci ve koruma önerileri. Master thesis. İstanbul Technical University.
- KOKSAL, G. 2007. İstanbul'daki sanayi mirasının geleceği için bir öneri; "İstanbul Endüstri Mirası Rotası". kentvedemiryolu.com/indir.php?dosya=gul_koksal_istanbul_kent_smp.pdf (accessed May 20, 2016).

20, 2016)

KOKSAL, G. 2012. Endüstri mirasını koruma ve yeniden kullanım yaklaşımı. Güney Mimarlık. 8, pp.18-23.

MADRAN, E. & ÖZGONUL, N. 2005. Kültürel ve doğal değerlerin korunması. Ankara: TMMOB Mimarlar Odası.

Mehmet Alper ile Cibali Tütün ve Sigara Fabrikası'ndan Kadir Has Üniversitesi'ne. 2008. http://www.mimarizm.com/makale/mehmet-alper-ile-cibali-tutun-ve-sigara-fabrikasi-ndan-kadir-has-universitesi-ne_113537 (accessed May 22, 2016).

ÖZSULE, Z. 2005. Geleneksel yerleşimlerin korunmasının kültürel peyzaj açısından değerlendirilmesi. PhD thesis, İstanbul University.

Tobacco Factory. <http://www.rhm.org.tr/en/tobacco-factory/> (accessed May 18, 2016).

UNESCO. 2009. World heritage cultural landscapes, a handbook for conservation and management. World heritage papers 26. Paris: UNESCO World Heritage Centre

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Keywords

Cultural landscape - Industrial heritage - University museums

The role of the Science and Technology Museum in the development of Patras University cultural landscape

Penelope Theologi-Gouti & Evangelos Vitoratos

Abstract

This paper describes a study case of the Science and Technology Museum (STM) of Patras University, Greece. It highlights its role in the development of the University's cultural landscape and in its extension. STM succeeded to influence it by offering high quality non-formal education services to society. It was socially endorsed by the university and society. The key lies in sustainability which STM achieved to easily manage change and has endorsed strong and cost effective rules for functioning. New channels for distribution of scientific culture were developed. They have changed how people consume scientific and technological culture and created strong university-community partnerships.

Introduction

Cultural landscapes are the result of consecutive reorganization of the land to better adapt its use and structure to the changing demands of society. Cultural Landscapes change. Their changes are the result of three main driving forces that act simultaneously, accessibility, urbanization, and globalization (ANTROP 2003).

The Science and Technology Museum (STM) was founded in 2001, by Patras University in Greece, as a Laboratory of the School of Natural Sciences. This museum operates as a place of both study and recreation. It links the tangible and intangible heritage of sciences and technology of the university and the region and connects sciences to technology. As a university museum, it has to successfully serve the biggest range of audiences although it has crucially to do this with very much lower funding opportunities than other museums (KELLY 2001b).

To serve the community and fulfill its goals, the Museum is using actions that are commonly recognized by international conventions and specialized bodies such as ICOM. Building values, stimulating interest, fostering protection, providing tools for planning and management, and undertaking practical intervention are the key tools for the Museum's development. (RINALDI 2009) As there is no national policy framework for University Museums in Greece, the Museum had to find its own ways to be successful and allow further public/private sector involvement and knowledge management, in order to contribute to the development of the University's Cultural Landscape.

Since its opening to the public in 2009, the Science and Technology Museum has developed different means of dialogue and mediation to communicate with the university community and society. These means of dialogue include permanent and temporary exhibitions¹. At the same time, many other means are used to communicate with society as interactive exhibits, educational programs in exhibitions (Fig. 1), thematic networks, seminars and experiential meetings, informal and entertainment events, performing arts activities and concerts. This dialogue is supported and extended by volunteering and internship (THEOLOGI-GOUTI 2014).



Fig. 1

Educational Program 'I learn how
telephone works'

Photographer: anonymous museum
volunteer for the Science and
Technology Museum
© Science and Technology Museum,
Patras University

The Science and Technology Museum's exhibitions have been set up in a friendly object-oriented environment of non-formal education for different audiences. The permanent and the temporary exhibitions are based on Museum objects, interactive exhibits, demonstration experiments, reference to inventors and inventions, interdisciplinary and experiential approach, historical continuity, connecting science and technology. 'Telecommunications in our lives² is the theme and the title of the museum's permanent exhibition that has a dynamic character. The permanent exhibition is constantly enriched with new objects, information, and with educational interactive exhibits developed by university students³ (THEOLOGI-GOUTI 2014).

¹ The temporary exhibitions are organized together with important bodies of science, technology and culture as the French Institute, the Association of Patras artists, the Centers for natural sciences of the Secondary Education and others. They deal with environmental issues, energy, arts and technology, light and color, photography among others.

² The permanent exhibition presents the history of telecommunications, physics experiments as basis of telecommunications and records of different types of telecommunications as the telegraph, the telephone, the mobile, the radio, the television and the sound.

³ From the Department of Computer Engineering and Informatics and the Department of Architecture, during Internship in the Museum. They have developed an Interactive exhibit on the History of Telecommunications, a number of interactive exhibits on ancient greek telecommunications, an interactive exhibit on how telephone works, an interactive exhibit on the telegraph, two interactive exhibits on internet, an interactive exhibit on radio, and one interactive exhibit on television.

This paper highlights the role of the Science and Technology Museum in the development of the human dimension of the Patras University Cultural Landscape and in the extension of the Cultural Landscape beyond the University. Landscapes change as they are the expression of the dynamic interaction between natural and cultural forces in the environment due to the polarization between more intensive and more extensive use of land (ANTROP 2003). As a university museum, STM used those forces of Patras University to effectively disseminate knowledge, stimulate understanding, protect heritage, promote higher learning, and enhance the quality of life inside and outside Patras University (KELLY 2001b).

Impact

Museums are channels to the local community through integration into the community and through linkages outside of the institution, whose activities help the development of skills and provide social interaction (KELLY 2006). The Science and Technology Museum has been developed as a channel of Patras University to society. As a channel, it was able to influence and transform the cultural landscape of Patras University by offering high quality non-formal education services to different levels of society. The need to offer high quality services to visitors comes on one hand from their experience in the Museum, from the increasing importance of the educational role of the museum, and on the other, from the increasing pressure for the Museum to justify its existence. The Museum staff has made many efforts to know who its audience is, and how this audience can be extended, and develop exhibitions and other activities that will be popular and thus, will increase attendance (HEIN 1998).

The local community, mostly the educational community, started understanding and valuing the role of the Science and Technology Museum and the impact it has on the local community, in a reciprocal relationship of mutual benefit. The broader community also understands and has strong views about the museum's role, in providing information about issues that might be difficult and in giving access to science and technology (KELLY 2006).

The museum has succeeded in connecting the three levels of education. This connection has started to produce a number of benefits for the university such as attracting a number of high school students to choose to enroll at Patras University for their studies. The Museum also serves as a platform that connects different users: university and school students, school teachers, university professors and staff, people with special needs and other different publics (SIMON 2010). They all act as content creators, distributors, consumers, critics, and collaborators. Some examples are university staff and students who work or play with school children, or develop activities or experiments for children, children and teachers participating in activities specially organized by the museum for various levels of knowledge, as well as teachers and children who collaborate in setting up activities with the museum.

The Museum organizes and operates educational programs for school groups that include activities as treasure hunt games, performing arts activities, puzzles, interactive activities on computers, displays interactive experiments, and educational games. They have established innovative and successful ways to communicate scientific and technological culture. Alongside, the museum is educating school students in the use of museums. Apart from the regular programs on communication, telegraph, telephone, mobile, messages, sound, computer, internet safety; the museum has developed a special educational program for four to seven years old children, called *Discovering the House of 'Museum Kid'*⁴, which is based on the nature of a museum, and the activities that compose its operation.

⁴ The 'museum kid' is the Museum's mascot, a puppy, whose role is to explain to school groups how the Museum operates.

On the other hand, the museum helps its visitors to approach science & technology by using experimentation and participatory techniques, not just to give visitors a voice, but to develop experiences that are more valuable and compelling for everyone (SIMON 2010). It is for this reason, that STM has developed successful ways to attract and educate the public through events, (Fig. 2) such as seminars, concerts and other experiential activities organized for special publics. These activities are making science and technology easier to comprehend. A number of these activities are participatory projects⁵ that make relations among staff members, visitors, community participants and stakeholders more fluid and equitable. They open up new ways for diverse people to express themselves and engage with institutional practice (SIMON 2010). In this way, the museum amplifies the scientific and technological literacy of university students, school students, school teachers and the wider audience.



Fig. 2

Event for the General Public 'I
protect the forest'

Photographer: anonymous museum
volunteer for the Science and
Technology Museum
© Science and Technology Museum,
Patras University

Every year the Science and Technology Museum is involved in developing human participatory networks. They create important value for the museum and participants as well as poles of attraction for the non-participating audience members and provide a meeting ground between the scientific community and society (DURANT 1996). Human networks have been developed with university professors, and students and various students' scientific associations from different fields. An informal network has also been developed with the other Patras University museums⁶, in order to organize joint exhibitions and activities on environmental issues, on one hand and to explore possibilities for a common structure for the future, on the other. In this way, it is clear that the museum contributes to the monitoring of environmental indicators, which is becoming critical given the increased emphasis in the world today on climate change (KELLY 2006).

Very strong human networks have also been set up with bodies of science, education and culture diffusion, such as the Departments of Innovative Education of Primary and Secondary Education⁷ (KOUFOU 2014), Education Consultants of Primary and Secondary Education, the Centre for Natural Sciences of Secondary Education, the French Institute, Chorales, the Association of Patras Artists, Music and Art Groups and Performing Arts Groups, and the European Researchers Night. The museum collaborates with them and involves them in the channels for scientific culture distribution.

Therefore, these actions are aimed to foster informal and institutional networking thereby enhancing knowledge sharing. They have eventually tackled the issue of the cultural isolation of the University and, again, strengthen the general understanding and appreciation of science and technology (RINALDI 2009).

⁵ A good example is the event 'The generations meet at the Science and Technology Museum: Memory enables creativity', that was organized for the International Museum Day 2013 "Memory + Creativity= Social change". Children of primary school with teachers and parents met with retired technicians of the Greek Telecommunication Company, interacted and children designed the telephone of the future.

⁶ The other officially founded museums of Patras University are the Zoological Museum and the Botanical Museum.

⁷ Departments of Culture, Departments of Health Education, Departments of Environmental Education.

Challenges and opportunities

The Science and Technology Museum opened to the public in 2009, just about when the financial crisis was starting to affect Greece. However, it was socially endorsed by the university and society although the museum has encountered difficulties to be incorporated by the Central University and Departments. The key to the success lies in sustainability, not to mention that potential landscapes should enhance sustainability, which also needs to be understood in the context of the irreversible processes of urbanization and globalization (ANTROP 2003).

At the mid-1980's, museum directors have understood that the key to their success lies in how well they manage change within their organizations (KNELL 2003). The Science and Technology Museum achieved to easily manage change (technological, social, crisis...) and has endorsed strong and cost effective rules for functioning. New channels for distribution of scientific culture were developed. Those channels have changed how people consume scientific and technological culture and created strong university-community partnerships.

Museums have opportunities to influence, challenge and sometimes change how visitors think, inspiring them to take action on big issues and be more informed citizens in an increasingly globalized world (KELLY 2006). Since its establishment, the Science and Technology Museum has faced a number of challenges. The biggest challenge was to open the University to society and involve society in the museum. The University is situated in the suburbs of Patras and there has always been a minor connection with the city. Connecting the three levels of education was a big challenge as well. Other challenges were popularizing science and technology, by making them easy to understand, diffusing the scientific and technological knowledge, mostly the knowledge produced in Patras University, cultivating society in using museums and educating students and society. After the opening, the Museum had to deal with the economic crisis. It started in 2008, just before the museum's opening. It is obvious the museum has been asked to invent various ways to be successful with very few means.

In parallel, since its opening, the Museum has encountered a number of opportunities. A number of collections existed already in various laboratories and different departments⁸. The biggest and most important collections were the collection of equipment of telecommunications of the Department of Electrical Engineering and Computer Technology, and the collections of physics scientific instruments that became the basis of the Science and Technology Museum's permanent exhibition.

A new Building was specially designed for the Science and Technology Museum and a part of it⁹ was built (THEOLOGI-GOUTI 2000). There has always been a few Professors and Emeritus Professors willing to transmit their knowledge, and expertise on their discipline¹⁰. Many professors have supported the research for setting up the Museum's permanent exhibition. Others support the documentation of collections, participate in setting up the strategy of the Museum, and the strategies for dealing with the public. Several professors participate in events, seminars, workshops, by giving popular lectures to different publics. Finally, there has always been many volunteers, students, and young people, ready to help any time the museum needed them.

Facing Problems and Difficulties

The Science and Technology Museum has also faced a number of difficulties and problems since the beginning. The organization of the museum started from point zero. At the beginning, there was no building, no office, no chair, no table, no computer, not even owned collections. Alongside, the lack of money and the lack of personnel, and mostly specialized personnel were needed. A sense of isolation and loneliness surrounded the Museum (STANBURY 2000).

Bureaucracy was a real problem. The Museum needed flexible ways of functioning in order to blossom. Instead, it faced many problems to be able to function. It was not easy for the University's administration to accept the Museum. For the University, it is not still clear that the Museum cannot operate as an administrative department nor rely on bureaucracy as it has different goals, and a different work plan.

⁸ Mostly in the oldest Departments of the University as Physics, Electrical Engineering and Computer Technology, Computer and Informatics Engineering, Mechanical Engineering and Aeronautics, Chemistry, Civil Engineering, Geology.

⁹ 25% of the designed building has been built.

¹⁰ Mostly professors from the Departments of Physics, Electrical Engineering and Computer Technology, Computer and Informatics Engineering, Education, Philosophy etc.

The Museum team had to keep relationships with the Rector's office, University Professors, Departments and the administration. Professors and University staff's mentality has been a real problem. Many professors (more at the beginning, very few now) believe that the University is a place only for research and teaching students. They didn't want to hear about academic heritage or scientific and technological heritage or popularization of science and technology. Some of them were annoyed by children and teens coming to the Museum. Through time this mentality has reduced significantly. Now the biggest part of the Patras University community, agrees on the necessity of the Museum of Science and Technology for the University and for society.

The last difficulty was the lack of 'Museum Culture' in the university community and society. It is obvious that difficulties and problems in setting up the museum were also challenges to be surmounted at the same time.

Changing the University's Cultural Landscape

Humans have always adapted their environment to better fit the changing needs of society and thus reshaped the landscape (ANTROP 2005). Through challenges, opportunities, difficulties and problems, the Museum of Science and Technology strives to redefine the new cultural landscape of Patras University and its role and position as a University Museum in relation to the university community and society. Many efforts have been made to undertake the task of setting science and its history in motion and in the service of society (ARNOLD 1996). The Science and Technology Museum's exhibitions have been set up in a friendly, object-oriented environment. Collections exhibited in the permanent exhibition or in temporary exhibitions are the first facility that visitors enjoy, as direct contact with collections is one of the special things that the museum can offer (CLARKE 2002). As most genuine museums of science, STM has combined the adoption of a certain number of hands-on exhibits with the quest for new ways of interpreting the historical collections (DURANT 1996). To be educative, experiences are not only hands-on but also minds-on, and engage visitors in mental interaction (Fig. 3). They are organized to be educative not only sufficient by lively, vivid, and interesting (HEIN 1998).



Fig. 3

School Students experimenting
Physics within an Educational

Program

Photographer: anonymous museum
volunteer for the Science and
Technology Museum

© Science and Technology Museum,
Patras University

Has the Science and Technology Museum succeeded to develop and extend Patras University's cultural landscape? The answer is yes; many achievements have been made in this direction. The Science and Technology Museum is fulfilling its civic responsibility to help produce well informed citizens as well as specialist scholars. Since the beginning of its operation it has played the real role of a university museum and has been distinguished by the wide range of audiences it was able to attract (KELLY 2001a). It doesn't offer visitors the satisfaction to simply gaze at worthy displays of exhibits in glass cases. Visitors are actively involved with the exhibits, to learn informally and to be entertained simultaneously. The museum is looking at ways to constantly improve access to its exhibitions so they can be enjoyed by more people. It uses many ways of doing this as for example new technologies, live interpretation, interactive experiments, arts and performing arts. They are all valid ways of trying to demystify the museum as well as science and technology, and help visitors make more sense of the collections (CAULTON 1998).

Thus, the Science and Technology Museum was also able to bring an important number of visitors, mostly children, adults, and students to the museum and consequently to the University¹¹. Direct contact with collections is one of the special things it can offer. Children, teens, students, and any type of visitors participating in the museum activities, all seem to have been affected by the opportunity to work with the “real thing”. Many were inspired by the objects—both immediately on site where the opportunity to interact with the objects was much valued, but also for children and teens back to classroom, where the impact of using the objects could provide inspiration for a term’s work (CLARKE 2002).

The museum was also able to focus the society’s interest in science and technology and in the University and open the University to society. Through engaging with museum collections, children, teens, students, the public can develop their understanding in specific and grounded ways and preconceptions can be challenged (CLARKE 2002). Clearly, in considering learning in the free-choice environment of museums, the interest and beliefs of the learners are fundamental (FALK 1992). It is understood that learning requires active perception, attention and encoding, and STM tries to develop processes that can be appreciated by the biggest possible number of people.

Therefore, strong relations with society have been developed, the three levels of education have been connected, (Fig. 4) scientific and technological Literacy has increased, and the quality of cultural services of the University of Patras have been enriched. All the above actions have reinforced the message that Patras University is a place of culture and learning, and have extended the University’s cultural landscape (KELLY 2001a).



Fig. 4

University students interacting
with school students within the
Educational program ‘Adventures
in the SpiderInternet City’
Photographer: anonymous museum
volunteer for the Science and
Technology Museum
© Science and Technology Museum,
Patras University

Conclusion

Using different means of dialogue and mediation the Science and Technology Museum communicates and interacts with the university community and society. STM was firstly connected to the local society. It gave access to the University, to science and technology and promoted a different. Connections with school groups and student groups from neighboring areas followed. Providing understanding of science helped the Museum succeed in amplifying and transforming Patras University.

Now, the Museum’s connection with society is extended to most parts of Greece. There are visitors from different parts of Greece as well as a number of foreign visitors. The connection with society was increased by a nationwide photography contest ‘Tele-communicate’ that has been launched in the beginning of 2016 for the International Museum Day ‘Museums and Cultural Landscapes’ covering three categories: children, teens, and adults. A number of school and university students, school teachers and others have worked from winter to spring this year in order to participate in the contest.

The contest gave the museum great results. On one hand the contest amplified the Science and Technology Museum’s visibility, as well as Patras University cultural landscape. On the other, the museum was able to collect a very good photographic archive on telecommunications today and the past for the future.

¹¹ When the museum opened in 2009 the number of visitors was 10.000. In 2015 the museum had 42000 visitors.

The continuation of developing Patras University cultural landscape process will be very long and on-going. Many efforts to increase the connection with society should continue to be made, year by year and new activities to attract the public should be invented to keep society interested. Interaction with society needs to be constant, as well as society's needs should be updated every time. Finally, to accomplish the goals to amplify the University's cultural landscape, Patras University should finish the Science and Technology Museum building and provide the Science and Technology Museum with the necessary specialized staff and resources.

New landscapes emerge with changing life-styles, but ways involving the preservation of valuable elements and areas can become embedded functionally (ANTROP 2006). The transformation of Patras University landscape attracted the society's regard and turned it on the University, on the Museum, and on science and technology. It brought a different life style to the University and society. Through a global, integrated approach in which nature meets culture, past meets present, tangible heritage meets the intangible, science and technology meet arts and culture, the protection of scientific and technological cultural heritage, as an expression of living culture, contributes to the development of society, and the university's landscape (RINALDI 2009).

Thus, the STM, having embedded values of Patras University, as well as values of science and technology, has always been able to educate society in using museums as an interesting and entertaining activity for their leisure time and demonstrated that museums are an integral part of social and cultural capital (KELLY 2006).

Literature Cited

- ANTROP, M., 2005. "Why landscapes of the past are important for the future" *Landscapes and Urban planning*, 70 21–34, www.sciencedirect.com, SCIENCE@DIRECT
- ANTROP, M., 2006. "Sustainable landscapes: contradiction, fiction or utopia?" *Landscape and Urban Planning*, 75, 187–197, www.sciencedirect.com, SCIENCE@DIRECT
- CLARKE, A., DODD J., COOPER GREENHILL E., O'RIAIN E., SELFRIIDGE L., SWIFT F., 2002. *Learning through Culture*, Leicester: University of Leicester.
- ARNOLD, K., 1996. "Presenting Science as a product or a process: Museums in the making of science", *New Research in Museum Studies: an International Series*,
- CAULTON, T., 1998. *Hands on Exhibitions managing museums and science centers*. London: Routledge.
- DURANT, J., 1996. "Science Museums or just Museums of Science." *New research in Museums: an international Series*.
- HEIN, G., 1998. *Learning in Museums*. Edited by Kaplan F., Hooper Greenhill. E. London and New York: Routledge.
- FALK, J., & DIERKING, J., 1992. *The Museum Experience*. Washington D.C.: Whalesback Books.
- KELLY, L., "Measuring the impact of museums on their communities: The role of the 21st century museum", *INTERCOM 2006 Conference Paper*,
- KELLY, M., 2001a. "Introduction." In: *Managing University Museums*, ed. by Kelly M. (Paris: OECD), 7-18.
- KELLY, M., 2001b. "Conclusions." In: *Managing University Museums*, ed. by Kelly M. (Paris: OECD), 197-201
- KNELL, S., 2003. *The shape of things to come: Museums in the technological Landscape*. Leicester: University of Leicester.
- KOUFOU, A., & THEOLOGI-GOUTI, P., 2014. "Science And Technology Museum Of Patras University And Department Of Cultural Education In Primary Education, Prefecture Of Achaia, Greece. An Example Of Cooperation And Knowledge Dissemination." *Museos Universitarios Tradicion Y Futuro*. (Madrid: Campus Moncloa), 367-371
- RINALDI, M. D., 2009, "Identity and Globalization", *International Congress on Science and Technology for the Safeguard of Cultural Heritage in the Mediterranean Basin*, Cairo, Egypt,
- SIMON, N., 2010. *The participatory Museum*. Santa Cruz California: MUSEUM 2.
- STANBURY, P., 2000. *University Museums and Collections*. *Museum International*, 52(2):5-9.
- THEOLOGI-GOUTI, P., 2000. A new museum in an ancient land: Patras University Science and Technology Museum. *Museum International* 52(2): 25-27.
- THEOLOGI-GOUTI, P., 2014. Science and Technology Museum of the University of Patras: a place for non formal education and experiential approach of science and technology (Μουσείο Επιστημών και τεχνολογίας Πανεπιστημίου Πατρών (ΜΕΤ ΠΠ): χώρος άτυπης μάθησης και βιωματικής προσέγγισης. *Notes of Museology /Τετράδια Μουσειολογίας*

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Keywords

Non-formal education - Sustainability - Networking

Breathing new life into dormant academic heritage in Spanish universities and secondary schools

Isabel García, Luis Mayo & María José Gómez

Abstract

Old and prestigious universities and secondary schools are linked historically, as evidenced by their heritage, which talks about the people and luminaries who studied or taught in their classrooms. A significant scientific and educational heritage created or acquired for the teaching of science and art is present in both contexts. The original use of the heritage may have disappeared, but new interpretations have been generated that enrich its value and extend beyond material existence. The aim is to find current connections between school and university to facilitate the production and sharing of new knowledge through projects that will give life to what is at present a 'dormant heritage'.

Introduction

At the Complutense University in Madrid, Spain, we have recently been working on the connections between the university and the public it serves. We intend to rebuild the educational and cultural landscape of the capital through the study and dissemination of the rich academic heritage preserved in certain educational institutions. There are close parallels in their origin and function between the historical collections in the oldest higher education institutes in Madrid and the ones kept in public universities. When studying the collections and their history, we searched for common ties with the aim of offering a wide and comprehensive view of the history, the objects and their potential. It is usual for institutions to carry out research into their own history and development, but rarely do they connect with other institutions unless there are joint interests. The discovery of common origins has provided the opportunity to trace the generation of similar collections in two educational contexts framed in different academic levels today. In the past, however, this was not accentuated as both were held in the same respect and with similar consideration.

Their common history starts in the nineteenth century. The study of these emblematic institutions gives a clear indication of the evolution of the Spanish educational system. This sought excellence in the training and was subject to extensive discussions that flowed from numerous legal initiatives during the century. The laws changed rapidly due to an unstable political situation.

There are many references about the need to match European institutions. In those debates France is the country that inspired many of the proposals. The liberal thought influence of the French revolution proposed an education system capable of generating an egalitarian, just and free society where the responsibility of education fell on the State, moreover education was a right that should be guaranteed to all citizens. There are direct allusions to the Condorcet report of 1792 (REAL 2012).

It is common in Spain not to give credit to its own achievements. In this case we should, as we consider it necessary, assert the relevance of the historical academic institutions. Inside the secondary school walls important scientific debates took place and many of the teachers achieved great importance and public presence. Also, these institutions were able to gather significant teaching collections with great historic and scientific value. The collections were similar to the ones found at the University, although we recognized that their significance is better preserved.

The secondary education schools, as they are known today, were established in most Spanish provinces between 1836 and 1845. From that date two areas of knowledge existed: Humanities and Sciences, the latter included mathematics, physics, chemistry and natural history (geology, botany and zoology) disciplines aimed to strengthen the observational capacities of the students, singularly centered in their own environment. The teaching of science sought to stimulate material progress and facilitate the development of future professional scientific careers. The trend was to intensify the teaching of sciences, creating pedagogical laboratories and seeking human progress, cultural actions and the development of individuals (RODRÍGUEZ 2009). In 1845 only 25 per cent of class hours were dedicated to science, however, by 1873 there was a greater recognition with a total of 44 per cent of the class hours dedicated (SANZ 1985).

Regarding the University there are references in 1821 about the establishment of a major University (called Central University) offering comprehensive studies required for the full knowledge of the sciences. This was extended to the universities of Lima, Mexico and Santa Fe in Bogota which will offer the same studies as the Spanish one. (Decree LXXXI of June 29, 1821 General Regulation of Public Instruction). In 1836 Central University moved to Madrid and in 1845 a Royal Decree established that only this University in the capital will award the doctoral degree and offer the programs needed to obtain it (article 77). At that time there were only ten universities: one central and nine in different districts.

As noted above, Spain looked to France as a model for the emergence of university faculties (HERNÁNDEZ 2008) although incorporated some modifications in educational law (Public Instruction Law. September 9, 1857). In general terms, the Spanish system applied the reduction of universities and gave the State complete control of the study programs (ÁLVAREZ 1972, 329-340). The increasing interest in science learning was established in article 14 of the Law of 1857: "As effective means to expand and complete the progress of science, the Administration will seek the growth of academies, libraries, archives and museums, and will create new schools for the higher levels of science, linking its organization to the existing ones as much as possible". In 1857, the academic and administrative sides of the secondary and tertiary institutions were permanently separated, however, San Isidro High School was aggregated to the University, and in 1874 depended only on the State. In the twentieth century German universities were also a model to complete the reforms that Spanish higher education needed. The German system proposed the integral development of the human being, promoted the acquisition of knowledge and enhanced research capacities, all this was present in the Spanish Project of University Reform of March 17, 1933. The Spanish government also granted numerous scholarships to study in Germany (GÓMEZ 2009).

The oldest High School and the biggest university

The center of Madrid and Spain is where the history of the oldest high schools and the biggest University emerged. San Isidro High School holds the honor of being the oldest educational center in Spain, inheriting a long and rich history from the fourteenth century, first with the so called Estudios de la Villa, and afterwards with the foundation of Imperial College (1603) and the Centre for Royal Studies (1625) by the Jesuits. In 1725, the Seminary of Nobles was created to train the ruling elite of the country. In 1767, King Carlos III drove out the Jesuits and recast the Centre for Royal Studies as a secular institution to boost renewal of the country.

The University completed the move to Madrid in 1837 becoming the central university and the two most important secondary schools were part of it. The University shared classrooms, cabinets, laboratories, teaching materials, scientific collections and teaching staff with the San Isidro Institute. The school of architecture, the faculties of philosophy, medicine and arts at the University of Madrid were located in their classrooms. As CORBACHO (2004: 34) stated, "Complutense University of Madrid (formerly the Central University) is the true heir to Imperial College since, in its transfer to the Moncloa campus, it took much of the cultural heritage of the Estudios". Among these collections, there is a large part of its bibliographical assets.

Teachers at the school taught basic secondary education classes, and the lecturers at the university taught the advanced classes. Both institutions were supervised by the Dean of philosophy and the Professor of political economy. Being a teacher at a high school was a preliminary step to becoming a lecturer at the Central University but it was an outstanding recognition when achieved. An example is the natural history Professor and Director of the Institute Sandalio de Pereda. He started his career as a lecturer at the School of Medicine, two years later obtained the natural history Chair at the University of Valladolid. After six years he became a professor at the San Isidro institute where he taught in thirty three courses and was the Director for sixteen years. He was an essential character in the development of the natural history cabinet and was the author of various textbooks. He was also a member of the science, medicine, natural history academies in Madrid, Barcelona and Mexico.



Fig. 1

Central University

Façade, 1920-1930

Complutense University of Madrid

General Archives

AGUCM SG/1497,01

Regrettably, after 180 years, very little of the common origin is identifiable. Most faculties moved from the center of Madrid to the University City. The university has kept part of the historic buildings in the center of Madrid where its historic library and the old assembly hall is located, as well as some of the collections.

Teaching sciences, common collections

Although some of the teachers lectured in schools and university, it is easier to use the collections to establish links between the institutions. We will focus on the teaching of the sciences, in the gathered material culture and the initiatives to promote the preservation and dissemination of cultural heritage.

Historically, the creation of educational collections and museums is evidenced more clearly in secondary schools. These were kept in the same place where they were conceived. Their historical and academic heritage can be divided into four large sections: firstly the building, secondly the library, thirdly the natural history cabinet and finally the physics and chemistry cabinet. In the university the collections grew in different locations; faculties and departments, but the cabinets were lost during relocations.

‘Good education’ was the aim, which had to be practical and based on intuitive, active and experimental teaching methods, “...due to the young age of the majority of students, it is required that, in order to obtain good results in instruction, the classes are essentially practical, and this is impossible since there are not adequate and abundant means of demonstration. Make theoretical a subject that must be experimental oblige the student to remember only words and not express ideas, leading to discouragement, and interfering in the development of their privileged intelligences”, (Instituto San Isidro Memorias: 1860-1861, 53).

There was an urgent need for teachers to count on the best scientific materials, thus encouraging the creation of cabinets. Firstly, the physics and chemistry collections were gathered. BERTOMEU et al. (2010, 2011) have studied them extensively.

In 1860, San Isidro School installed the first natural history cabinet associated with the natural history Chair. The cabinet grew and in 1877 gained the highest recognition when Sandalio de Pereda was the director. At that time, the famed professor of natural science, Manuel María José de Galdo López de Neira, worked on the establishment of the cabinet and travelled to Paris to purchase educational materials. The academic institutions had a basic catalogue provided by the State but big institutes could purchase more pieces and more expensive items. In Paris he bought a complete model of Auzoux man and numerous reproductions of zoological and botanical models (ARAGON 2012: 105-107). Galdo also published the Manual of Natural History that was used in teaching for almost half century. The collections he acquired went in parallel with writing the textbook inspired by French works of the time. San Isidro Institute had a proper space for the natural science collections. The cabinet was equipped with two rows of glass display cases with stuffed animals and teaching models. In the center, two large table cases contained minerals and fossils. In the middle a tall display case stood containing the Auzoux man as the central piece. The history of the evolution of the collections in their different stages has been studied by MARTÍN (2012, 2013). Regrettably, in the 1970s, the cabinet underwent an unfortunate reform, which modified the cabinet layout and the collections were dispersed to other locations.



Fig. 2

Natural Science Cabinet. San Isidro

School nineteenth century

Photo: IES San Isidro

In the University, gathering educational and scientific collections came later. In 1860, the Central University had six faculties and nine colleges. The Faculty of Science was organized into three sections: mathematics and physics, chemistry and natural science. Years later, a fourth one was added when mathematics and physics separated. The teaching of sciences in general lacked practical work, only the natural history section had suitable practical classes, which were taught at the National Natural History Museum. However, if we compare the collections of both institutions, we find the same concept. The same catalogues were available but in the case of the university the number of pieces was greater.

Schools and universities were also related to important scientific institutions such as the Museum of Natural Science, the Spanish Society of Natural History, the Royal Observatory and the Royal Botanical Gardens. The Royal Spanish Society of Natural History, founded in 1871, was an association created by school teachers, which assembled the leading naturalists in Spain. Its main objective was to promote the research and study of nature, the dissemination of knowledge generated, the defense of natural heritage and the training of natural science teachers.

The Museum of Natural Science also played a key role. The museum was born as a Royal Cabinet of Natural History in the 18th century, an institution dedicated to the advancement of science. From its origin until today, teaching was its fundamental purpose having a close relationship with secondary education centers and universities. It was also a vital element for the formation and distribution of collections of specimens and natural samples destined to these educational centers, especially from the second half of the nineteenth century. Thanks to this collaboration, cabinets and museums were created all around Spain becoming essential in practical teaching of the natural sciences (MARTÍN, 2014).

In 1885, the Royal Society of Natural History proposed an important educational reform to improve the natural sciences studies in Spain that was ignored until 1900. Until this year only the practical classes of natural sciences section were held in the Museum, botanical garden and in the departments of the university. The other sections of the science faculty took longer to offer the demanded practical lessons (BARATAS & FERNÁNDEZ 1992). The Royal Society also proposed measures to foster scientific research within the University and the Museum of Natural History.

Today, the national natural science museum is one of the major research institutions in Spain and works jointly with the university. Moreover, the Royal Spanish Society of Natural History has been located in the museum building since 1910. Concerning the university collections those have been dispersed and developed separately in different faculties.

Defense of heritage

The rich and varied heritage is undeniably important for its historical, educational and scientific value. Commonly, the cabinets were named as museums, an indication of significance. The collections bear a great similarity to what is found in other countries, however, the idiosyncrasy of the history of educational reforms in Spain has propitiated a reality of its own. Among other issues it has taken a long time to realize the importance of this heritage and the need to preserve it. It is certainly surprising that, for its survival, we have to talk about its defense, and not about its promotion.

In the case of schools, it was necessary to create the National Association for the Defense of the Heritage of Historical Schools. Although the first conference was organized in 2007, the Association was founded in 2010. Its objectives include work to recover their assets, whether documentary, bibliographic, scientific, or architectural; the restoration and inventory of such assets, as well as fostering cooperation among schools for scientific and educational activities.

Unfortunately, the Association has not been able to meet the objectives of heritage protection. They are very active, but as we have learnt, the real defense comes from within the institutions, which face difficult challenges in keeping the collections in their original context and guaranteeing their conservation. In addition, a more extensive awareness campaign is required, and support from public institutions provided that they understand the importance of this heritage for the history of the country and agree that it should be kept in its original context and in more suitable conditions.

The museum of education and science

These days, the dormant heritage has started to come to life. In the 1990s, there was a proposal at San Isidro school to build an exhibition space to show the collections that were in poor condition. The main problem was finding a proper space for it. Twenty years later, in the twenty first century, the school achieved its major goal of opening the Museum of Education and Science. The initiatives, enthusiasm and energy came from inside the institution, supported by the administration and carried out by teachers and students. The space chosen was the historical seventeenth century staircase, which had fallen into disuse.

Two associations and a project were essential in the development of the museum; besides the National Association for the Defense of the Heritage of Historical Schools, there is ARCE (Agrupaciones y Redes de Centros Educativos / Groups and Networks of Educational Centers), which groups educational centers, sponsored by the Ministry of Education. Its program aims to establish collaborative channels enabling clusters or networks of schools and public institutions in the field of education in Spain to work together. The purpose is to develop joint projects carried out by all the centers or participant institutions.

The project, called CEIMES (Science and Education in Madrid Secondary Schools through their Cultural Heritage 1837-1936), is a program of activities among research groups in the Community of Madrid, mostly university groups, financed by the Ministry of Innovation and the Community of Madrid for three years (2008-2011). The aim was to safeguard and enhance their scientific and educational heritage using new information and communication technology to advance the knowledge of educational innovations when experimental science was seen as essential for teaching. Most of the collections were catalogued and are accessible through the web. Thanks to this project, a very valuable book was published, titled *Science, education and heritage in historical schools in Madrid (1837-1936)* (LÓPEZ-OCÓN, ARAGÓN & PEDREZUELA 2012). This volume is divided into two parts, the second *New life for a forgotten heritage* is especially significant.

The historic royal staircase houses the school's permanent exhibition detailing its educational heritage. Books, maps, photographs, school records, illustrations and examples of student's work are on display – along with objects from the biology and physics laboratory: the Tree of Life, an array of animals stuffed by the famous taxidermists, the Benedicto Vives brothers, as well as anatomical models of plants and animals from the nineteenth century made by Dr. Auzoux. As MARTÍN stated (2012, 154) the staircase escaped the reforms of the twentieth century to serve as organizer of museographic discourse. Display cases and documents are set out in a metaphor for the ascending path to knowledge and wisdom. It is not a straight road, but a spiral that opens various perspectives and culminates with one of the most important piece in the history of the collections, the Auzoux Man.



Fig. 3
Permanent exhibition at the
Museum of Education and Science
San Isidro High School
Photo: Luis Mayo

There have been diverse initiatives to use their heritage for teaching purposes, thus creating emotional links between the students and their environment. In recent years, activities have been organized which seek the students' involvement in the care and study of the heritage of their school so that they can assess its importance and the historical significance of their educational center (MARTÍN 2012, 130-131). The most recent is a joint project to study, restore and disseminate the Auzoux models kept in San Isidro School and at the Veterinarian Museum of the Complutense University.

The extension of the museum

In reality, it is more a dispersion, rather than an extension of the Museum, probably due to declining importance of the collections as teaching elements and the lack of awareness of these as heritage collections. BERTOMEU et al (2011) pointed out that the most outstanding educational collection was the one belonging to San Isidro School. Some pieces date from the eighteen century and were produced by the school teachers so they are unique. Despite the richness of this heritage some unfortunate events have happened in recent years.

In 1995, the herbarium with the plants of the Community of Madrid moved to the Royal Botanical Gardens. In 1985, the collection of around 850 devices from the physics and chemistry cabinet was transferred to the Ministry of Culture for care and restoration. The reasons cited for this were lack of space and maintenance. Later in 1998, the collection unexpectedly became part of the newly-created National Museum of Science and Technology; most of the pieces were in storage. With the passage of time, reference to the origin of the pieces is being lost, including the original educational purpose. Some of those pieces are now part of the permanent exhibition of the museum called cabinet room opened in 2014.

This space of the Museum exhibits a large number (166 pieces) of the type of objects that were used in experimental sciences - mainly in the nineteenth century - providing a journey through the study and teaching of various scientific disciplines, such as meteorology, heat, electromagnetism, optics, sound, mechanics, etc. The pieces come from the San Isidro High School and from the Faculty of Physics at Complutense University of Madrid. This may seem a positive encounter for both institutions. They seem to find the spirit of continuity in showing complementary collections in common spaces to present similar ideas in science education after almost 180 years. Nevertheless, the collections are not treated in the same way.

The labels on the university exhibits read "Lent by the Faculty of Physics". At San Isidro school, it only says, "Comes from..." Sadly, it can be interpreted that this means that the pieces do not belong to the school any longer although the collections were on display in the museum. There is a general feeling at the school that they have lost part of their identity, because those objects will probably not return. According to the school's teachers, the Museum has also lost its original assignment, unitary character and pedagogical usefulness, and runs the risk of losing its history (MARTÍN 2012, 154)

The future

The museum project has been successful, since other historical schools either have permanent exhibitions or occasionally organize temporary shows to highlight their historical, artistic and scientific heritage, but clearly, these initiatives are not enough. There is a need to address the question in a more comprehensive manner, in colloquial parlance, to get together with the rest of the family and work on the continuity of educational levels. By recognizing the importance of the institutions, we need to find and work out the connections in order to bring their history and collections to life.

In order to establish the ties, the true cornerstones making a real contribution in education and science must be sought out. The objective is not to lose the link with the past and the goals achieved by teachers and students. Favorable circumstances have promoted meetings that can lead to lasting cooperation. Collaboration on work with the natural science collections at the San Isidro museum and the Fine Arts Faculty at Complutense University of Madrid has just started. This conveys a complementary but different view to the scientific one. In both institutions, there is the solid belief that it is necessary to strengthen links between secondary education and university. Students, teachers and researchers are working together helping to bridge the gap between institutions.

Work in the learning spaces on studying real objects, contextualized within the framework in which they were used, are a wonderful tool to generate a social conscience committed to humanistic knowledge (GONZÁLEZ & BARATAS 2012, 97). Once positive results have been produced, this work must continue and extend its spatial limits to other national and international institutions.



Fig. 4
Snake head
Auzoux anatomical model
collection
San Isidro High School
Photo: Daniel Rivera

Conclusion

The secondary schools have played an important part in educating and inspiring the elite of Spanish society. San Isidro High School was the first to be created and the best in reflecting the history of secondary education and history in general. Numerous students have become a significant part of Spanish history: politicians, scientists, philosophers, musicians, journalists, writers, including four literature Nobel Prize winners. In addition, some of their teachers were prominent science figures. This human potential is reflected in a very valuable historic and educational heritage.

Moreover, between the mid-nineteenth and to mid-twentieth centuries, the university model remained very stable, and the Central University was the benchmark for other Spanish universities and the political and social landscape at the time. Many of their teachers also had political responsibilities (SAN ANDRÉS 2015, 17). The relationships between the tertiary and secondary educational levels have been diverse, but a common ground concerning heritage, docents and text books can be recognised.

In the last years there is a growing interest in the history and heritage of education at all levels. One hundred and fifty years after the creation of the secondary institutes, in 1995, various activities and exhibitions were staged to celebrate this important anniversary. From then on, a commitment was made to continue working on preserving, defending and disseminating the valuable architectural, scientific and documentary heritage that they treasure. We saw some interesting results but many initiatives have not progressed very far and have been unable to rouse the dormant heritage as yet. Only projects that go beyond the walls of the institutions can help in this task. It is clear that many disciplines merged that can offer many stories and points of view to enrich this historical material. For this reason it is important to recuperate the relationships between educational environments with proposals that are durable over time.

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Literature cited

- ÁLVAREZ DE MORALES, A. 1972. Génesis de la universidad española contemporánea, Madrid, Instituto de Estudios Administrativos.
- ARAGÓN, S. 2012. Historia de objetos que cuentan historias: plantas, rocas y animales en los institutos históricos madrileños. In: Ciencia, educación y patrimonio, eds. L. López-Ocón, S. Aragón & M. Pedrezuela (Madrid: Ceimes, CSIC and Comunidad de Madrid), 105-116.
- BERTOMEU SÁNCHEZ, J.R. et al. 2011. Las colecciones de instrumentos científicos de los institutos de enseñanza secundaria del siglo XIX en España *Historia de la Educación*, 30: 167-193.
- BERTOMEU SÁNCHEZ, J.R. et al. 2010. Los Instrumentos Científicos de los Centros de Enseñanza Secundaria en España: historia, estado actual y futuro del patrimonio científico educativo. In *Coleções Científicas Luso-Brasileiras: Patrimônio a ser descoberto*, eds. Granato, M. y Lourenço, M.C. (Rio de Janeiro: Museu de Astronomia e Ciências Afins - MAST/MCT), 15-46.
- CORBACHO, J. 2004. Una pequeña gran historia. Guía breve del Instituto San Isidro. Madrid: Publicaciones San Isidro.
- CONDORCET, J.-A.-NICOLAS DE CARITAT. 1792. Rapport et projet de décret sur l'organisation générale de l'instruction publique: présentés à l'Assemblée Nationale, les 20 et 21 avril 1792 impr. par ordre de l'Assemblée Nationale. 1792.
- FADÓN GUERRA, I. 2008. IES Cardenal Cisneros. Madrid. CEE Participación Educativa 7: 55-59.
- GÓMEZ SÁNCHEZ, T.F. 2009. La universidad alemana, una referencia para el Proyecto de Ley de Reforma universitaria de 1933 In: *Influencias alemanas en la educación española e iberoamericana (1809-2009)*, Coord. HERNÁNDEZ DÍAZ J. M. (Salamanca: Globalia Ediciones Anthema).
- GONZÁLEZ BUENO, A. & A. BARATAS DÍAZ 2012. Los desvanes de la memoria. Museos y colecciones científicas en la universidad. In: Ciencia, educación y patrimonio, eds. L. López-Ocón, S. Aragón & M. Pedrezuela (Madrid: Ceimes, CSIC and Comunidad de Madrid), 93-101.
- HERNÁNDEZ DÍAZ, J. M. (ed.) 2008. *Influencias francesas en la educación española e iberoamericana (1808-2008)*, Salamanca: Universidad de Salamanca.
- Instituto de San Isidro. ca. 1876). *Cursos académicos de 1858 á 1875*. Madrid Colección de memorias.
- MARTÍN ALBALADEJO C. 2014. El Museo Nacional de Ciencias Naturales y la enseñanza de las Ciencias de la Naturaleza en España: las colecciones como herramienta didáctica. *Boletín de la Real Sociedad Española de Historia Natural. Sección Aula, Museos y Colecciones*, 1: 7-24.
- MARTÍN VILLA, R. 2013. Aspectos de la enseñanza de las ciencias naturales en el Instituto San Isidro y de su gabinete de historia natural. In: *El Instituto de San Isidro: Saber y patrimonio: apuntes para una historia* (Madrid: Consejo Superior de Investigaciones Científicas), 75-102.
- MARTÍN VILLA, R. 2012. Actividades de difusión del patrimonio histórico educativo. El museo del Instituto San Isidro. In: Ciencia, educación y patrimonio, eds. L. López-Ocón, S. Aragón & M. Pedrezuela (Madrid: Ceimes, CSIC and Comunidad de Madrid), 151-158.
- REAL APOLO, C. 2012. La configuración del sistema educativo español en el siglo XIX: Legislación educativa y pensamiento político. *Campo Abierto*, 31,1: 69-94.
- RODRÍGUEZ GUERRERO, C. 2009. *El Instituto del Cardenal Cisneros de Madrid (1845-1877)*. Madrid: CSIC
- RODRÍGUEZ GUERRERO, C. & L. LÓPEZ-OCÓN CABRERA 2012. El Instituto del Cardenal Cisneros: la puesta en valor de un patrimonio singular. In: Ciencia, educación y patrimonio, eds. L. LÓPEZ-OCÓN, S. ARAGÓN & M. PEDREZUELA (Madrid: Ceimes, CSIC and Comunidad de Madrid), 117-134.
- SAN ANDRÉS MOYA, M. 2015. Los museos y colecciones de la Universidad Complutense de Madrid. Origen, peculiaridades y situación actual. In: *Libro del Congreso Internacional Museos universitarios. Tradición y futuro*, ed. I. GARCÍA (Madrid: Universidad Complutense de Madrid), 15-39.
- SANZ DÍAZ, F. 1985. *La segunda enseñanza oficial en el siglo XIX (1834-1874)*. Madrid: Ministerio de Educación y Ciencia.

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Keywords

Academic collections - High school heritage - Science cabinets

Article

Arts et Métiers: polysémie et dynamique d'une collection

Marie-Sophie Corcy, Lionel Dufaux & Dominique Ferriot

Abstract

Adossé à un grand établissement d'enseignement supérieur et de recherche, le Musée des arts et métiers interroge son identité au prisme de ses collections. Constituées dès 1794 pour soutenir l'industrie nationale et assurer la transmission des inventions et des procédés nouveaux de la science appliquée, servant les missions d'enseignement du Conservatoire des arts et métiers, les collections ont progressivement assumé leur caractère historique et contribué à écrire une histoire française de la technique. Elles s'inscrivent aujourd'hui dans une dynamique de recherche, nourrissant des axes relatifs à leur nature et à leur utilité et des travaux touchant l'histoire des sciences, des techniques et de l'industrie. La rénovation du musée en 2000 et l'ouverture à de nouveaux publics pose la question des moyens de valorisation des collections : expositions et actions de médiation spécifiques.

Enlarged abstract in English | Page 81

Introduction

Le Musée des arts et métiers est au cœur d'un grand établissement d'enseignement supérieur et de recherche, le Conservatoire des arts et métiers, fondé en 1794 pour «perfectionner l'industrie nationale». Les collections, constituées depuis sa création, se composent d'artefacts représentatifs de l'invention, s'illustrant sous la forme de diverses typologies (objets en grandeur réelle, modèles, échantillons, tableaux et dessins, photographies), cultivant un «art d'imitation» autour de la machine, un art propre à la transmission des savoirs et des savoir-faire (CORCY 2015). Le Conservatoire des arts et métiers a servi de modèle à la création, dans toute l'Europe, d'établissements instituant une complémentarité entre enseignement et collections. Il s'inscrit dans une économie de la connaissance et de l'invention ouverte sur l'espace public. Ses galeries en sont le point d'aboutissement ; elles consacrent l'utilité de l'invention¹, assument leur regard rétrospectif, puis se constituent progressivement en musée. Celui-ci, réputé pour la qualité et la cohérence de ses collections, s'est ouvert à un autre public. Il est aujourd'hui fréquenté tant par des spécialistes du patrimoine et de l'histoire des sciences et des techniques (historiens, ingénieurs, professionnels des musées) que par des visiteurs curieux et par un important public scolaire pour lequel des actions de médiation sont proposées, entre autres sous la forme de visites guidées et d'ateliers pédagogiques.

Utilité de l'invention / Utilité des collections

Les collections constituent le point d'ancrage du musée. C'est en effet la conservation d'une collection qui fait la spécificité du musée et le distingue, en particulier dans le domaine des sciences et des techniques, des centres d'interprétation. Les opérations d'étude, de gestion et de conservation des collections viennent nourrir les politiques scientifiques et culturelles du musée, et cela s'applique tout particulièrement aux musées universitaires (FERRIOT and LOURENÇO 2004).

Les récents travaux conduits au sein du Musée des arts et métiers sur l'histoire des collections ont permis, en appréhendant la question des contextes, d'en comprendre les mécanismes d'enrichissement et de constitution au gré de l'évolution des missions de cette institution. Ils ont permis d'apprécier la nature des collections. Le premier critère de sélection des inventions présentées dès le XIX^e siècle dans les galeries du Conservatoire des arts et métiers a été celui de l'utilité : l'utilité de l'invention, reflet de la science appliquée. Le processus de muséification des galeries, provoqué par le défaut d'actualisation des collections et le rythme de l'innovation, conduit à la reconnaissance d'un statut muséal des collections. Celui-ci est porté par le regard rétrospectif d'une idée du progrès des techniques, induit notamment par les commémorations de l'Exposition universelle de 1889 (CORCY 2013), et ancré par la volonté de contribuer, au lendemain de la Première Guerre mondiale, à la création d'une histoire (française) de la technique. La figure de l'inventeur prend, peu à peu, le pas sur l'invention ; le génie humain et sa capacité d'innovation sont réintroduits dans les galeries aux côtés des traces matérielles de l'invention au moyen d'un dispositif narratif et de représentations (bustes, portraits...).

L'utilité des collections se substitue alors à celle de l'invention. Les collections, patrimoniales, se cherchent une nouvelle cohérence, délivrent un discours plus «universel», échappant désormais aux impératifs d'un établissement conçu comme le bras armé de l'État pour les questions industrielles, deviennent un support à la narration, résonnent différemment. Le musée du Conservatoire tente alors, brièvement et souvent par opportunité, l'expérience de la spécialisation en créant des musées dans le musée [Musée de la prévention des accidents du travail et d'hygiène industrielle (1904), Musée de la photographie et du cinéma (1927) ; galerie de téléphonie et télégraphie (1920) ; salle des chemins de fer (1942)], avant de réaffirmer, dans les années 1960, sa vocation généraliste. En 1963, il prend l'appellation «Musée national des techniques».

¹ CORCY, M.-S. 2015. Le Conservatoire des arts et métiers, l'invention et l'inventeur : l'utilité et l'expérience au service de l'industrie nationale / la fabrication d'une histoire des techniques. Colloque international Fabrique des sciences, fabrique des arts, Mudam Luxembourg, 15-17 octobre 2015 (unpublished).

C'est encore le principe d'utilité qui conduit à la rénovation du Musée des arts et métiers à l'aube du XXI^e siècle : l'utilité d'un musée généraliste dédié à l'histoire et à l'actualité des techniques, alors que les établissements de promotion de la culture scientifique et technique se développent et monopolisent le débat dans l'espace public; l'utilité des collections techniques et de la science appliquée dans le contexte de l'émergence des technologies du numérique et de la dématérialisation. Le Musée des arts et métiers fait le pari de s'ouvrir à un public plus large en repensant son exposition permanente sur la base d'un découpage thématique et chronologique, par « domaines » complémentaires et favorisant la médiation par le biais d'interfaces pédagogiques innovantes, replaçant l'artefact – et donc les collections – dans un système de médiation, dont se sont inspirés depuis nombre d'autres établissements. Le Musée des arts et métiers reprend sa place dans le paysage des établissements de culture scientifique et technique en affichant son atout : ses collections.

**Le domaine Mécanique du Musée
des arts et métiers avec, au sol,
le chemin de fer Decauville qui
assurait la liaison entre les galeries
et les amphithéâtres**
© Musée des arts et métiers-
Cnam/M. Favareille



Mais la rénovation du musée s'est avant tout appuyée sur un colossal chantier des collections, expérience inédite dans l'histoire de l'établissement et qui fait aujourd'hui date dans l'histoire des musées. La rénovation des bâtiments, à Paris, rue Saint-Martin, est le corollaire à la création de réserves, construites en 1994 sur l'ancienne friche industrielle du Landy à La Plaine-Saint-Denis, offrant les conditions optimales de conservation des collections (MUSEE NATIONAL DES TECHNIQUES, 1994). Basées sur un modèle original, l'accessibilité des collections, ces réserves vont au-delà d'un simple lieu de stockage: centre de ressources ouvert aux chercheurs, elles offrent un accès privilégié aux collections qui ne sont pas exposées au musée (PICARD 1996). La mise en œuvre de cet outil de référence a nécessité, entre 1994 et 1998, l'organisation du déplacement de près de 80.000 artefacts, accumulés depuis plus de 200 ans, localisés dans les salles, greniers et caves, et s'est confrontée à la difficulté du récolement. L'accessibilité des collections, s'appuie tout d'abord sur la mise en place, au sein des réserves, de structures adéquates à la conservation des différentes typologies parmi les collections et l'adoption d'un système informatique de localisation emprunté à l'industrie (codes à barre assurant la traçabilité des mouvements). Par ailleurs, elle suppose et à la fois permet le référencement des collections selon les méthodes de l'inventaire descriptif et scientifique propres à la gestion muséale: l'identification de l'œuvre, de l'inventeur et/ou du constructeur, son contexte de création et d'intégration dans les collections constituent autant de facteurs essentiels à leur perception.



**Magasin de conservation dans
les réserves du Musée des arts
et métiers, construites en 1994 à
Saint-Denis**

© Musée des arts et métiers-Cnam/
L. Boegly

Le référencement des collections s'opère ainsi grâce à une base de données informatique qui devient le creuset de millions de données résultant de l'expertise physique de l'œuvre et de l'analyse des sources archivistiques. Celles-ci se composent notamment des inventaires et autres listes (lacunaires) de récolement, des éditions successives des catalogues des collections, et plus généralement des brevets d'invention et des sources propres à l'histoire des techniques (ouvrages, périodiques, articles et communications). La base de données constitue l'outil essentiel pour la gestion et la recherche sur les collections; consultable sur Internet dès 1998², elle devient la vitrine des collections du Musée des arts et métiers. Le Musée des arts et métiers s'affiche ainsi «hors les murs», et cette nouvelle visibilité équivaut déjà à la renaissance de ses collections.

Le référencement autorise alors l'élaboration d'une politique scientifique consciente des points forts et des fragilités de la collection. La gestion des collections, qu'il s'agisse d'enrichissement, de conservation préventive ou de restauration, trouve des arguments scientifiques pour asseoir ses actions sur deux terrains géographiquement éloignés mais bien complémentaires : les salles d'exposition et les réserves. Les réserves se posent comme le lieu privilégié de la recherche, appliquée dès lors que ses résultats sont utiles à la gestion des collections. C'est ainsi que les travaux touchant à l'histoire des pratiques de gestion ont permis de définir la date d'attribution d'un numéro d'inventaire fixe et chronologique, et donc de dater précisément les registres d'entrées, et trouvent une incidence directe sur le récolement des collections. De même, il est possible d'esquisser une nouvelle politique d'acquisition privilégiant les jalons technologiques, s'ouvrant sur le contemporain et consolidant la vision rétrospective des avancées technologiques les plus représentatives ou des applications les plus significatives et conforte la dimension généraliste des collections. Elle reconsidère la question du «prototype» et des innovations ratées. Elle se fonde dans l'approche simondonnienne des séries et des «lignées techniques» (e.g. BONTEMS 2016).

Les opérations de gestion des collections forment ainsi le premier pilier sur lequel peuvent s'appuyer les musées universitaires. L'inventaire et la conservation préventive sont les préalables à la construction d'une politique scientifique et culturelle, assumant la dimension rétrospective de ses collections et animée par une politique prospective en matière d'enrichissement. Le musée s'appuie sur les textes réglementaires en vigueur, en particulier le Code du patrimoine, qui fixe les obligations et garantit la protection juridique des collections des établissements labellisés «Musée de France». À ce titre, il bénéficie du contrôle scientifique et technique exercé par le ministère de la Culture, en particulier pour les opérations de récolement, de suivi de l'inventaire ou encore de restauration.

² Le Musée des arts et métiers a été le premier musée français à disposer d'un site Internet, mis en ligne en 1994.

Tradition et utilité de la recherche

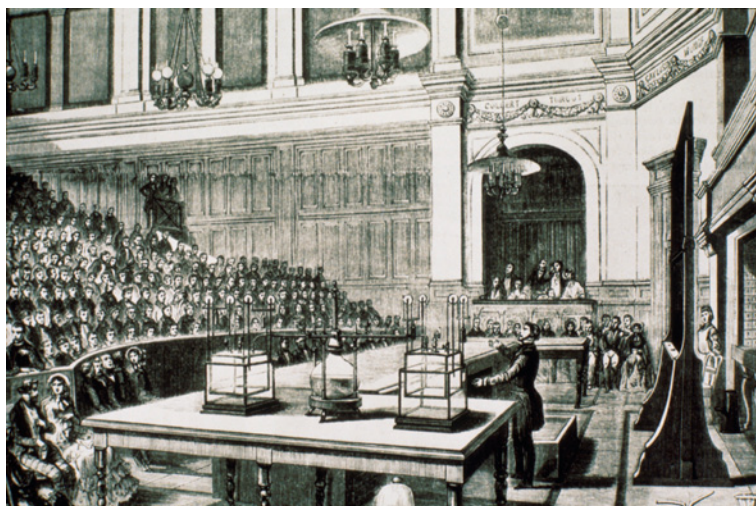
Si la recherche ne constitue pas une spécificité du musée universitaire par comparaison avec les autres musées, dépendants ou non du ministère de la Culture, le Conservatoire des arts et métiers a, dès les premières années de sa création, concilié l'enseignement, la recherche et la diffusion des savoirs avec le développement de ses collections. Le Conservatoire a créé un modèle cognitif original, privilégiant la « science des faits » à la « science parlée », d'après le baron Alquier (1752-1826)³, s'articulant autour d'espaces d'apprentissage distincts, la galerie et l'amphithéâtre, où la présence d'une voie de chemin de fer, posée pour faciliter le transport des collections de l'un vers l'autre, prend une dimension symbolique et forge, en hommage aux premiers démonstrateurs, le mythe d'un « Conservatoire du geste et des pratiques ».

Eugène Péligot, professeur titulaire
de la chaire de chimie appliquée,
réalise l'expérience de la synthèse
de l'eau devant les auditeurs de
son cours

Gravure, 1847

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Ainsi les professeurs titulaires d'une chaire d'enseignement prennent part, tout au long du XIX^e siècle (et plus ponctuellement au siècle suivant), au développement des collections, commandant des modèles « pédagogiques » auprès de constructeurs parisiens, faisant jouer leur expertise dans les sociétés savantes ou les jurys des expositions universelles, mettant en oeuvre leurs réseaux pour susciter des donations, que l'objet soit utile à leurs recherches au sein du laboratoire, appuie leurs leçons dans l'amphithéâtre, ou trouve une destination dans les galeries (DUFAUX 2015). Les exemples sont légion ; quelques chaires (Mécanique, Géométrie descriptive, Filature et tissage, Physique appliquée, Verrerie et céramique...) ont toutefois davantage assumé ce rôle. Les inventaires font ainsi état de mutations d'appareils et d'instruments issus du laboratoire ou du cabinet du professeur vers les galeries publiques. La recherche s'ouvre toujours, au Conservatoire, sur l'espace public. L'exemple du cours (1938), puis de la chaire (1941), de Téléphonovision⁴, est encore significatif au XX^e siècle : le laboratoire utilise les collections du musée dans le cadre de ses travaux et accompagne le développement de collections liées à la télévision ; des instruments qui ont servi à Eugène Huguenard (1881-1954) ou à André Didier sont portés à l'inventaire patrimonial, devenant ainsi de précieux témoignages de l'activité de la chaire : c'est le cas en 1959 de la caméra de télévision mécanique⁵ (1935) de René Barthélemy (1889-1954) ou du disque de Nipkow⁶ de l'émetteur de télécinéma (1938) de la tour Eiffel. Au contraire, la mise en oeuvre de la galerie des arts graphiques et de la photographie, en 1881, et les conférences publiques instituées en collaboration avec la Société française de Photographie dans les années 1890, servent (en vain) le projet de création d'une chaire de photographie. C'est ce même cas de figure en ce qui concerne la volonté d'instituer, à la même époque, les chaires d'art appliqué, d'électricité ou des chemins de fer, avec plus ou moins de succès.

3 Charles-Jean-Marie Alquier, Rapport sur une résolution du Conseil des Cinq-Cents relative au Conservatoire des arts et métiers. Séance du 27 nivôse an VI, Paris, Imprimerie nationale, 1798.

4 Le terme « téléphonovision » est inventé en 1938 par Jean Perrin (1870-1942). Arch. Cnam, chaire de Téléphonovision, J. Mesnager, Rapport de la commission d'examen des candidatures au cours de Téléphonovision, 3 juin 1938, p. 2 (CORCY 2014).

5 Inv. 20807.

6 Inv. 20823.

**Paraboloïde hyperbolique,
génération rectiligne double.
Modèle pour l'enseignement de la
géométrie descriptive construit par
la maison Pixii Père et Fils pour le
professeur Théodore Olivier, 1830
Inv. 4439
© Musée des arts et métiers-Cnam/
S. Pelly**



La question du public – on parle d'auditeurs concernant l'enseignement au Conservatoire – est une autre récurrence dans l'histoire de l'établissement. La création d'un haut enseignement en 1819 est motivée par la nécessité de former ingénieurs et techniciens dans le contexte de la révolution industrielle, tandis que les éphémères «leçons détachées», proposées dès 1849 et dispensées le dimanche, s'adressent aux chefs d'atelier, contremaîtres et ouvriers (FONTANON AND PESTRE 1994). Les conférences populaires, héritées de ces «leçons détachées», toujours dispensées, et les visites-conférences des galeries, initiées au début du XX^e siècle, perpétuent cette volonté de diffuser la recherche en proposant des modes appropriés selon les publics. L'université de tous les savoirs (UTLS) s'installe ainsi au Conservatoire en 2000.

L'histoire des collections nous permet d'appréhender ces aspects et notamment celui de l'usage des collections. L'étude de la constitution des collections est un chantier très récent, à la marge du courant historiographique initié dans le cadre du bicentenaire de l'institution. Il résulte des possibilités permises par l'accessibilité nouvelle des collections et des outils institués pour assurer leur gestion. Les travaux entrepris depuis une quinzaine d'années et les trois colloques internationaux⁷, organisés en collaboration avec le milieu universitaire et les Archives Nationales ont permis d'afficher une méthodologie combinant l'histoire des pratiques de gestion, l'histoire de l'institution, l'histoire des techniques⁸. Ils s'intéressent à l'invention et aux artefacts imaginés pour la représenter. Ils interrogent le statut des collections et la matérialité des sources et se réfèrent à l'histoire de l'institution, en considérant l'évolution de ses missions ; ils se raccrochent à l'histoire de l'industrie et des réseaux de sociabilités. Ils favorisent la convergence de plusieurs champs de recherches, touchant l'histoire, l'histoire de l'art, l'épistémologie ou encore la muséologie, et ouvrent sur d'autres aspects, sociologiques ou anthropologiques, en s'attachant à la question des usages. Ces travaux ont jusqu'ici proposé une approche certes structurée des collections qui ne dément toutefois jamais la possibilité d'en déduire de nouvelles grilles de lecture. Les axes développés dans l'exposition «Eppur si muove»⁹, présentée en 2015 en collaboration avec le Mudam - Luxembourg, espace partagé entre art et technique, dérivent de cette nouvelle approche globale des collections, donnant à considérer l'objet technique, historique, dans son rapport aux problématiques contemporaines relayées par les artistes.

7 Voir CORCY, DEMEULENAERE-DOUYERE and HILAIRE-PÉREZ 2007, CARRE et al. 2012 et ANA MARIA CARDOSO DE MATOS (Université d'Evora), MARIE-SOPHIE CORCY, CHRISTIANE DEMEULENAERE-DOUYERE (Archives Nationales), IRINA GOUZE-VITCH (EHESS), colloque international « Cabinets de curiosités, collections techniques et musées d'arts et métiers, Origines, mutations et usages, des Lumières à la Seconde Guerre mondiale », Paris, Musée des arts et métiers (Cnam), Centre Maurice Halbwachs (EHESS) et Université d'Evora (CIDEHUS), 2011 (unpublished).

8 Marie-Sophie Corcy, communication « Méthodologie et sources pour une histoire de la constitution des collections du musée du Conservatoire des arts et métiers », séminaire Penser/classer les collections techniques, Liliane Hilaire-Pérez (EHESS, Paris VII), Sophie Archambault de Beaune (Lyon III), Valérie Nègre (Ecole nationale supérieure d'Architecture de Paris La Villette), Fabien Simon (Paris VII), Christiane Demeulenaere-Douyère (conservateur en chef du patrimoine), Koen Vermeir (CNRS), Céline Trautmann-Waller (Paris III), 6 mars 2014.

9 Eppur si muove – art et technique, un espace partagé, Mudam Luxembourg, Musée des arts et métiers, 2015.

La politique d'acquisition s'empare de la question des usages. Les objets proposés par le public au musée n'ont, sauf exception, comme ce fut récemment le cas avec un modèle de Cinématographe Lumière, plus de lien avec le contexte de l'invention; l'usage se pose comme un argument, là où la proximité avec l'inventeur ou le constructeur était autrefois déterminante. L'acquisition d'un appareil photographique Vest Pocket Autographic Kodak¹⁰ ne se justifie pas par l'absence de ce modèle parmi les collections ni par son rôle dans l'histoire des techniques, mais par ses caractéristiques sociologiques et l'histoire personnelle du donateur: le Vest Pocket est qualifié de «Kodak du soldat» pendant la Première Guerre mondiale; il a été offert au donateur par sa mère qui le tenait de soldats pendant ce conflit. L'objet fait état d'une autre proximité, celle de l'utilisateur, ramenant la dimension sociale de la technique au cœur des préoccupations du musée. C'est encore cet argument qui motive l'acceptation du don d'un récepteur de télévision¹¹, acquis en 1953 pour la retransmission des cérémonies du couronnement d'Elisabeth II: cet événement a motivé de façon remarquable le développement du parc télévisuel français; en même temps, ce récepteur témoigne des avancées technologiques et de l'effort de normalisation réalisés pour permettre cette diffusion à l'échelle européenne. D'autres fois, c'est la proximité entre le propriétaire de l'objet et le Conservatoire des arts et métiers qui motive la démarche de donation; le donateur fait valoir son statut d'ancien auditeur¹². Les propositions d'acquisition qui sont régulièrement faites au musée – plusieurs centaines sont évaluées chaque année – témoignent d'un intérêt, voire d'un attachement, pour ses collections; elles sont significatives de l'engagement des publics dans le processus d'enrichissement des collections et d'évolution du musée.

La recherche peut être appréhendée selon d'autres points de vue. Les thématiques couvertes par les collections peuvent nourrir des travaux dans des champs disciplinaires variés. Mais l'étude des collections scientifiques et techniques constitue également un champ en soi, à relier avec les travaux menés dans la communauté des musées universitaires et dans les collections d'enseignement. Dans le cas des Arts et Métiers, les collections ont permis, dès les années 1950 et 1960, à l'histoire des techniques d'émerger, avec Bertrand Gille (1920-1980), Maurice Daumas (1910-1984), puis Yves Deforge (1929-1997) ou François Caron (1931-2014), et de s'affirmer comme une discipline universitaire, à la croisée de l'archéologie industrielle et de la muséologie. La reconnaissance de l'histoire des techniques au titre des disciplines historiques a soutenu l'apparition d'associations ou de sociétés savantes promouvant le patrimoine industriel autour de musées techniques et industriels. Ainsi le Centre de Documentation et d'Histoire des Techniques (CDHT) du Cnam est l'un des membres fondateurs du CILAC, Comité d'information et de liaison pour l'Archéologie industrielle, créé en 1979 par les pionniers de l'étude et de la mise en valeur du patrimoine industriel en France.

Maurice Daumas, conservateur-adjoint (1947), chef du service de la muséologie technique (1960), puis professeur d'histoire des techniques au Conservatoire (1969), se montrait très attentif à l'idée d'un réseau rassemblant les musées techniques et les chercheurs français et étrangers. Il contribua par son expertise et une politique volontaire de dépôts à la création de musées de spécialité sur le territoire national, tels le musée du Fer de Jarville ou le musée Ampère à Poleymieux-au-Mont-d'Or (JANIN and SIMÉON 1999). Son intérêt pour le patrimoine industriel et scientifique se manifeste, certes par ses publications et ses échanges avec les chercheurs étrangers, mais également par sa politique d'enrichissement, par dons ou dépôts, et d'actualisation des collections et la refonte des salles sur le mode de «sections» favorisant la convergence entre les filières techniques et rompant avec l'approche linéaire du progrès technique.

Soucieux des questions patrimoniales et conscient de l'intérêt de l'objet comme source archivistique, François Caron, historien et professeur d'histoire contemporaine à l'université Paris IV-Sorbonne, est à l'origine de la création d'un DEA d'histoire des techniques réunissant des équipes de l'EHESS, du Conservatoire national des arts et métiers et de Paris VIII. François Caron est une figure importante du comité scientifique institué pendant la rénovation du musée pour conforter les orientations du projet. Son approche de l'innovation et de la technologie, autour de «la dynamique des systèmes techniques», dans la lignée des travaux de Bertrand Gille sur la notion de filières techniques, apparaît en filigrane dans la refonte de l'exposition permanente. De même que l'on retrouve son approche des usages, et son intérêt pour l'évolution des pratiques sociales et culturelles. Selon François Caron, «la technologie [...] construit le social autant qu'elle en est le produit». François Caron affirme la dimension sociale de l'histoire des techniques, en articulant l'offre créatrice et la demande sociale, et propose une nouvelle lecture du «progrès» des techniques.

10 Inv. 45298.

11 Inv. 44840.

12 Récepteur de télévision type 441 lignes LMT modèle 3703A et loupe accessoire, inv. 45296.

Cette approche recoupe les critères actuels de la politique d'acquisition du Musée des arts et métiers et s'applique à une vision actuelle de la constitution des collections.

La mise en place du Centre d'Histoire des Techniques (CDHT) (1960) et le développement de cette discipline autour de Maurice Daumas, Jacques Payen (1931-1993) et Dominique De Place confirment l'approche historique de la collection dans l'étude et la mise en scène des jalons et des ruptures technologiques. La mise en place d'un Service pédagogique (1960) et la création du Club des Jeunes Techniciens (1961) confortent parallèlement le musée dans ses missions de diffusion culturelle vers de nouveaux publics.

Le Conservatoire est très présent dans les instances muséologiques autour notamment de l'ICOM (Conseil International des musées), créé en 1946. Maurice Daumas a été trésorier de l'Organisation internationale (1959-1971) et le Musée des arts et métiers est aujourd'hui membre de droit du Conseil d'administration d'ICOM France. En 1982, l'Assemblée Générale fondatrice de l'AMCSTI (Association des musées et centres pour le développement de la culture scientifique, technique et industrielle), présidée par Hubert Curien, se tient au Conservatoire national des arts et métiers. Le Musée abrite depuis le siège social de cette Association. En 2001, à Barcelone, Dominique Ferriot, professeure des universités au Cnam, est élue membre du Conseil d'administration fondateur de l'UMAC, le Comité international de l'Icom pour les musées et collections universitaires.

Médiation et valorisation

Les collections, référencées, gérées et étudiées peuvent être intégrées dans des opérations de valorisation à destination des publics toujours plus élargis. La construction d'un parcours de visite permanent (DUFAUX 2013), la programmation d'expositions temporaires et les réflexions quant à la médiation doivent s'imposer pour faire connaître les collections, les faire sortir de leur périmètre universitaire et contribuer à l'ouverture de l'université vers la Cité. Le cas des Arts et Métiers est éclairant : le musée devient un objet polysémique propre au décroisement et à la diversité des approches.

Objets de recherche, les collections deviennent des supports et des sujets de médiation et de valorisation au service d'un nouveau public, là où elles servaient jadis l'enseignement des techniques et la promotion de l'innovation. Les collections restent une référence tant pour les enseignants que pour les créateurs, artistes, scientifiques, qui trouvent une inspiration renouvelée dans la découverte de l'ingéniosité enfouie au cœur des machines et des instruments. À l'origine des musées de sciences en Europe (BENNETT 1997), les musées «universitaires» et singulièrement le Musée des arts et métiers peuvent ainsi être les nouveaux modèles d'une approche globale de la transmission des connaissances et de la création de nouveaux savoirs pour des publics plus nombreux, acteurs possibles d'une nouvelle médiation des sciences et des techniques et d'une culture vivante de partage des savoirs et des savoir-faire.

Maurice Daumas se montra très sensible à la médiation et apporta une réponse au décalage induit par une collection majoritairement ancienne, compréhensible par le public du XIXe siècle averti dans le domaine des techniques et des sciences appliquées, mais devenue inintelligible pour le public du XXe siècle. Cette question rejoint celle de la notoriété du musée et surtout de sa fréquentation à travers l'évolution et la diversité de son public. La modernisation du musée et la conquête de nouveaux publics, dans un contexte de rivalité entre le Musée national des techniques et la Palais de la Découverte, passaient par la mise en œuvre d'une «muséographie dynamique». Il développa ce concept dans les salles remaniées et réinterprétées du musée, sur le mode de la «fresque animée»: «Les objets doivent être présentés d'une manière vivante: la vitrine, qui les isole, doit céder la place au banc de démonstration. Tous les moyens d'explications doivent être utilisés: photographies de grand format, schémas lumineux, enregistrements sonores, etc.»¹³ écrivait-il dès 1959. Les objets sont réinstallés avec le souci de leur mise en valeur, parfois sur le mode du diorama, mais surtout de leur compréhension; ils étaient accompagnés d'un (trop) grand nombre de documents et de photographies pour les mettre en contexte.

13 Arch. Cnam, séance du 28 octobre 1959 du Conseil d'administration du Conservatoire des arts et métiers.

La rénovation du musée, dans les années 1990, replace au contraire l'artefact dans un système de médiation respectueux de la patrimonialité de l'objet mis en perspective, respectueux, aussi, de «l'esprit du lieu». Ainsi l'église, lieu pour Umberto Eco (1932-2016) d'une «conjunction qui réunit l'univers supérieur des ogives célestes et le monde chthonien des dévoreurs d'huiles minérales» (ECO 1990) garde encore les traces de ses vies passées, lieu de culte jusqu'à la Révolution puis «temple nettoyé, sans images ni fétiches» avec «à la place d'honneur dans le chœur, ancienne place de l'autel» une belle statue en plâtre de Denis Papin¹⁴ qui impressionna tant August Strindberg, visiteur émerveillé du Conservatoire en 1883 (STRINDBERG 1990). La statue de Papin, en bronze, est placée depuis 1886 dans la cour d'honneur du Conservatoire à proximité de celle de Nicolas Leblanc.

Il s'agit dès lors de rénover le Musée sans perdre son âme et de concevoir de nouveaux parcours suscitant également l'émerveillement et la curiosité de publics toujours plus exigeants. Une nouvelle pédagogie par l'objet se met en place dans le cadre d'un parcours chronologique et thématique dans l'histoire et l'actualité des techniques (FERRIOT and JACOMY 1998). Comment en effet mettre en valeur un monde d'objets qui, comme l'écrit si bien François Dagognet (1924-2015), «est souvent plus révélateur de l'esprit que l'esprit lui-même. [...] C'est dans les choses que l'esprit se donne le mieux à voir»¹⁵. C'est le défi relevé par une jeune équipe pluridisciplinaire qui, tout en respectant la primauté de l'objet, propose pour la nouvelle «exposition permanente» une série d'outils de médiation (panneaux objets-phare, albums à feuilleter, «tableaux électroniques», modèles et ateliers pédagogiques), autant de supports aux «démonstrations» et visites commentées assurées par des personnels spécifiquement formés à cet effet.

Il s'agissait de définir une politique culturelle mettant le souci du public au cœur de l'institution. Le développement des publics est un objectif majeur pour une institution soucieuse de contribuer à la richesse du débat démocratique et à l'enrichissement des savoirs. Le public des chercheurs, spécialistes et professionnels des musées a très vite été capté par les réserves, où les structures mises en place à des fins d'étude et de conservation permet de découvrir «la partie cachée de l'iceberg» et de se confronter à la réalité comme à la magie de la collection. Le public scolaire est un public privilégié pour un établissement dépendant du Ministère de l'Éducation nationale. Toutefois, l'offre culturelle demeurant importante à Paris, il nous a paru fondamental de renouveler sans cesse les propositions en matière de visites et d'ateliers. C'est donc le public familial que nous voulions convaincre. Nous avons choisi de clarifier le parcours de l'exposition: sept grands domaines pour présenter quelques milliers d'objets choisis parmi des dizaines de milliers pour leur capacité à rendre compte de l'évolution des techniques et de la science appliquée; une centaine parmi ces objets ont un statut «d'objets-phares», justifié par leur caractère historique et/ou leur qualité d'invention majeure, et sont dotés de «tableaux électroniques» mettant en scène des séquences animées (en trois dimensions) pour montrer l'objet en fonctionnement et intégrer des éléments de mises en contexte (images, films, documents d'archives). L'exposition permanente peut s'appréhender dans la succession des sections thématiques, mais peut également servir de support à la mise en œuvre de visites transversales. Le caractère original des objets et, pour beaucoup de musées universitaires, le fait d'être implantés dans des lieux historiques, classés parfois monuments historiques, sont des contraintes mais surtout un formidable attrait pour tous les publics. Les «tableaux électroniques» et les bornes multimédia qui jalonnent l'exposition permanente, puis les audioguides, marquent l'irruption du numérique dans les salles du musée. Ces dispositifs, non intrusifs, accompagnent le visiteur dans la découverte des collections, mais sans se substituer à la médiation humaine, irremplaçable pour induire la relation entre le visiteur et l'objet et renforcer l'expérience de la visite. Les visites proposées par les médiateurs constituent l'un des atouts majeurs du musée.

¹⁴ La statue en plâtre de Denis Papin par Aimé Millet rejoint le Conservatoire des arts et métiers en 1880. La statue, reproduite en bronze, est érigée dans la cour d'honneur du Conservatoire en 1887. Le plâtre original est remis à l'Administration des Beaux-arts en 1888. Arch. Cnam, 2AA/4, 2AA/5, 5AA/11, 5AA/15, 5AA/17.

¹⁵ Entretien avec François Dagognet publié par le journal Le Monde le 2 novembre 1993.

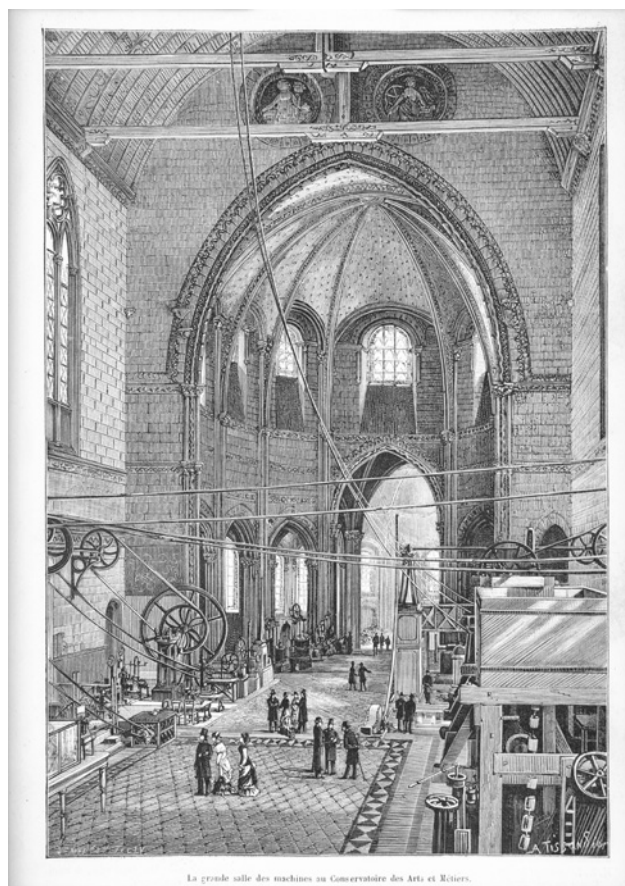
Enfin, la politique culturelle s'exprime par la nature et la qualité des expositions temporaires. Dès les années 1950, le musée a mis en œuvre une politique très active d'expositions traitant aussi bien de grands sujets historiques (Horloges et automates, 1954 ; Histoire et prestige de l'Académie des sciences, 1966) que de questions plus contemporaines («L'Espace», 1964; «Le Concorde», 1969). Après les expositions organisées pendant la période de rénovation du musée, dans et hors les murs, le musée a poursuivi l'organisation d'expositions destinées à un large public, valorisant les collections («Volt(a)», 2001; «La Boussole et l'orchidée», 2003; «Bartholdi. Les bâtisseurs de la Liberté», 2004; «1909. L'Avion de l'exploit», 2009) ou mettant l'accent sur des problématiques contemporaines («Atmosphère. Le climat révélé par les glaces», 2008; «Toujours plus vite! Les défis du rail», 2009; «Métro... Ticket pour une expo», 2011). En 2016, l'exposition «Laboratoires de l'art», conçue en collaboration avec le Mudam - Luxembourg, pose le musée industriel comme un laboratoire de la pensée technique et artistique. Les expositions temporaires offrent, dans certains cas, l'occasion d'introduire des dispositifs de médiation nouveaux, notamment interactifs ; elles permettent également d'approfondir des sujets pointus, avec l'organisation de conférences, débats et tables rondes réunissant publics et spécialistes. Le rayonnement du musée s'exprime enfin par la politique des prêts et dépôts. Plusieurs centaines d'objets sont prêtées chaque année, en France comme à l'étranger, et figurent en bonne place dans des expositions prestigieuses contribuant à la diffusion des savoirs comme au prestige de l'institution.

Quinze ans après la réouverture du musée rénové la question des publics est au cœur de la réinvention constante du musée autour de ses collections et dans ce lieu sans pareil qu'est l'ancien prieuré de Saint-Martin-des-Champs; lieu de culte devenu à la Révolution «Panthéon des techniques», plus tard «musée des machines en action», le Conservatoire des arts et métiers reste un établissement singulier qui inspire autant qu'il instruit les visiteurs de ses galeries et les chercheurs qui fréquentent les magasins de conservation et côtoient les milliers d'objets abrités et méthodiquement classés dans les réserves. L'irruption du numérique ne remet pas en cause l'importance de l'expérience et la relation à la matière qui forment nos émotions et notre compréhension du monde. Au contraire, face à la dématérialisation, à la disparition de l'objet dédié face à l'objet hybride, les collections instaurent ce rapport essentiel entre le visiteur et l'objet, entre le geste et la technique.

La «salle des machines en mouvement» du Conservatoire des arts et métiers, laboratoire expérimental de mécanique installé en 1853 dans l'ancienne église prieurale de Saint-Martin-des-Champs

Gravure de Jules Poyet publiée dans La Nature, 1880 Bibliothèque du Cnam

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Photo Studio Cnam



La grande salle des machines au Conservatoire des Arts et Métiers.

«Voici presque un siècle, Bergson demandait un supplément d'âme à une civilisation qui s'enfonçait à ses yeux dans la matière; devons-nous demander à notre culture d'images, de messages et d'information un supplément de corps? Lorsque les réseaux, en effet, se chargent du savoir et du travail, le bien le plus rare dont, bientôt, le prix montera au zénith, devient son expérience. Notre nouvelle culture se définit donc par cette inversion des anciens rapports de l'esprit et du corps.» Prononcé à l'occasion du 40^e anniversaire du Centre National d'Études Spatiales pour légitimer les vols habités, ce plaidoyer de Michel Serres¹⁶ trouve un écho particulier dans le monde des musées et particulièrement les musées universitaires riches d'objets et d'hommes, chercheurs, enseignants, auditeurs qui ensemble peuvent s'engager dans un dialogue fécond pour inscrire concrètement les arts, les sciences et les techniques dans une culture vivante.

Enlarged abstract

Les Arts et Métiers: the polysemy and dynamics of a collection

Marie-Sophie Corcy, Lionel Dufaux & Dominique Ferriot

The Musée des arts et métiers, in Paris, is the heart of a large higher education and research institution, the Conservatoire des arts et métiers, founded in 1794 to “perfect national industry”¹⁷. Its collections date from the foundation. They comprise artefacts representing invention, encompassing diverse typologies (life-size objects, models, samples, pictures, drawings, photographs) and promoting an “art of imitation” vis-à-vis the machine, as well as an art of knowledge and skills’ transmission. In Europe, the Conservatoire des arts et métiers has been a model for institutions seeking complementarity between teaching and collections. Entirely renovated in the early 2000s, the Museum was a pioneer in the concept of ‘open storage collection’, accessible to researchers in La Plaine Saint-Denis, a few kilometres from the historic Abbey of Saint-Martin-des-Champs, where the Museum is located. During the Revolution, the Conservatoire hosted scientific and technological demonstrations enabling artisans, or simply inquisitive amateurs, to “copy good models”, but also to invent and “see further”¹⁸. This tradition of conservation and innovation has resulted in more than two centuries of dynamics and innovation, making the Museum a centre for life-long education and training.

Usefulness of invention / Usefulness of the collections

Collections are the cornerstone of a museum. It is the preservation and interpretation of a collection that anchors the museum’s mission, distinguishing it from interpretation centres, particularly in science and technology. Collections’ study, management and conservation nurture museums’ scientific and cultural policies, including university museums’. At the Musée des arts et métiers, recent research into the history of its collections has enabled an understanding of how the institution’s successive missions have shaped collection constitution and development. Initial exhibition selection was determined by inventions’ usefulness and capacity to illustrate applied science. Nineteenth century Universal Expositions introduced another criterion, the contribution to a (French) history of technology. In the twentieth century, the Conservatoire des arts et métiers briefly created museums within the museum – the Museum of the Prevention of Work Accidents and Industrial Hygiene, the Museum of Photography and Cinema, Telephony and Telegraphy Gallery, the Railways Gallery – and in the 1960s a broad interest and aim was reaffirmed through the designation Musée national des techniques.

The 1990-2000 renovation brought the initial Musée des arts et métiers vocation to the Museum, by favouring collection complementarity and a thematic and chronological approach. The new permanent exhibition was organised into seven domains – Scientific Instruments, Materials, Construction, Communication, Energy, Mechanics, and Transports). Visits were concluded in the ‘church’, initially a hallowed place of worship and a ‘pantheon of technology’ since the nineteenth century, featuring instruments and machines as emblematic as Foucault’s pendulum, the Statue of Liberty original models and Blériot and Esnault-Pelterie’s aeroplanes.

¹⁶ Colloque «Quel avenir pour l'Espace?» 40^e anniversaire du CNES, La Sorbonne - 18 décembre 2001, Florilège, éditions CNES, avril 2002.

¹⁷ Convention nationale. Instruction publique. Rapport sur l'établissement d'un conservatoire des arts et métiers : séance du 8 vendémiaire, l'an III de la République une et indivisible, Paris, Imprimerie nationale, 1794.

¹⁸ Idem.

The heart of the renovation programme was the collection. The majority of the artefacts is currently in the Saint-Denis storages, after significant reorganisation and reappraisal, unprecedented in the institution's history and the recent history of museums in general. From 1994 to 1998, an inventory of c. 80,000 artefacts accumulated for more than 200 years and dispersed in multiple rooms, attics and cellars was completed. Each item was documented and allocated a bar code, a pioneering museum technique at the time. The first website providing access to the entire collection and its long-forgotten treasures went online in 1994. The museum defined an acquisition policy returning to an approach by technological series and fields that was the museum's in the ages of mechanics, the museum's golden age in the 19th century. Today, the incorporation of contemporary heritage of science in the collection is still a major challenge, but at the same time an essential component of Musée du Conservatoire des arts et métiers' mission statement.

Tradition and applied research

From its initial years, the Conservatoire des arts et métiers has reconciled teaching, research, the dissemination of knowledge and the development of its collections. The institution created an original model, privileging the 'science of facts' articulated this around distinct apprenticeship spaces, the gallery and the amphitheatre. The Decauville railway track was installed in the exhibition galleries to facilitate transport of exhibits to and from the amphitheatre.

Throughout the nineteenth century, professors played an important role in collection development, ordering pedagogical models from Parisian makers and using their networks to obtain donated objects useful to their laboratory research, illustrate their lessons in the amphitheatre, and be displayed in the galleries. In the twentieth century, the example of the 1938 Téléphonovision course – which became a chair in 1941 – is significant. The laboratory used the museum's collections for research and shaped the development of the Television collection. René Barthélémy's mechanical television camera (1935) and the Nipkow disc of the 'télécinéma' transmitter (1938) on the Eiffel Tower were used by Eugène Huguenard (1881-1954) and André Didier.

The question of the public – or listeners, as students at the Conservatoire are called – is another recurrent preoccupation in the institution's history. The creation of higher education courses in 1819 was motivated by the necessity to train engineers and technicians in the context of the Industrial Revolution. In the nineteenth century, there were 'popular lectures'; in the early twentieth century, 'lecture-visits' of the permanent collection began to be offered. Both reflect a will to disseminate research adapted to different audiences. Furthering this tradition, a 'University of all knowledge' was created at the Conservatoire in 2000, providing daily science lessons given in the amphitheatre to a wider public by the most prominent researchers in the arts, science and technology.

The history of the collections is a 15 years long research programme. It has promoted the convergence of several disciplines, focussing particularly on the question of object use. This broad approach enables the consideration of the technological object in all its polysemy, notably in its relationship to contemporary issues explored by artists. The axes developed in the *Eppur si muove* exhibition, created in 2015 with the Luxembourg Museum of Modern Art, are examples of this perspective¹⁹. Moreover, the patient research undertaken by the Centre d'histoire des Techniques (CDHT, created in 1960) and the development of the discipline by Maurice Daumas and Jacques Payen is still essential for the study and enhancement of the Museum's unique collection.

The Conservatoire des arts et métiers also played an active role in the creation of the International Council of Museums (ICOM) in 1946. Maurice Daumas, then the Museum's director, was one of ICOM's first treasurers. Dominique Ferriot, director of the Musée des arts et métiers from 1988 to 2000, advocated, with other colleagues, for the creation of ICOM's committee for university museums and collections (UMAC), in Barcelona in 2001. Its current director, Yves Winkin, joined UMAC immediately after he was appointed.

¹⁹ *Eppur si muove* – art et technique, un espace partagé, Mudam Luxembourg, Musée des arts et métiers, 2015.

Mediation and valorisation

The referenced, managed and studied museum's collections can be mobilised for activities aimed at increasingly wider audiences. Some of those activities include the creation of a new visitor experience of the permanent collection, the museum's exhibition programme and the development of workshops and panel discussions addressing exhibition themes and, more generally, social debates concerning science and technology.

University museums and the Musée des arts et métiers in particular, forerunners of science museums in Europe, can pave the way for innovative global approach to the transmission of knowledge and the creation of new knowledge for wider audiences.

After experimenting with different types of 'dynamic museography', the Museum's new exhibitions have made the object central to all presentations, thereby respecting the 'spirit of the place', which has filled with wonder visitors such as August Strindberg and Julien Green. Umberto Eco, in his *Foucault's Pendulum* (1988) takes us into the Church of Saint-Martin-des-Champs: "You enter and are stunned by a conspiracy in which the sublime universe of heavenly ogives and the chthonian world of gas guzzlers are juxtaposed." The young team charged with the 1990-2000 Museum's renovation reasserted the primacy of the object whilst creating a whole series of mediation tools (flagship object panels, albums, interactive electronic displays, models and educational workshops), all key components of the demonstrations and guided visits conducted by specially trained staff.

Audiences are diversifying. In the Museum's open storage collection, researchers can have direct access to objects and associated documentation. Schools groups and secondary school teachers are key audiences for an institution dependent on the Ministry of Education. Families can find a permanent exhibition encouraging inter-generational knowledge sharing, with numerous surprises among the thousands of objects highlighted (the automaton theatre, for example). The general public can benefit from the documentation resources provided in the permanent exhibition. Finally, Online audiences, via an increasing number of networks and new vectors of knowledge.

Problems remain, however. The Museum was the Conservatoire des arts et métiers' origin and is still at its heart. It has benefited from a complete renovation, supported and financed by the French state's Major Projects programme. However, like any other university museum, its governance is under the authority of a major teaching and research institution whose core business is the life-long training of adults. There are opportunities for the Museum to benefit from competences and networks of teachers with diverse profiles, all professionals in their speciality. However, this is also a challenge since the institution's various missions can be competing rather than complementary. In this respect, the experience of other university museums in different countries and regions, is an essential asset for envisaging new modes of relating to our different publics. This is central to the Musée des arts et métiers' past and present commitment to UMAC.

Literature cited

- ALEXANDRIAN, K. 2016. "L'accueil des publics dans les réserves du Musée des arts et métiers" colloque international «Les réserves mutualisées: accessibilité, consultation, préservation, fonctionnalité et sécurité», Link pôle européen de la Communication, Musée du Cinquantenaire, Bruxelles, <http://linkproject.eu/>.
- BENNETT, J. 1997. "Le Musée d'histoire des Sciences d'Oxford." Musée Des Arts et Métiers, La Revue, no. 21: 30–38.
- BONTEMS, V. 2016. "Sur La Classification Des Objets Techniques Selon Simondon." *Artefact*, no. 3: 183–98.
- CARRE, A.-L., HILAIRE-PEREZ L., CORCY M.-S. C. & DEMEULENAERE-DOUYERE C., eds. 2012. *Les Expositions Universelles En France Au XIXe Siècle. Techniques, Publics, Patrimoines*. Alpha. Paris: CNRS Éditions.
- CORCY, M.-S. 2013. "La Muséification des Galeries du Conservatoire des Arts et Métiers : Le Cas de l'Exposition Rétrospective du Travail et des Sciences Anthropologiques de l'Exposition Universelle de 1889." In *Les Expositions Universelles. Les Identités au Défi de la Modernité*, ed. C. DEMEULENAERE-DOUYERE & Liliane HILAIRE-PEREZ. Carnot. Rennes: Presses universitaires de Rennes.
- . 2014. "Les Collections de Télévision du Musée des Arts et Métiers." In *Culture TV. Saga de la Télévision Française [Application Pour iPad]*, ed. M. SAUVAGE & I. VEYRAT-MASSON. Paris: Musée des arts et métiers / smArtapps.
- . 2015. "La Politique d'enrichissement des Galeries du Conservatoire des Arts et Métiers, 1849-1880." *Artefact*: 165–82.
- . 2016. "Les réserves du Musée des arts et métiers : «réserves visitables» ou «réserves

accessibles?»" colloque international «Les réserves mutualisées : accessibilité, consultation, préservation, fonctionnalité et sécurité», Link pôle européen de la Communication, Musée du Cinquantenaire, Bruxelles, <http://linkproject.eu/>.

CORCY, M.-S., DEMEULENAERE-DOUYERE, C. & HILAIRE-PEREZ L. 2007. *Les Archives de l'invention - Écrits, Objets et Images de l'activité Inventive*, Actes du Colloque International de 2003. Toulouse: CNRS / Université de Toulouse-Le Mirail.

DUFAUX, L., ed. 2013. *Le Musée Des Arts et Métiers. Guide Des Collections*. Paris: Musée des arts et métiers / Artlys.

———. 2015. *L'Amphithéâtre, la Galerie et le Rail. Le Conservatoire des Arts et Métiers, ses Collections et le Chemin de Fer au XIXe Siècle*, Rennes: Presses Universitaires de Rennes.

ECCO, U. 1990. *Le Pendule de Foucault*. Translated by Jean-Noël Schifano. Paris: Grasset.

FERRIOT, D. & JACOMY, B. 1998. "Problématique d'une Rénovation : Musée des Arts et Métiers." In *la Révolution de la Muséologie Des Sciences*, ed. B. Schiele & E. Koster, 21–37. Lyon: Presses universitaires de Lyon.

FERRIOT, D. & LOURENÇO M.C. 2004. "De l'utilité des Musées et Collections des Universités." *La Lettre de l'OCIM*, 93: 4–16.

FONTANON C. & PESTRE, D. 1994. "Les 'Leçons Du Dimanche.'" In *Le Conservatoire National des Arts et Métiers au Cœur de Paris*, ed. M. LE MOËL, 102–7. Paris: Action artistique de la Ville de Paris.

JANIN, J. & SIMEON M. 1999. "Le Musée Ampère et de l'électricité." *Musée Des Arts et Métiers, La Revue* 26: 52.

MUSEE NATIONAL DES TECHNIQUES 1994. *Les Réserves dans les musées. Colloque international*, 19-20 septembre 1994. Paris: Musée National des Techniques.

PICARD, É. 1996. "Les Nouvelles Réserves du Musée des Arts et Métiers." *Musée des Arts et Métiers, La Revue* 15: 24–36.

STRINDBERG, A. 1990. *Nuits de Somnambule par Jours Éveillés (1883)*. Translated by Jean de Faramond. Paris: Librairie Séguier.

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