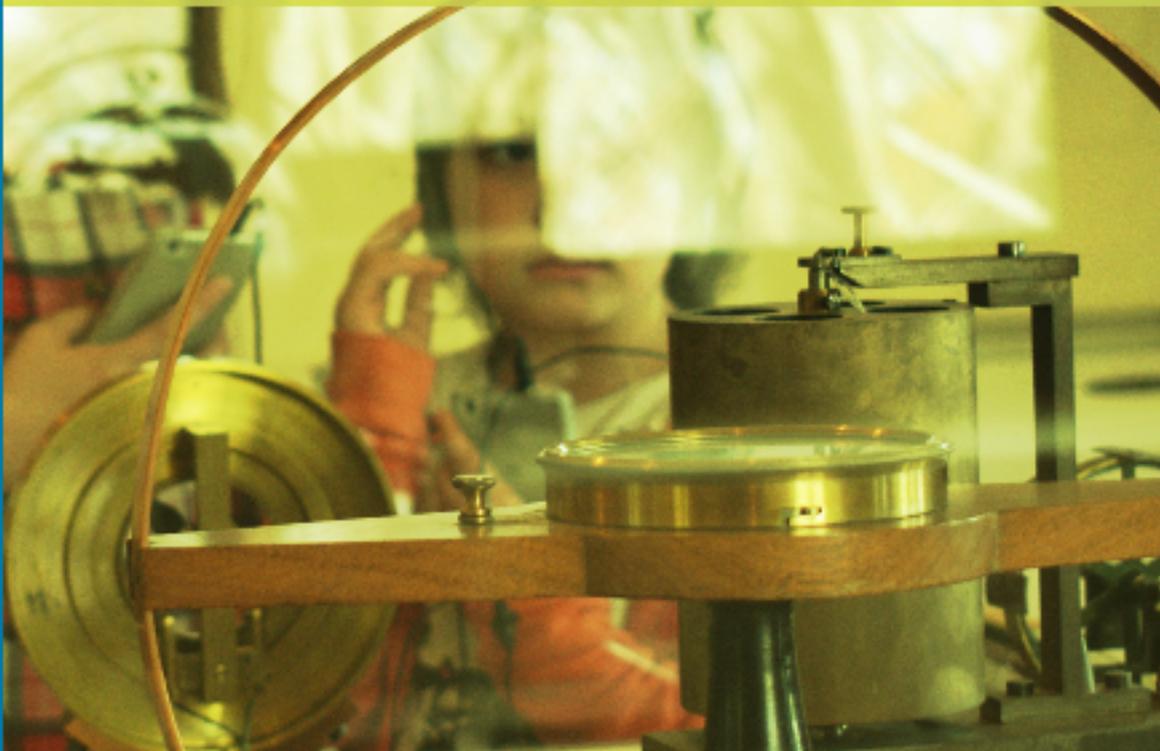


Turning Inside Out

European University Heritage:

Collections, Audiences, Stakeholders



EDITORS:

Marlen Mouliou, Sébastien Soubiran, Sofia Talas, Roland Wittje.



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Turning Inside Out European University Heritage: Collections, Audiences, Stakeholders

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Turning Inside Out

European University Heritage: Collections, Audiences, Stakeholders



PROCEEDINGS

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EUROPEAN ACADEMIC HERITAGE NETWORK

NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS,
11 – 13 JUNE 2015,
GREECE



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*Museum of Palaeontology and Geology, National and Kapodistrian University
of Athens*

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PREFACE

The Muses, according to Greek mythology, are daughters of Zeus and Mnemosyne (goddess of memory), hence consciously connected to the efforts of preserving human memory and its contents. The proper place for venerating the Muses was, in the perception of the ancient world, a Museum. The famous institution with this name in Ptolemaic Alexandria enriched the idea with the notions of collaborating scholars and of collecting cultural objects.

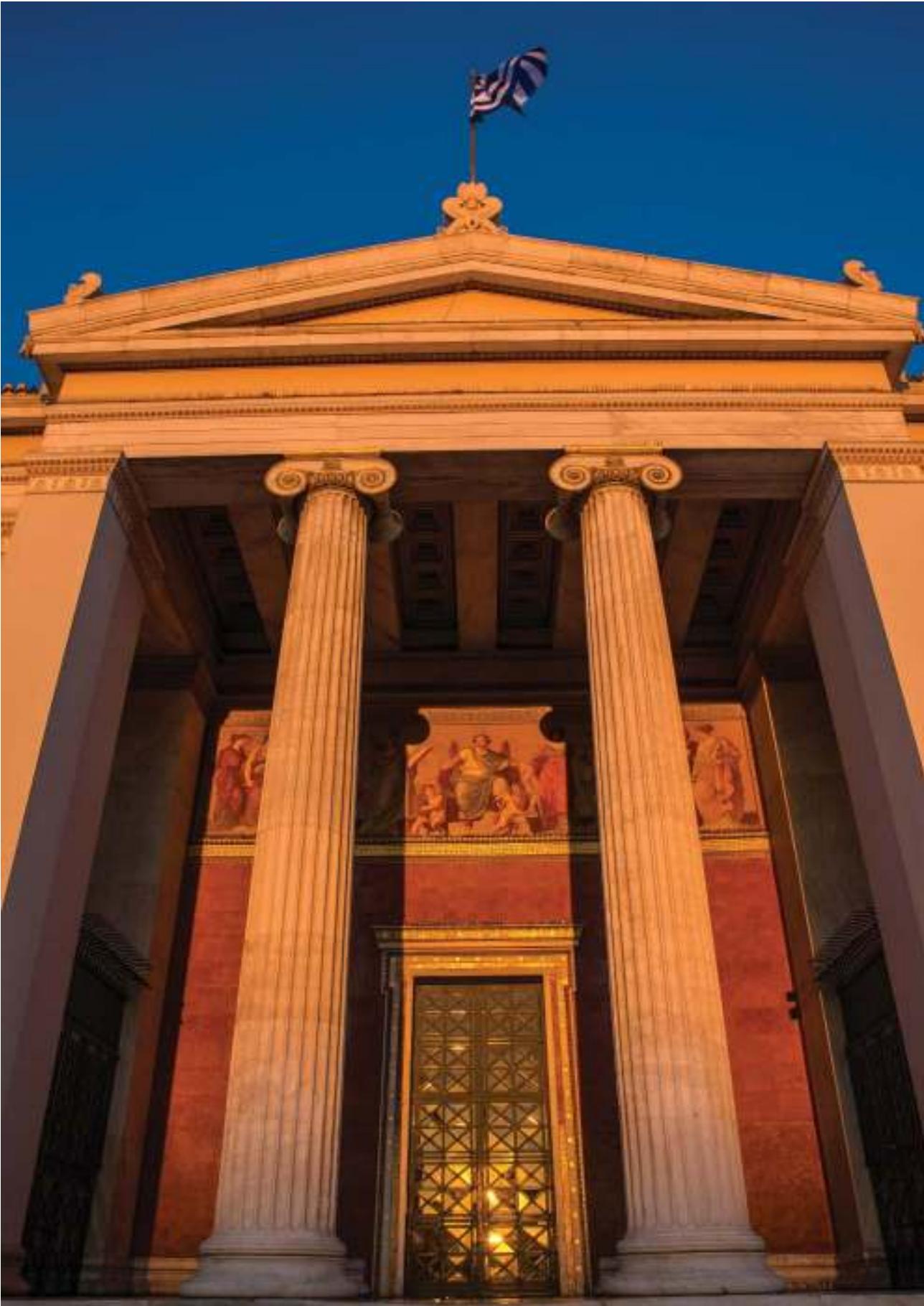
In the modern age this was practically expressed through the establishment of various university collections, by the universities themselves or with the Universities' support. University museums express in a very natural way their bearers' care for cultivating sciences and for consistently promoting and sharing valuable data via exhibitions. Museums and universities are scientific entities that possess in common a lot more than what they may express at first sight, due to the structure of organization and coordination (or the lack of them) in modern states.

In the light of these thoughts it is a great pleasure and challenge for us to organize this year's UNIVERSEUM in the city of Athens and in the venues of the University of Athens. In this context, we feel that hosting UNIVERSEUM is a great trigger and a unique opportunity to realize the university's strengths and lessen its weaknesses, and therefore attain a more substantial dialogue between the past and the present of the university in an international environment. It could even be an awakening experience.

We would like to deeply thank everybody involved in welcoming UNIVERSEUM in Athens in 2015, especially the members and the administrators of all planning and organizing committees, the enthusiastic staff of the University of Athens History Museum and of the other University of Athens museums for undertaking eagerly and carrying out conscientiously the preparation of this meeting. They all shared a common purpose and collaborated closely to achieve it despite adversity and very limited resources. In these times when lack of harmony is often painfully present, may this museological assembly and the integrated work that comes with it be a chance for orchestrating our own 'counter-music' with a lasting impact.

The edition of the proceedings of this meeting somehow embodies the same spirit and encourages the continuation of our efforts. The Muses offer abiding inspiration to their true adherents.

Professor KONSTANTINOS BURASELIS
Vice Rector for Academic Affairs and International Relations,
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Introduction: Why should universities care about their heritage?

SOFIA TALAS, ROLAND WITTJE, MARLEN MOULIOU, SÉBASTIEN SOUBIRAN

In the last decades, university heritage has garnered increasing and widespread interest: several papers and books have been published,¹ and various activities and conferences have been organised around it. This has started to enlighten us about the size and diversity of university heritage, as well as the difficulties to manage and promote it. In particular, one issue is recurrently at stake: why should universities care about their heritage? There are national or local museums that deal professionally with heritage of all kinds. Why should universities bother with their own heritage? Why should they preserve it, what for and how? Reversing these questions, how could we actually make university heritage relevant for universities? How should it be made a central issue for universities' three , namely reasearch, teaching and the so-called Third Mission, the engagement with local communities?

These are some of the main issues addressed in this volume, which brings together selected papers that were presented at the 16th Universeum Annual Meeting, held at the National and Kapodistrian University of Athens, Greece, from 11 to 13 June 2015.

The potentialities of university heritage are naturally twofold: they can be oriented towards the general public or can focus on audiences inside universities. Audience is here understood in a broad sense, including people who may use university heritage for research and teaching. The two first parts of this volume focus on these two kinds of audiences, the general public and the internal audience, respectively.

¹ See, for instance, Talas and Lourenço, *Arranging and Rearranging; Maison*, Talas and Wittje, *Shaping European University Heritage*; Ruiz Castell, *Beyond Public Engagement*. See also UMAC's *Newsletters* and Jandl and Gold, *Advancing Engagement*.

The volume starts by dealing with the public-oriented potential of university heritage, to examine how it can be made part of universities' Third Mission. This is a particularly topical question today, as the understanding of the cultural role of universities has changed drastically in recent decades, and the action of universities in communities and in society receives increasing attention as part of the national and international focus on universities' Third Mission. University museums and collections, archives and libraries can become central to this enterprise, as they have a long history as cultural actors in local communities or at the national or international level.

The first paper of the volume gets right to the core of the matter, with a discussion on the project of the future Museum of Geography of the University of Padua. After an analysis of the Third Mission as it is intended by the European Commission and in the Italian context, Giovanni Donadelli, Chiara Gallanti, Lorena Rocca and Mauro Varotto examine how geography can fit universities' social engagement and they show how the new Museum of Geography could contribute to establish new relations between the university and its territory, thus becoming a kind of "Third Mission incubator".

The following two papers by Lea Leppik and Geert Vanpaemel discuss the possible difficulties and risks of a strong public engagement. Leppik examines the specific situation of a science history museum housed at the national university of a small European country. The author shows how difficult it is for the science history museum of the University of Tartu, in Estonia, to find a balance between somewhat contradictory missions such as promoting both national culture and transnational science; or targeting the widest possible public while maintaining high quality scientific and professional standards. The author underlines in this sense the importance of carrying out research on the collections in spite of various difficulties, in order to ensure long-term sustainability and quality in any kind of public engagement.

Going even further in this direction, Vanpaemel's paper points out the risks connected to the use of university collections in scientific outreach activities that only aim at the public understanding of science, without taking into account the very nature of academic collections. Such a use means endangering the collections themselves due to the loss of a large part of their potentialities. Vanpaemel then elaborates on these potentialities, showing how talking of the past may, for instance, stimulate reflections on the future.

The opportunities of reflecting and debating provided by university museums are also discussed in the paper by Jelle De Schrijver, Chantal Dugardin and Danny Segers from Ghent University Museum. The authors show how academic heritage, being so deeply connected to historical and ongoing research processes, can be mobilised to discuss the nature of science itself. As they underline, this may reinforce the image of university museums' embodying the intangible heritage of

research, which is at the core of the nature of universities.

Another example of the way university heritage can convey to the public some of the main values of universities is provided in the paper by Alexandra Bounia and Despina Catapoti, in which they discuss the case of two exhibition spaces created in the main campus of the University of the Aegean in the island of Lesbos. These spaces host historical artefacts coming from the local community and propose both local and new media initiatives for this community itself. They thus become a symbol of the University of Aegean's attention to the region, its people and its development.

We stay in Greece for an account by Elena Kitta, Myrsini Pichou, Irini Savvani and Fay Tsitou of the activities of Athens University History Museum. The authors show how this institution attracts a wide audience thanks not only to the interdisciplinary nature of its collections and the long history of the museum building, but also through a variety of cultural and scientific events encompassing contemporary art projects, alternative museum interpretation programmes and new multimedia exhibits.

Strongly involved in public engagement as well, the Science and Technology Museum of the University of Patras is described by Penelope Theologi-Gouti and Evangelos Vitoratos, who present a broad overview of the activities proposed by the Museum to different audiences, from young children to elderly and differently abled people. The Museum was founded with the intent of connecting the local university with society and, in spite of the difficulties it has to face, it successfully offers initiatives to increase scientific and technological literacy as well as opportunities of experimentation, collaboration and innovation.

The second part of the volume discusses some of the issues related to the potential audiences of university heritage inside universities, be they university staff or students. Analysing and discussing such issues is crucial to enhance the role of university heritage for university research and teaching. In particular, within universities, various communities have natural ties with specific dimensions of university heritage: there are, for instance, generators of heritage and potential scholars who could base their researches on university heritage. For example, on the one hand, through research and teaching activities, biologists, astronomers, physicists, engineers and technicians have been and still are generators of scientific heritage. On the other hand, art and architecture historians, museologists or historians of science may have a natural interest for university heritage in relation with their specific field of interest. The volume provides some examples of how different groups of generators and scholars regard university heritage. It suggests some possible roles that heritage plays, or could play, for and within these communities and within universities at large.

Dealing with generators of heritage, the first paper of this section by Jean Davoigneau, Françoise Le Guet Tully and Françoise Vernotte describes the trans-

formation of Besançon Observatory, an obsolete astronomical observatory, into a public cultural site. This was possible only thanks to the fruitful collaboration between experts of heritage, the city of Besançon and the astronomers themselves. Not only the heritage but also the know-how could thus be preserved.

The knowledge about heritage held by its generators is at the centre of the paper by Anne Vaalund and Ragnhild Dannevig, who discuss a project launched in 2014 by the Museum of University History of the University of Oslo. The project aims at locating, selecting and registering scientific objects scattered throughout the Department of Biosciences thanks to the help of retired scientists and technicians. The paper examines the successes and the delicate issues related to the setting up of a collection thanks to an “army of seniors”.

Interviewing scientists on their past research work in order to study recent scientific and technological heritage is also one of the crucial points of Anne Bidois and Anne-Sophie Rozay’s paper. Through the example of a project carried out by the INSA, Rouen’s School of Engineering, and the University of Rouen, the authors show how this may contribute to raise the interest of the scientific community in its own heritage.

The importance of having scholars interested in university heritage is well illustrated by the paper of Marlen Mouliou, who discusses an initiative she developed in a seminar course of museology in 2014. She shows in particular how the galleries of the Cast Collection of the Museum of Archaeology and History of Art of the National and Kapodistrian University of Athens can be turned into labs of experimentation, unlocking the critical and creative potential of students.

Object-based teaching is also discussed by Alexandra Sfyroera, Yiannis Papadatos and Michel Roggenbucke. Here again, the Museum of Archaeology and History of Art of the National and Kapodistrian University of Athens is on stage: the authors not only present the teaching activities carried out there since the 1990s, but they also depict a special project that, from 2010, has transformed the Museum into a lively place of archaeological practice for all the students of the Department of History and Archaeology.

In the last paper of this section, Flora Papparou deals with the teaching potentialities of historical scientific instruments kept in Greek schools and universities. Focusing on the collections housed at the School of Chios and at Athens University History Museum, the author analyses the possible related educational activities as opportunities to explore fields as diverse as science, history of science and science communication.

The following sections of the volume present short communications on various themes. After a paper by Bjørn Vidar Johansen on the vulnerability and long-term sustainability of university heritage, the third section opens with three papers discussing digital projects. Launched by several European universities to enhance the virtual accessibility to their heritage, these projects deal with repositories for

storing, preserving and promoting digital content, respectively developed by the University of Padua (Lorisa Andreoli, Mariagabriella Fornasiero, Alessandra Menegazzi and Sofia Talas), the National and Kapodistrian University of Athens (Dimitris Antoniou, Giannis Economou, Irene Lourdi, Costas Viglas and Sevasti Zoi), and with virtual exhibitions (Lourdes Cirlot, Santiago Vallmitjana, Pilar Mateo and Isabel Garcia Malet). Then, a group of papers provides the description of several university collections and the related ongoing or future museum projects—from the Museum of Geography of the University of Padua (Giovanni Donadelli, Chiara Galanti, Lorena Rocca and Mauro Varotto) to Marseille Observatory Museum (James Caplan), from the collection of scientific instruments of Athens University History Museum (Georgios Vlahakis, Panagiotis Lazos, Flora Papparou and Fay Tsitou) to the collection of exhibits related to the bombardment of the Piraeus Harbour by the Allied Forces in 1944 at Athens Criminology Museum (Georgios Loutsidis, Sotiris Athanaselis, Chara Spiliopoulou and Maria Stefanidou), from the heritage of the University of Ioannina (Andreas Fotopoulos) to the Archaeological Museum of the University of Peloponnese (Emilia Banou, Maria Xanthopoulou and Eleni Zimi). The presence of many contributions from Greece constitutes a particularly precious resource as only a few Greek collections were known at the European level until now.

The fourth section discusses scientific and technical issues of conservation and preservation related to palaeontological heritage (Alexandra Alexandropoulou, Effrosyni Karantoni, Nikolaos-Aleksios Stefanis, Kristalia Melessanaki, Paraskevi Pouli and Georgios Panagiaris), zoological items (Effrosyni Karantoni, Ekaterini Malea, Paraskevi Pouli, Kristalia Melessanaki, Anastasios Legakis and Georgios Panagiaris), and criminology heritage (Eleftheria Katsivela, Mihalis Lazaridis, Ilias Kopanakis, Louiza Raisi, Zoi Sakki, Maria Stefanidou, Effrosyni Karantoni and Georgios Panagiaris).

Finally, the last section proposes an overview of the heritage of the National and Kapodistrian University of Athens (NKUA). It opens with an introduction by Michael Dermitzakis, who outlines the past and present situation of the museums and collections of the University, and provides an insight into the problems and possible solutions. Then, after an analysis by Aikaterini Dermitzaki and Anastasia Doxanaki about the national and local policies that regulate Greek university museums and in particular NKUA museums, the following 18 papers present the heritage of Athens University. Numerous fields of knowledge are represented, from the Historical Archive (Vangelis Karamanolakis) to the Sciences and Technology Museum (Chrysoleon Symeonidis), from the Museum of Archaeology and History of Art (Maria Constantoudaki-Kitromilides and Alexandra Sfyroera) to the Museum of Dental School (Margarita Sakelliou, Georgios Vougiouklakis and Dimitrios Koutroumpas) and various medical museums—the Moulage Museum of “Andreas Sygros” (Marianna Karamanou, Katerina Christopoulou and Christina Antoniou),

the Criminology Museum (Konstantinos Moraitis, Sotiris Athanaselis, Chara Spiliopoulou and Maria Stefanidou), the Anatomical Museum (Maria Piagkou, Ioanna Ralli, George Skandalakis, Dimitrios Lappas and Panayiotis Skandalakis), the Museum of Pharmacology (Charis Liapi, Jannis Papadopulos, Haris Carageorgou and Nikolaos Sitara). Several papers then deal with the natural history museums and institutions of the University, such as the Museum of Mineralogy and Petrology (Athanasios Katerinopoulos, Andreas Magganas, Panagiotis Voudouris and Ifigenia Megremi), the Botanical Museum (Theophanis Constantinidis, Ioannis Bazos, Dimitris Kazanis and Margarita Arianoutsou), the Zoological Museum (Anastasios Legakis), and the Botanical Garden (Ioannis Bazos, Theophanis Constantinidis and Margarita Arianoutsou). Athens University History Museum is then presented by Elena Kitta, Myrsini Pichou, Irini Savvani, Fay Tsitou and Eleftheria Kentrou. The presentations of the Museum of Education (Maria-Zoi Fountopoulou, M. Ntinou, H. Tsigas, A. Riga, K. Karageorgou, Marilena Karra), the Folklore Museum and Archive (Vassiliki Chryssanthopoulou), the Museum of Biblical and Christian Archaeology (Christos Karagiannis), the Anthropological Museum (Myrsini Kouloukousa) and the Museum of Palaeontology and Geology (Georgios Theodorou) close the volume.

Such a number and diversity of collections and related activities is striking and underlines the keen interest of the NKUA in the preservation of its own heritage. Many collections are used for university teaching and/or research activities, and this is certainly a major strength. Some are also open to broader audiences. Of particular interest are the laboratories of some museums, offering school groups discipline-related activities, and a website to disseminate information worldwide and make the museum more easily accessible for research and teaching. The multidisciplinary approach is also striking and reveals all its richness, showing the multifaceted peculiarities of university heritage.

These papers, as most of the papers of this volume, underline the importance for university museums to develop and preserve their specific identity among other institutions in the cultural sector. University museums are unique places for the presentation of academic research and teaching processes of the past and present and for the public interpretation of collections. They are specifically appropriate and have a long tradition of mobilising effective links between the university community and the broader public, creating spaces where local communities and their territory may be studied and discussed in close connection with the communities themselves. We absolutely have to keep such unique features and promote them as far as possible.

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SECTION 1

**UNIVERSITY HERITAGE AND CULTURAL
ENGAGEMENT OF EUROPEAN UNIVERSITIES**



University heritage, museums and Third Mission: a geographical viewpoint on social engagement

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Social engagement refers to participation in collective activities and today represents a key strategy through which museums and other cultural heritage organisations can both empower their connections with visitors, and improve their own efficacy as cultural and scientific institutions. As explained by Waterton and Watson, understanding the role that heritage plays in a particular society allows us an insight on how the communities engage with it.¹

That makes it possible for museums and collections to connect with their social context, improving their ability to serve as dynamic social spaces for community engagement and action. Social engagement shows therefore a strong geographical base because 'where', 'who' and 'how' affect any process oriented to encourage local participation in heritage valorisation. Such connections appear even more evident when applied to a geographical collection, like the one present in the University of Padua.

This paper originates from the authors' experience on structuring the scientific project of the future Museum of Geography of the University of Padua in Italy. Even though the museum has not been formally established, two years' work on historical research, collection reconnaissance and space organisation has led to an idea of a 'collections and connections' museum, where the collections become strategic to highlight social and spatial connections to both historical and present research practices and visitors' personal experiences.

¹ Waterton and Watson, 'Heritage and Community Engagement', p. 2.

All the reflections shared in this paper are the result of the interpretation, through geographical lenses, of the growing attention on university Third Mission as a valid opportunity for universities to both enhance and legitimise the cultural and social engagement of their scientific heritage.

Third Mission as starting point

The term 'Third Mission' gained currency in the 1980s. It refers, on the one hand, to the role of the public communication of science, and on the other hand, to the role of technology transfer and applied research. In the last decade, international debate has progressively enlarged the spectrum of its definition, and has brought clarity around this 'umbrella term', reaching some important results in the Green Paper of the E3M Project of the European Commission.²

The document recognises the 'social dimension' of the Third Mission, beyond the first economic and industry-related meaning. The Third Mission is thus to be articulated in three activities: Technology Transfer and Innovation, Continuing Education and Lifelong Learning, and Social Engagement, the topic of this paper. A second important point clearly stated by the Green Paper is that the Third Mission is not to be understood as a mission in itself, but that it is called to redraw the entire spectrum of university activities, including research and teaching. A third point refers to the need for the Third Mission to promote a careful evaluation of the criteria for measuring all university activity. It adds to the existing quality indicators other parameters and better guidelines to steer, as well as evaluate and classify, the university activities to 'social welfare'.

In the Green Paper, however, the framework of indicators and evaluation methodologies is sketchy, lacking a clear identification and measurement of the activities to be monitored.³

In the Italian context, the principles provided by the Green Paper were earlier applied by the Italian Agency for the Evaluation of Universities and Research Institutes (ANVUR) in an experiment that lasted six years, from 2004 to 2010. In this project, the evaluation of social engagement was still tentative and for university museums was limited to few indicators (number of active museum centres; number of museum sites managed; number of days of opening; number of square meters; presence of visit counter system; number of visitors; number of paying visitors). In its 2015 report, ANVUR recognised that the indicators were not sufficiently standardised and there was need for the clarification of scopes and methods of the social engagement, so that it could go beyond the most easily quantifiable aspects.⁴

² E3M Project, 'European Commission Green Paper'.

³ Varotto, 'Tertium non datur', 639.

⁴ ANVUR, 'La valutazione della terza missione nelle università italiane', 31.

This topic is still top priority for international and national discussion,⁵ as confirmed also by the International Workshop on 'Evaluation of the Third Mission of Universities and Public Research Organizations' promoted by ANVUR in Rome on 4 May 2015. However, the evaluation of the Third Mission today remains a self-assessment, information and transparency tool for universities,⁶ without any role in allocating economic resources.

While waiting for a system of evaluation able to read and compare different realities on an international scale, universities are invited to pay attention to the communication of science and to strengthen the exchange within their specific communities and territories.

As confirmed by scientific literature, the greatest impact of the knowledge produced by research is to be found in the vicinity of the universities.⁷ This is particularly evident when considering technology transfer (e.g. the growing number of start-up companies developing close to the academic institutions). But some other less obvious indicators may be taken into account, among which is the geographical provenance of university museum visitors. It would be interesting to examine where the visitors come from in order to investigate the extent of the geographical area each museum attractions. It is equally interesting to study how universities interact with their environment, and this was the main focus of a recent study by Cavallo and Romenti,⁸ who identified three main meanings of territory-community relation models applied by university organisations. This categorisation includes visions such as 'competitive basin' in which the university needs to diffuse its own products, 'co-decisional partners' in which the university looks for resources with a collaborative approach, and 'open, global, connected, creative and socially responsible ecosystem' in which universities are part of a broader system oriented to holistic development. It is interesting to see how such categorisation might apply to university museums as well, highlighting different possible approaches to their understanding of social engagement. According to Boyer's⁹ theory of Public Engagement as well as Furco's vision of 'engaged campus',¹⁰ for example, it could be suggested that communities' expectations and needs play an important role in orienting museums' future researches and divulgation projects. What emerges from this exercise is the need for a model of a museum that sees the environment in which it is based as a public agenda, shared and participated in by the local and national community. This vision could be able to merge the meanings of public and community into social engagement.

⁵ Vargiu, 'Indicators for the Evaluation of Public Engagement'.

⁶ ANVUR, 'La valutazione della terza missione nelle università italiane', 5.

⁷ Veugelers and Del Rey, 'The Contribution of Universities to Innovation'.

⁸ Cavallo and Romenti, 'Università italiane e territorio'.

⁹ Boyer, 'The Scholarship of Engagement'.

¹⁰ Furco, 'The Engaged Campus'.

Between geography and social engagement

It seems, therefore, clear that geography has something to say regarding social engagement. There is, in fact, a close relation between the new 'social' definition of third mission and the social-oriented knowledge of geography.

The Third Mission is an opportunity for the geographical discipline to see the recognition of its role of science oriented to social and spatial development, strengthening its relations with the territory where they are still weak. On the other hand, such opportunity turns into a renewed commitment of the role that geography is called to play, redefining the contours of its mission and the criteria of evaluation of its activities (not always clear to the general public) in accordance with the third mission guidelines.¹¹

Starting from these considerations, reflection is encouraged on the theoretical and practical role of geographers in the definition of the 'Third Mission'. The legitimacy of territorial involvement and activity for universities is emphasised, as well as the idea that university museums are a natural medium between scientific heritage and the general public, and therefore represent one of the most receptive contexts to territorial involvement and activity.

In order to offer a tool able to guide future debates, Varotto proposed an agenda for Italian geography organised around five strategic goals inspired by the Green Paper: sharing knowledge; multi-scalarity; articulation of scientific outcomes; engagement; and recognition and integrated assessment.

Such an agenda was used by the authors as a responsive tool for developing the Museum of Geography as an integrated formative system. In the following text, Varotto's reflections are reported (R) and later posed as questions (Q) to be addressed and interpreted considering the specificity of the case and context (A).

Sharing Knowledge

R: The first strategic goal refers to Sharing Knowledge. For geography, this means paying attention to the different meanings of the words 'publish' and 'public'. The issue involves the debate on transparency and free use of research products paid for by public funds. From this point of view, Italian geography is profoundly backward, without even a comprehensive website to share its production and the majority of scientific journals of geographical associations still only accessible in hard copy or by subscription. The exhortation for geographers is to publish less but to publish better, in other words, to make public (for real) the results of the researches in a more effective and pervasive way.

¹¹ Varotto, 'Tertium non datur', 639.

Q: How will the Museum of Geography share its knowledge?

A: This will be done not only by exhibiting (making public) collections that are not yet public nor published, but also by embracing, in a wider sense, an open access philosophy. This can be translated in publishing catalogues, teaching support materials and scientific productions online, on free-access formats and platforms. But it could also include special attention to providing free access to the Museum for everyone. On a larger scale, this could lead to engagements and contributions in international projects aimed to share knowledge on cultural heritage, for example, the Europeana multi-lingual online repository project (www.europeana.eu). However, the spirit of the museum should always be directed to encourage different ways of dissemination towards different audiences, as indicated by the Royal Geographical Society guide, *Communicating Geographical Research Beyond the Academy. A Guide for Researchers*.¹²

Multi-scalarity

R: Multi-scalarity is understood as the ability of universities to connect to the wide range of social ecosystems which can be found in their towns, regions, nations and beyond. This complexity of relations is not adequately recognised and evaluated today. Enhancing international relations or scientific products are considered to have greater impact and of an excellent level, while relations and products at lower scales are thought to be less important. It is generally at the local level that social expectations are higher.

Q: How could the Museum of Geography meet multi-scalarity?

A: The Museum of Geography could meet multi-scalarity in three ways. First, the Museum's contents and exhibits should present different geographical scales to support the idea of a discipline which considers multi-scalarity as a necessary method for learning how to create hypothesis and connections between phenomena and places. Second, the Museum should make evident the multi-scalarity of scientific networks, which include local, national and international groups of peers and experts that are involved in researching, teaching and enhancing geography. Finally, multi-scalarity in partnerships should be considered and accomplished. This could include a multi-scale network of institutions, museums, associations or shops that have agreed to sign a specific partnership with the Museum of Geography for enhancing geographical education and dissemination.

¹² Gardner et al., *Communicating Geographical Research beyond the Academy*.

Scientific outcomes

R: The third goal considers the articulation of scientific outcomes and it is from a discipline with a strong territorial involvement, such as geography, that a call should go out for a serious consideration of other profiles of activity, not necessarily aimed at publishing a product in classical terms.

Q: How will the Museum of Geography articulate its own scientific outcomes?

A: In our vision, the Museum should prepare itself to go beyond the academic walls and find the right communication tools to meet and connect with the city and its communities. Its heritage and spirit could serve as an intercultural medium as well as an artistic one. The Museum should stimulate geographers to recover the traditional role of 'craftsmen' of territorial knowledge¹³ by engaging them with local actions able to reveal global issues or elaborating personal representations on social phenomena. The Museum could play an important role in supporting local authorities to promote public and community engagement through a specific 'call for changes' or 'call for different views', to be aggregated and elaborated with scientific cartographic elaborations and presented through theatre or a web documentary. The Museum should take advantage of the geographical language in order to define and promote long-life education projects aimed to address social complexity.

Engagement

R: 'Engagement' is a central term both in the documents of the Working Group E3M and for cultural organisations today. The process of engagement should reflect the values of inclusiveness, participation and reciprocity in the resolution of public issues of a democratic society. The final goals should therefore aim to prepare educated and engaged citizens and to strengthen democratic values and civic responsibility. Engagement means first of all sharing and extending the boundaries the research activity outside the discipline and the academic world, to avoid the risk of self-referential knowledge reduced to the cultivation of its own backyard.

Q: How could the Museum of Geography support engagement?

A: We see three main directions: the first is community engagement, obtained by approaching civil society through constant public debates, organising courses

¹³ Varotto, 'Tertium non datur', 642.

and training opportunities that recognise the needs of the territory and also trying to steer the search paths (for example, projects, PhD candidates, publications) to the concrete needs of the area. The second operates through interactive exhibits and personalised guided tours of the city, province or region. The third opens to specific geographical practices and activities to be held outside the museum aimed to engage and sensitise attendees to geographical issues.

Recognition and Integrated Assessment

R: Concerning recognition and integrated assessment, geographers are invited to apply the principles of the third mission in their universities, fostering the development and social legitimacy of the discipline. The social relevance of academic activity is not always taken into account by the usual practice of evaluation: the aspect of 'engagement' of research and teaching, so far ignored or marginally considered, must make its way in the official evaluation or bibliometric criteria.

Q: How could the Museum of Geography interpret a recognition and integrated assessment?

A: An integrated assessment for the Museum of Geography could involve specific visitor typologies through different strategies, such as focus groups or role games. The evaluation of the Museum of Geography should therefore take into account not only its ability to target different audiences, but also the effectiveness of each engagement action. The legitimacy of the museum is gained through its ability to inform its visitors of the importance of geography not just for the university, but also for their daily lives.

Conclusion

Reflecting on the possible applications of the agenda for Italian geography to the Museum of Geography has been a motivating exercise. It allowed us to identify the museum's potential in establishing generative and regenerating relations between the university and its territory.

From this perspective, the university museum becomes a third mission incubator through which the university can invest to refine the innovation originating from the synergy between its three missions.

The fundamental components of this incubator might be synthesised in three main pillars or dimensions. The first consists in having a vision, which means to work for a new university commitment that considers the territory's needs and potential as a road map for its own activities. The second is the structure and consists of the ability to think, organise and perform events oriented to dissemination

and social engagement. The third is communication, the ability to adopt diverse communication strategies depending on the aims and the target involved.

We believe that considering these three dimensions will help cultural organisations to direct and strengthen the synergy between them and their local environments. In this way, a university museum, such as the Museum of Geography, will see its role evolving from an experimental incubator to a strategic pivot in enhancing the university's social and cultural engagement.

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National Science Museum in McWorld

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I will endeavour to determine the position of a science history museum established in a small European country's national university in the modern globalising world. Let us begin with terminology. The term 'McWorld' comes from Benjamin J. Barber's book *Jihad vs McWorld*¹ where he uses it to describe a transnational world shaped by mass media, entertainment establishments and fast food chains (the most famous of which is McDonald's) that are recognisably similar everywhere. Barber contrasts this with tribalism—the preservation of national-linguistic-cultural uniqueness—and its militant form, jihad, in the case of which people attempt to shut off the impact of globalisation, even with a gun in their hands. A more liberal interpretation of the terms allows us to see this fundamental clash between globalisation and preserving cultural uniqueness everywhere in the world and in different spheres of life, including museums.

The term 'national' (*rahvuslik*) is used in Estonia to indicate linguistic and cultural identity (e.g., national costumes) as well as nationally important institutions (e.g., national archive, national university, national opera, etc.). The University of Tartu Museum is not a national museum (it operates under the University). Yet, in many aspects, it is the central museum of science history in Estonia simply because there is none other like it, and the status of the University of Tartu as the national university also places a greater responsibility on the Museum.

¹ Barber, *Jihad vs. McWorld*.

Universities and science tend to be international or transnational in essence. However, there has recently been a lot of emphasis on the so-called 'Third Mission' of universities, the task of serving society, and this ties them more to the needs of the local society rather than international research. Naturally, any university, no matter how international, always depends somewhat on the potential of the local society and the material and human resources it has to offer.

Therefore, the science museum established at the national university of a small nation is in quite a controversial position. The preamble of the Estonian constitution states that the Estonian state must "guarantee the preservation of the Estonian people, the Estonian language and the Estonian culture through the ages".² The idea of the national university is to promote the nation state, Estonian language and culture, which puts it in the service of tribalism and jihad if one follows Benjamin J. Barber's sense of the term. As a university, we wish to be a high-quality research institution and contribute to transnational science. The University of Tartu is the only Baltic university currently among 2 per cent of the world's best universities and is rightfully proud of it. Due to the international nature of research, a science museum is inevitably part of the transnational world of research. As a modern museum, where offering leisure opportunities is of increasing importance, the university's museum is also part of the global entertainment world (McWorld).

In order to understand the tasks of the national university, we need to take a look at Estonian history.³ Estonia is a small country: 1.3 million people lived in Estonia in 2011. It is on the border of eastern and western culture and has seen many different conquerors. The ancestors of Estonians reached this region probably after the last glacial period, which makes us the aboriginals of Europe. In the 13th century, crusaders from Germany conquered the Estonian territories and since that time, until the 19th century, the upper class spoke German. The local written culture was primarily German. Over time, the Estonians (and Latvians) who were dominant in number became peasants without political rights. If someone from the indigenous people rose to the ranks of the ruling elite, it meant adopting the German language and culture. Despite changes in national affiliation and jurisdiction, the local German-speaking elite managed to maintain extensive autonomy under Poland, Sweden and Russia. The national awakening of indigenous Estonians took place in the second half of the 19th century, just like in many other small European nations. There was extensive Russification in education and administration at the end of the 19th century but it could not suppress the desire for national independence any more. Estonia gained independence on the ruins of the Russian Empire on 24 February 1918. The first period of independence lasted until

² The *Constitution of the Republic of Estonia*, translation published 30 October 2013, <https://www.riigiteataja.ee/en/eli/530102013003/consolide>

³ See, for example, Kasekamp, *A History of the Baltic States*.

1940 when Estonia was incorporated into the Soviet Union. During the Second World War, Soviet occupation was replaced with German occupation (1941–44) and then again with Soviet occupation, which lasted until the beginning of the 1990s. The identity of Estonians is primarily linguistic and cultural (not political or religious) and strongly tied to their location.

The beginning of Estonian written culture is associated with the Reformation. The first Estonian-language book was printed in 1525 (catechism), and the complete translation of the Bible was published in 1732. Public education was flourishing in the 19th century; general literacy and the habit of reading newspapers played an important part in the national awakening, which began in the 1860s. According to the 1897 census, 91 per cent of the population could read and 77.7 per cent could also write. At the same time, the number of people with higher education was low, and by the time the national university was opened on 1 December 1919, there were only about 1,000 Estonians who had higher education.⁴

The University of Tartu

The University of Tartu was the only one in the region for a long time. Its history is international.⁵ The predecessor of the University was the Jesuit grammar school, which opened in Tartu under the Polish rule in 1583 during the counter-reformation. By 1632, Tartu belonged to Sweden and the University was founded with a charter bearing the signature of King Gustav II Adolf. It was intended to help secure the victory of Protestantism over Catholic Poland. This was the second university of Sweden (after Uppsala) and it had the important mission to educate the youth of Sweden's overseas province: "... that now, with former barbarity banished, their children, both poor and rich, Germans and non-Germans, are equal to attain education in all sciences and free arts so that the parents could keep an eye on them without having to send them away to foreign lands for years and often ending in their doom..."⁶

There are no records of local poor non-Germans attending the university but we also have no knowledge of the origin of many students.⁷ The University founded by the Swedes had to move several times and discontinue its work due to wars and epidemics, until the Estonian territory was ceded to the Russian Empire and the University was closed in 1710 (with the promise to reopen it someday).

The University was reopened in 1802 as the third university of the Russian Empire (after St. Petersburg and Moscow), with German as the working language and with a Protestant faculty of theology. "Let through this institution our successors become wise and fair judges who skilfully defend the rights of the oppressed in

⁴ Karjahärm and Sirk, *Vaim ja võim*, 11.

⁵ Siilivask, *History of Tartu University*.

⁶ Menius, *Jutustus Tartu Ülikooli inauguratsioonist*, 31–33.

⁷ Tering (compiled), *Album Academicum der Universität Dorpat*.

the spirit of Enlightenment; capable doctors who alleviate the sufferings of the victims; enterprising and patriotic statesmen; fine and noble military heroes," prayed Chief Pastor Fr D. Lenz at the university reopening ceremony on 21 April 1802.⁸

In 1893 Russian became the language of instruction at the University of Tartu and the institution became the true university of the empire, the students of which were mainly from the various governorates of the western part of Russia. After the Tsar was overthrown in 1917, there were attempts to build an international university in Tartu for Estonians, Germans, Russians and Latvians like some kind of free port,⁹ but politically it was a utopian ideal. During one semester, in the autumn of 1918, the University operated as a German university again. All this took place in the context of the First World War, collapse of the Russian Empire and declaration of independence of Estonia on 24 February 1918, German occupation (February to November 1918) and the Estonian War of Independence (1918–20) to break away from Russia that had become a Communist nation by then.

On 1 December 1919, the University of Tartu was opened as an Estonian university. The war with Russia still continued; the Tartu Peace Treaty that ended the war was not signed until 2 February 1920. This explains a history professor's wishes to the young university: "Let Estonia's university connect its fate firmly with the current and future tasks of the Estonian state and people, let it grow or perish with our nation!"¹⁰

This short overview shows that the 'Third Mission' of universities, aimed at society, has always been the top priority for the University of Tartu. The University has played an important role in shaping the country, nation and local society.

At the same time, the University has naturally aspired to be an internationally significant research institution. The 19th century, especially the first half, could be considered the heyday of science when the achievements of researchers from Tartu were often at the forefront of science at the time, many of which are still significant landmarks in science history. To give only a few examples: Karl Ernst v. Baer (1792–1876) who studied at the University of Tartu discovered that mammals also have ovule and nature develops according to one principle. Friedrich Wilhelm Struve (1793–1864) led the measuring of the 3,000-km geodetic arc that reaches from North Cape to the Black Sea and passes through the Tartu Old Observatory, the purpose of which was to specify the shape and measurements of the earth—a monumental work that was included in the UNESCO World Heritage List in 2005. Nikolay Pirogov (1810–81), innovator of Russian field surgery, Alexan-

⁸ Lenz, 'Predigt am Tage der Eröffnung der kaiserlichen Universität in Dorpat den 21ten April 1802'

⁹ *Dorpater Zeitung*, 21 December 1918, 28 July 1919. Please provide the titles of the articles in the newspaper. These will have to be added to the biblio according to the last name of the authors.

¹⁰ Tarvel, 'Mõtted ja soovid meie ülikooli avamise puhul', 34–40. First published in *Sotsiaaldemokraat*, 5 October 1919.

der Schmidt (1831–94) who developed the blood coagulation theory, Emil Lenz (1804–65) who formulated the law of induced electrical current, and many other very famous researchers were University of Tartu students and/or employees. In the 19th century, the University of Tartu was an important intersection for Russian and German cultural exchange.

Former fame helped the new Estonian university to find its place in the 20th century European research world. The 300th anniversary of the University, which was celebrated in 1932, emphasised the age of the University (much older than the Republic of Estonia!) and gave Estonians confidence to consider themselves a cultured nation. The Estonian 'language of science' (terminology), which was developed during the period of first independence (1918–40), enabled the maintenance of the Estonian language in higher and secondary education throughout the Soviet occupation.

University of Tartu Museum

How is this all related to the University of Tartu Museum? The University already had the collections and display cabinets at the time of its reopening in 1802; these were also the oldest collections and museums in Estonia. For the 350th anniversary celebrations in 1982, the University of Tartu History Museum was established in 1976.

Preserving and intermediating memory and, through that, shaping group identity has always been an important role of museums. The science history museum established at the national university of a small country must simultaneously perform numerous and somewhat controversial tasks: demonstrate the international nature of research and its local applications, work on maintaining cultural identity and promote great figures of the past (who are mostly not Estonian). The university museum is expected to integrate different national groups and commemorate the prominent figures of each specialisation. Museums wish to be playful, attractive and capable of targeting various groups (from academics to pre-school children). At the same time, they want to be scientific and professional, carry national values and be international. And of course, to be anything at all, they need to make a profit.

The new development plan of the University of Tartu Museum includes offering new services (special tours for different target groups, children's birthdays, etc.), new initiatives (partner schools, concerts, TV programmes, museum shop) and ways in which we should mediate science and its achievements in a comprehensible way. The Museum has created a special character, the Crazy Scientist, who heads children's programmes and museum classes, birthdays and other events for popularising science. In recent years, much of the Museum personnel has changed; young, energetic and open-minded people who are willing to work

have joined the team. Visitor numbers are up and visibility in the media has improved.

Gradually, it is becoming clear that to ensure sustainability, we need an entirely different perspective about our collections. Often the inventory book enlists information about the object's material, time of creation, master and measurements. Today we would like to know much more about why the object was made, what was it used for, or the historic events in which this piece played a part.

Therefore, what we need is methodically innovative research that would encompass storytelling, mental history, everyday history, microhistory, interaction between the national and international, interaction between science, art and literature, etc. History of science is not taught as a specialisation at the University of Tartu; there are only some introductory courses for some specialisations. The majority of the Museum employees have an education in the humanities; however, many of the objects in the collections are from the field of hard sciences and medicine. It might be quite difficult for historians to understand the function of a device used in chemistry in the first half of the 20th century or the significance of 19th century histological microscopic preparations.

The language barrier has emerged as a new considerable problem. The younger generation who grew up in independent Estonia usually speaks good English, but they do not speak and read Russian or German, which have played an important part in our history and which are the languages of most archive documents. There is an actual danger that the historic memory of our nearly 400-year-old University will diminish to less than 100 years due to the language barrier. Without knowledge of the previously used languages, research on the past 100 years, when the official documents were mostly in Estonian, will also be incomplete. For example, between the two world wars people tried to publish research works in major languages (German, Russian, French, even Latin), and in the Soviet period the most important results were published in Russian. English became the *lingua franca* only in the last quarter of the previous century. Last but not least, the pressure to make profit is so great, that there is no chance to focus on researching the material in Estonian even from the last 100 years.

Naturally, the Museum tries to put together exhibitions that meet contemporary requirements. A good example was the exhibition held in the summer of 2015 about the solar eclipse expeditions of the Tartu Old Observatory. This was a topical theme because a considerably big solar eclipse was visible in Estonia in the spring of 2015. One of the most unique expeditions that were featured in the exhibition took place in 1860. Back then, scientists and tourists from America and Europe came together in Spain to view the solar eclipse, and this was the first time in history (of science) when the eclipse received so much public attention. The crew sent from Tartu included the University's professor of astronomy (Johann

Heinrich Mädler, 1794–1874), his wife and the servant of the observatory.¹¹ The professor and his wife were German but the servant was an Estonian peasant. This enabled the linking of an internationally significant science event with Estonia and Estonians. The story worked great as a tale, like a version of *The Hobbit: There and Back Again*. We had a chance to answer questions that people often ask—how did they travel, where did they live, how much time did it take, etc. The only problem is that exhibitions like this are actually expensive, custom-made and require extensive specialised research. We do not have enough money, employees or knowledge to manage such exhibitions about all topics and in all our branches.

What are the possible solutions? One option is to standardise exhibitions and educational programmes more, i.e., not make something new and interesting for each event but use a well-developed programme more than once. McWorld would like to get advance information about the product that has specific parameters. This is possible and reasonable up to a certain degree but the small population of Estonia sets rather restricting limits.

Science museums can and do use plenty of general international knowledge. Physics, chemistry or astronomy are very international, laboratory equipment and research problems were and still are relatively similar around the world. Purchased travelling exhibitions are common in science centres. This, however, poses the question: why do we need collections at all and what about preserving national values? Even international topics have distinctive local features that become apparent through collections. Everything that has been stored in the University's collections and museums vividly demonstrates the kind of work that was performed and the ways in which it was done here. A bit of analysis adds knowledge about research connections and relations with the local society, public demand and the social output of research.

To attract tourists, more attention should be paid to the role of the University of Tartu in Russian, German, Polish, Jewish educational history. However, due to the change of generations, we are facing difficulty with research on this topic. With regard to making a profit, the most important feature is the service offered to local school students.

Finding the right balance between McWorld, tribalism and international research or long-term perspectives and making a day-to-day living is indeed a tough challenge and it is impossible to provide a general recipe. Society is changing and the balance that has been achieved will usually not last, it must be constantly sought for, which is like walking the high wire all the time. The solution is, in any case, custom-made, and each university must find it based on the needs of their society and financier.

¹¹ Mädler, *Bericht 1860*, UT Library Manuscript department, 55-1-50.

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BIO

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University museums and science centres: the end of academic heritage?

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In this digital age, university collections¹ have become a burden to university regents. They take up space, are expensive to maintain, and represent an older type of scientific research that modern scientists would like to leave behind. Collections tend to be put away in cellars where they are easily forgotten, until they are in such a bad shape that everyone agrees to let them be discarded. Only some very beautiful pieces are kept and put on display. Yet, without the context that provides the necessary coherence and understanding of the collection, these items become mere 'museum pieces', testimony of some 'dark age', and only used to demonstrate the difference with our modern situation.

One solution to avoid the total obsolescence of university collections is to use them in scientific outreach activities. Collection items may be used to let visitors (primarily children) discover some of the basic facts about science. They may inspire science communicators to tell stories about human evolution, African wastelands, brain surgery and black holes. The collection rooms are transformed into modern classrooms where schoolchildren may wander among specially designed exhibits, which create wonder and amazement. For the managers of university collections, the visibility and popularity of their museums, attested by high attendance numbers, will provide a much-needed argument to defend their collections against the continuous threat of financial and organisational restrictions.

¹ In this paper, the focus is on collections of natural history specimens or scientific instruments. Some of the arguments may also apply to university archives or other heritage collections, but these collections have not been taken into consideration.

The transformation of university museums into outreach centres holds several important implications for the collections. If not guarded very closely, the collections may run the risk of being evaluated on the basis of their outreach efficacy, while neglecting not only their heritage value but also their potential to articulate the university's unique historical identity.

There may be several negative consequences.

(1) If a university values its collections for their outreach campaigns, it may lose interest in maintaining a historical collection that in fact emphasises an earlier 'pre-modern' view of the university. Outreach focuses on communicating with the public on the basis of the current situation of scientific research. Universities want to present themselves as being centres of research and innovation. To many university members, a collection of historical instruments or specimens reflects at best an outdated state of research. This may in particular apply to 'recent heritage', which for many active researchers is just the equipment they want to get rid of.

(2) If some items can be used effectively in an outreach set-up, many others are much harder to put to good use. Large collections of shells or electronic measurement instruments (especially if their make-up is difficult to explain to non-specialist audiences) may not only be considered as obsolete and irrelevant, but even a burden on the 'useful' part of the collection. It remains, however, important for the conservation of heritage to keep objects together and to preserve as much as possible of coherent collections. If collections have to be reduced, this should not happen as a result of the inability to use the collection pieces for outreach activities.

(3) The aim of scientific outreach is to bring science closer to the general public. But in doing so, the science being communicated is presented as being universal and fully established. Talking about science is and should indeed be identical all over the world. Yet, every university adds its own efforts to further our common scientific knowledge. University collections highlight this local initiative, informed by the talents of local researchers and by the availability of resources. University collections may also show the dynamics of science by showing discarded theoretical assumptions or forgotten inventions. If the collections are only used for outreach, there may be a tendency to downplay the local circumstances in which science is actually performed. In this process, the university heritage loses its unique features that link it to specific personalities and institutions.

(4) Although many university collections are very rich in content and may possess a large number of interesting items, they will face the competition of science centres, where visitor experience may be more in line with the general tendency in current science communication to build on the entertainment value of their science outreach activities. An old and somewhat decrepit speci-

men may seem only a poor alternative when compared to a computerised and animated model on a touch screen. It is doubtful whether university collections could ever get the better of well-designed science outreach campaigns.

To participate in outreach programmes is certainly an important opportunity for university collections to find a new place in the general restructuring of academic communities. However, if scientific outreach is to be the only new goal of university heritage, university collections will soon be superseded by more efficient approaches. It is therefore necessary for university museums to reflect on their own unique identity, and to focus on the differences between university museums and science centres.

I propose a short list of measures that can be taken to safeguard some of the academic features that would not be present in science centres but which, in my view, emphasise some of the essential features of university collections.

(1) Locate the museum at a meaningful location

Many universities have buildings specially constructed to house the university collections. During the 19th century, these buildings often also had a public function. Even if these buildings may not be available or suitable anymore, it may still be important to house the university collection in a historically meaningful building. The building reinforces the meaning of the collection and invites the visitor to understand the collection in its own habitat. After all, buildings are academic heritage too.

(2) Identify and communicate the academic background of the collection

What distinguishes university museums from science centres is that their collections are unique and historically constructed. They do not represent the universal march of science but the history of a particular institution, marked by individual people and singular events. It is the history of each object, what makes it worthwhile to be part of the university collection. University museums should communicate this historical background, providing a proper context for the appreciation of artefacts.

(3) Reconstruct the world of teaching and research

Whereas science centres are oriented towards the individual learning experience of visitors, the university museum should invite visitors to enter the privileged world of academic teaching and research. The museum should give visitors some feeling of what it is to do academic research—the painstaking comparison of specimens, the ordering of objects, the identification of extraordinary features, the creative setting up of laboratory experiments, the measurement of ‘faint’ phenomena, etc. The museum should focus on the role of university scientists rather than on the communication of scientific findings.

(4) Keep university staff and students involved

If the museum should retain its place in the university, it should prove itself to be a relevant space for academics. The museum should invite researchers (staff and students) to get involved in the collections, either by historical research, by conservation research or by celebratory events. The museum should be a welcome place to host events and conferences, to meet colleagues, to talk about university affairs. Presentations of the collections should be based on the advice and preferences of current (and retired) academic staff.

(5) Maintain university standards in outreach

Universities have an important role to play in bringing science to the general public and to represent scientific interest in public debates. University museums should be aware of these goals and support the efforts of the university in disseminating balanced and scientifically grounded position statements. University museums should collaborate with researchers and communication professionals from their own institution to design exhibitions or events.

At a time when scientific outreach is gaining importance in many universities, university heritage collections have to reflect on how to take advantage of these new opportunities. In contrast to science outreach, heritage invites the visitor to reflect on his own position, comparing his own point of view with regard to the past. By talking about the past, the heritage experience provokes a natural reflection on future developments, but with less of the science fiction content which seems to be endemic in many scientific outreach visions. University collections may therefore be very well suited for debating on our common future. Also, the university context of the collections easily opens up the closed world of science to social, historical and artistic comments. Situating science in the university and in society remains one of the prime challenges and privileges of university museums.

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The university museum as an arena for thought-provoking cognitive conflicts about science

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The nature of science

A few years ago, a group of scientists claimed that neutrinos move faster than the speed of light. Some students visiting the Ghent University Museum concluded that Einstein was not such a good scientist after all as his claim about the maximum speed of light appeared to have been incorrect. When the speed of neutrinos was later observed to be lower than 300.000 km per second, the students may have been relieved. Yet, their thoughts show that they embraced a particular misconception. The students had thought that a scientist is good when he is right, and that scientific ideas do not change over time. This misconception about the nature of science (NoS) is not unique. In fact, students harbour a range of erroneous ideas with regard to the scientific process, the role of the scientist, the value of scientific claims and the realm and the limits of science.¹ There are misconceptions such as “a scientist always knows the truth”, “scientific

¹ Lederman, ‘Research on Nature of Science’.

ideas never change”, or “a scientist is not creative”.² Some of these ideas may have been acquired in the regular science classes at school where the teacher propagates a purely objectified and disembodied view of science. In order to provide a more profound and realistic view of science, university museums can help. The academic heritage, the objects and stories bearing witness to a long tradition of the search for reliable knowledge can be used to discuss the nature of science. In this paper, we explore the question of how the nature of science can be educationally imparted in the context of a university museum.

The value of cognitive conflicts

As misconceptions are hard to erase, explicit reflection about NoS is considered crucial to learn successfully about the NoS.³ This means that students have to formulate their own ideas about science. But how do you provide a good context for students to learn in? A constructivist view of learning can provide help. In this theoretic framework, special attention is given to students’ prior knowledge. This entails that teaching is connecting prior knowledge with the new contents to be taught.⁴ Misconceptions need to be exposed, explored and replaced by new, more appropriate, ideas to adjust one’s thinking. Thus, the old erroneous foundations are removed in order to bring about a conceptual change in the students’ minds.⁵ Cognitive conflict is one of the more common instructional strategies used in the classroom to stimulate conceptual change. A cognitive conflict is a psychological state involving a discrepancy between cognitive ideas, experience, values or motives. Anomalous data or contradictory information can induce such a cognitive conflict.⁶ A student experiencing such a conflict will try to resolve the discrepancy by reconsidering his ideas about science. With regard to the NoS, this entails that a conflict between the student’s conviction(s) about science and his experiences may increase the student’s understanding of science. In short, to teach them about the NoS, persons are to be brought in situations where some of their understandings about science no longer hold.

² Schwartz and Crawford, *Authentic Scientific Inquiry as Context for Teaching Nature of Science: Identifying Critical Elements for Success*, 331–55.

³ Khishfe and Abd-El-Khalick, ‘Influence of explicit and reflective versus implicit inquiry-oriented instruction’.

⁴ Bodner, ‘Constructivism’.

⁵ Posner et al., ‘Accommodation of a Scientific Conception’.

⁶ Limón, ‘On the Cognitive Conflict as an Instructional Strategy for Conceptual Change’.

Cognitive conflict in the university museum: two examples

The examples of two workshops developed for secondary school students at the Natural History Museum in Brussels and the Ghent University Museum will help to explore how this theoretical approach can be translated in the educational practice.

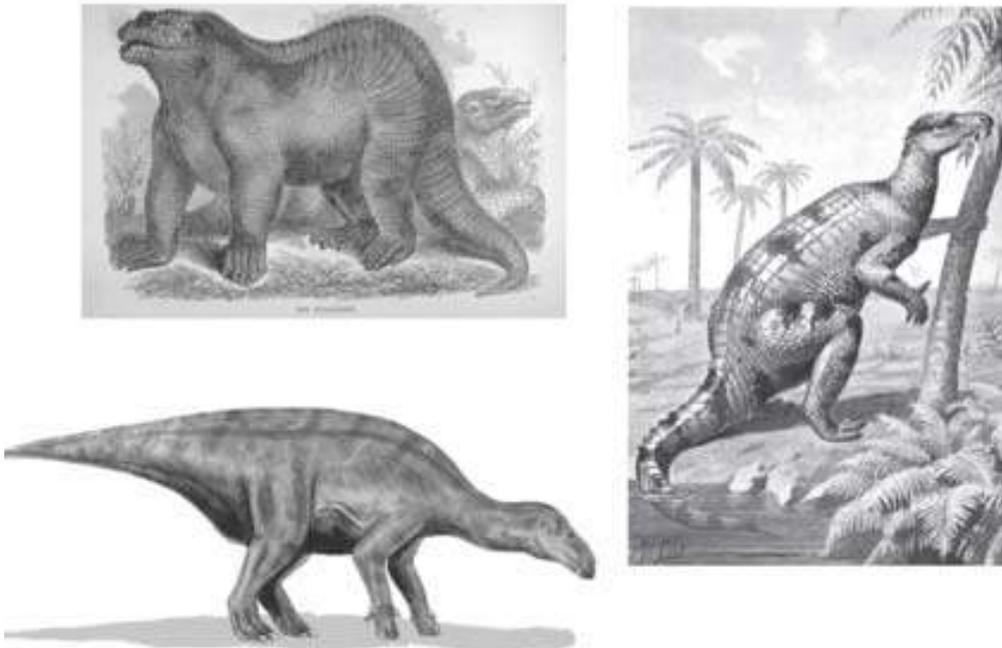


Figure 1
Three iguanodon reconstructions

Iguanodon bones

The Natural History Museum is famous for its large collection of iguanodon bones. The bones have been reassembled and reconstructed in different positions. While some of the iguanodon reconstructions are positioned vertically, as if the animal was running on the back of its paws like a kangaroo, others are positioned as if the animal was running on all four legs (see Figure 1). A third group of reconstructions have a combination of both approaches. The reconstructions show how the iguanodon fossils have been interpreted differently throughout

the years. In the workshop, students start with a set of bones and are asked to interpret the way the Mesozoic animal may have looked like. Then different groups of students look for different models, representations of the iguanodon. Afterwards, students engage in a dialogue about the scientific process tackling the question whether a scientist can be absolutely certain about his interpretation. In the final stage, the findings of certain dinosaur fossils with feathers are used as a prompt for students to imagine how iguanodons may be represented in the future. This sparkles dialogue about questions such as “Can a scientist ever know the correct answer?” In this workshop, contradictory scientific historic theories and findings about the reconstruction of the iguanodon are used to elicit a conflict in the students’ minds about the idea that science is objective and unchanging. Through dialogue misconceptions about science are made explicit and discussed.

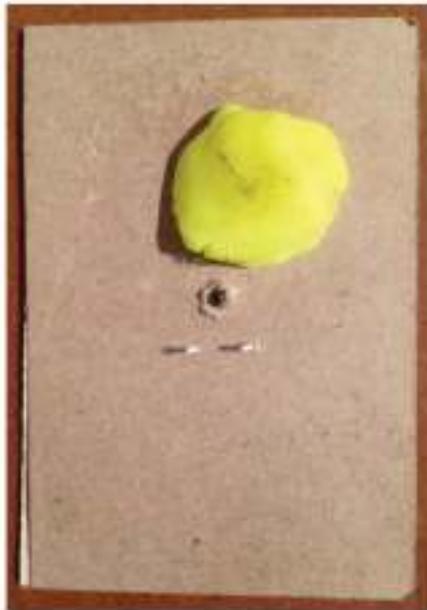


Figure 2

A reconstruction of Van Leeuwenhoek's microscope made by students in the workshop

Van Leeuwenhoek's microscope: science and technology

Another workshop aims to explore the relation between technology and scientific findings at the Ghent University Museum. In this case, 14-year-olds were asked to study the outer layer of an onion, either through a tablet-microscope, a reconstructed Van Leeuwenhoek's microscope or through a modern microscope. The tablet-microscope is constructed by adding a drop of water on the lens of the instrument, which then acts as a magnifier. Van Leeuwenhoek's microscope is reconstructed by students as they create a small lens by melting a glass tube and adjusting this lens in a piece of cardboard (see Figure 2). These instruments which are made by the students during the workshop allow them to discern cells in the onion's epidermis. Each time students observed the same object, the onion, through different instruments. After these hands-on activities, students were invited to think about the relation between technological instruments and what we consider to be real. In these dialogues, they discussed how new instruments can open up new fields of inquiry. Again, in this example historic scientific material was used to prompt discussions about the nature of science.

Discussion

By allowing students to step into the shoes of scientists, they can re-enact scientific practices and relive the questions at hand. Academic heritage can provide different perspectives eliciting cognitive conflicts in the minds of students with regard to ideas of the NoS. The different examples of iguanodon reconstruction, for instance, conflict with students' naïve idea that we can have a final and absolute understanding of the iguanodon's body. The different strategies to picture the onion skin conflict with the idea that a technological scientific instrument can tell us the absolute truth about the onion. By exploring and discussing these conflicts in a dialogue, students are able to explicate their conflicting ideas and develop new ones.

In the approaches, it is apparent that a combination of both hands-on and minds-on activities stimulated the students' enthusiasm to participate in the dialogue. In this philosophical dialogue students' presuppositions are uncovered. A characteristic of the philosophical dialogue is that the facilitator, the person guiding the dialogue, does not intervene with regard to the content of the discussion, so that students are stimulated to question their ideas and arguments.

The two examples of workshops show that attention for discredited scientific ideas is as important as attention for generally accepted theories. This allows falsifying the idea that science is a simple truth machine. Instead, the scientific practice is pictured as a striving for reliable knowledge. It will be interesting to develop

extra learning material using the academic heritage focusing on the relation between science and society or the processes of scientific endeavour and discovery.

The iguanodon workshop was originally developed for the Natural History Museum which is not a university museum. In the beginning, the educative personnel in this Museum were reluctant to integrate the discussion about science in their educative approach as the Museum and the educators were more inclined to focus on the anatomy and evolution of the dinosaur. Because of the Museum's mission to focus on the diversity and evolution of species, attention for the NoS and, for instance, the uncertainty of scientific findings is downplayed. The Museum acts as place for the display of knowledge about nature and science. In contrast, a university museum focusing not only on evolution as a scientific process but also on the nature of scientific inquiry and the evolution of scientific thinking, allows discussing and problematising the nature of science itself. When dioramas not only present the diversity of life but also show science as a (natural) phenomenon, the elements of wonder and discovery in scientific enterprise and the occurrence of conflicting explanations in science are brought to the fore. In this latter approach, it is much easier to elicit conflicts about science in the visitor's mind.

Evidently, not only can university museums approach the NoS, but since university museums function as (living) archives of academic research closely connected to the ongoing and ever-changing research communities, these museums provide an obvious stage to elicit conflicts about science. Roughly, one could discern two angles about the definition of science surface in this opposition between the natural history and the science museum. On the one hand, one might distinguish 'the science of certainty' where science is considered as a method providing a collection of reliable and truthful ideas that can be easily consolidated and displayed. On the other hand, 'the science of wonder' considers the scientific domain as a collection of uncertainties, a vast ocean of ideas waiting to be discovered. The natural history museum focuses on the consolidated facts; a university museum, in contrast, has the opportunity to focus on the element of wonder and discovery. As the latter focus makes it easier to uncover the scientific processes and allow the visitor to experience cognitive conflicts with regard to the NoS, university museums can play a key role in facilitating dialogue and discussion about science.

A focus on cognitive conflicts and the NoS may also impact the way we envision the build-up of temporary or permanent exhibitions in the university museum. Objects eliciting conflicting thoughts and experience may prove fruitful in fascinating and motivating the public for science. For instance, in exhibitions exploring the themes of uncertainty and doubt in scientific enterprise this approach may be successful. In order to elicit cognitive conflicts the collections should be regarded as places where the visitor finds problems rather than answers. As un-

derstanding the NoS significantly influences the scientific literacy of students,^{7,8} and helps them to understand and discuss (socio-)scientific issues, university museums can thus contribute to a more nuanced and insightful understanding of science among students, future scientists and citizens.

By stimulating the understanding of the NoS through cognitive conflicts, we may come closer to a university museum embodying the intangible heritage of curiosity and investigation ingrained in the university's core, an arena for civilised and academic conflicts, backed by findings, theories and interpretations. In this regard, we can reimagine the university museum as an arena where conflicts can be exposed and resolved. But maybe it's too aggressive to consider the university museum as an arena. Perhaps it can be seen as a salon as well as it is a place to elicit dialogue about science. A salon as it existed in the 18th and 19th centuries where aristocratic ladies invited scientists and aristocrats of the time, a salon where students can sharpen their minds.

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⁷ Clough, 'Strategies and Activities'.

⁸ Miller, 'The Measurement of Civic Scientific Literacy'.

BIOS

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University Museums as Mediators between University and Society: The example of Patras University Science and Technology Museum

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Introduction

This paper describes a case study, the Science and Technology Museum (STM) of the University of Patras (UP). The Science and Technology Museum of the University of Patras, Greece, is a new University Museum.¹ It opened to the public in 2009 with a core goal, to connect the University of Patras with society. It focuses on the scientific and technological literacy of school and university students, teachers and the society, and opens challenges and opportunities for experimentation, collaboration and innovation.

Another of the Museum's goals is to link the three degrees of education, primary, secondary and tertiary. It also aims to be an important educational hub for teaching the history of science and technology, and to fulfill the lack of technical museums in Greece, especially in Western Greece.²

In order to fulfil these goals, the Science and Technology Museum was prepared to play a university museum's dual role: serve as a tool for preserving and disseminating the university's research, and play an important role within the ed-

¹ Theologi-Gouti, 'A New Museum in an Ancient Land'.

² Theologi-Gouti, 'Science and Technology Museum of the University of Patras'.

educational community.³

STM provided opportunities for experimentation, collaboration and innovation. First, it created a friendly object-oriented environment of non-formal education for different audiences. Through targeted actions, it approached the educational community and society and managed to connect the three levels of education, using interactive and experimental activities.

The Museum has also succeeded in approaching and activating students and the university society by offering them an environment for experimentation, experience and innovation through volunteering and internship. Moreover, the Museum highlights its collections through an interdisciplinary approach and promotes the dissemination of knowledge developed in the University of Patras.

Finally, it has to be mentioned that the University environment is not ideal for a museum to flourish. Low budget, lack of personnel and bureaucracy are the biggest difficulties that the Museum has faced since its creation. To this we have to add the university's attitude towards museums, as well as the unwillingness to understand that museums require special rules of functioning and need to be flexible.

Communication Policy

The act of communication aims at producing an effect on another person.⁴ The need to work on the idea of the museum as a communication medium based on objects was understood quickly by the STM. As a new museum, its future public was unclear. A communication policy was developed before the opening to the public, aiming to approach various levels of society. It included the continuous effort to approach new social groups and individuals, the activation of students and university society, the approach of sponsors and the establishment of the Association of the STM Friends, the promotion of cooperation with relevant institutions and organisations of culture, science, technology and education, the organisation of events and activities aiming at various audiences, the use of different means of informing the public about the Museum's activities, the verification that the information has been received by the public.

The Museum targeted diverse audiences from kindergarten students to the elderly and disabled people. Different audiences have the opportunity to participate in educational activities, guided tours, educational workshops and other activities.

³ Stanbury, 'University Museums and Collections'.

⁴ Hooper-Greenhill, 'Museums and Communication'.

The Science and Technology Museum as mediator between the University of Patras and society

Mediation is defined as the full range of tools and resources used to forge a relationship between the visitor and the object: exhibitions, catalogs, events, lectures and guided tours, workshops and installations in the museum are some of the many channels for conveying information to the visitor, and which underpin and inform his or her encounter with the object on display. The works of curators are the most important facets of the museum's cultural mediation, according to the Museum of Louvre in Paris.⁵ Cultural mediation arises in response to the museum's need to promote new ways of communicating with visitors and to give them easy access to content produced by both the collections and the exhibitions, according to the National Museum-Center for the Arts Queen Sofia, in Madrid.⁶

The Science and Technology Museum has developed different means of dialogue and mediation in order to communicate with society. The means are the permanent and temporary exhibitions, the interactive exhibits, the educational programmes in exhibitions, the thematic networks, the seminars and the experiential meetings, the informal and entertainment events, and the concerts, as well as volunteering and internship. Each museum mediation activity offers different challenges and opportunities for experimentation, collaboration and innovation.⁷

The Science and Technology Museum's exhibitions create 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.

The permanent exhibition 'Telecommunications in our lives'⁸ has a dynamic character. It is constantly enriched with new objects, information and with educational interactive exhibits developed by university students.⁹

⁵ 'The Concept of Mediation'.

⁶ 'Cultural Mediation'.

⁷ Theologi-Gouti, 'Science and Technology Museum of the University of Patras'.

⁸ The permanent exhibition presents the history of telecommunications, physics experiments as the basis of telecommunications and records of different types of telecommunications devices such as the telegraph, the telephone, the mobile, the radio, the television, sound etc.

⁹ 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 a telephone works, an interactive exhibit on the telegraph, two interactive exhibits on the Internet, an interactive exhibit on radio, and one interactive exhibit on television. See Theologi-Gouti 'Science and Technology Museum of the University of Patras'.

Figure 1

Telephone Center ATZ , the only telephone centre of this type in the world that is still working



© Museum of Science and Technology of Patras University

The Museum organises a number of temporary exhibitions every year, in collaboration with important bodies of culture, education, science and technology, on different aspects of culture, environment, science and technology.¹⁰

Through targeted actions, the Science and Technology Museum approached the educational community and managed to connect the three levels of education using interactive and experimental activities. School groups from Patras, Achaia, from other parts of Greece, as well as foreign school students visit and participate in one or more of the Museum's educational programmes. All Museum activities highlight the connection between science and technology.

The Museum has developed a very strong relationship with educational bodies and schools. As a Science Museum, it is more aware of its specifically didactic purpose than other types of museums.¹¹ Thus, the Museum organises educational programmes for different knowledge levels of children and teens. A number

¹⁰ From January 2015 to March 2016, the Museum organised three temporary exhibitions: 'Forest, a Living Community' in collaboration with the French Institute of Greece and the museums of Zoology and Botany of the University; 'Light and Color in Sciences and Arts' in collaboration with the Union of Artists of Patras and the Centers of Natural Sciences of Patras Secondary Education; and 'Watching Climate through our Window' in collaboration with the French Institute of Greece.

¹¹ Hooper-Greenhill, 'Museums and Communication'.

Figure 2
Discovering Ancient Greek Methods
of Cryptography



© Museum of Science and Technology of Patras University

of programmes have been designed and implemented for different knowledge groups: for the kindergarten and the first and second grade of primary school, for the third and fourth grade of primary, for the fifth and sixth grade of primary, for junior high school, and for high school, as well as for people with mild mental retardation. Those programmes are related to the themes reflecting the nature of a museum, i.e., communication, messages, telegraph, telephone, mobile, sound, radio, computer and Internet safety.¹²

¹² For the kindergarten and the first and second grade of primary school: 'Discovering the House of the Museum Kid', 'The Trip of the Voice', 'Messages are Hidden in the Museum', 'Radio-Shouting', 'What, What, What, What is in the Box' and 'Adventures in the Spider Tissue-Internet City'. For the third and fourth grade of primary school: 'Communications Yesterday and Today', 'I Enliven the Radio' and 'The Secrets of Internet'. For the fifth and sixth grade of primary school: 'I Learn how the Telegraph Works', 'I Learn how the Telephone Works', 'I Learn how the Radio Works', 'I Surf Internet with Safety'. For junior high school: 'I Learn how the Telegraph Works', 'I Learn how the Telephone Works', 'I Learn how the Mobile Telephone Works', 'I Learn how the Radio Works', 'Sound, a Trip on the Waves', 'I Surf Internet with Safety'. For high school: 'I Learn how the Telegraph Works', 'I Learn how the Telephone Works', 'I learn how the Mobile Telephone Works', 'I Learn how the Radio Works', 'Sound, a Trip on the Waves', 'I Surf Internet with Safety'. For disabled people 'Searching for the Family of Akis the Telephone Kid'. See Theologi-Gouti 2014.

Children and teens participating in the educational programmes watch and interact with objects, photos, videos, and the animator. They listen, participate in activities, play, search, experience, compare, think and finally they create and learn.

The Museum also organises and participates in Thematic Networks of Local Schools in collaboration with the Departments of Cultural or Health Education of Primary or Secondary Education with different themes.¹³ These thematic networks of local schools are one-year projects for school groups.¹⁴ A number of groups from participating schools work on the same subject, but with a different sub-theme. They participate in one or more of the Museum's educational programmes, they meet in the Museum, they interact with the Museum and amongst themselves, and finally they develop educational, art or scientific material. Very often they offer the developed material to the Science and Technology Museum. The Museum uses this material for the educational programmes, or as material proposed to teachers for the preparation of the school groups before their visit to the Museum.

The Science and Technology Museum encourages the involvement of university students by offering them a pleasant place of experimentation, experience and innovation.¹⁵ Students from different departments of the University of Patras and some Departments of the Higher Education Technological Institute can participate in different activities through volunteering and internship. Many students have been trained and participate as animators in educational programmes, in the design of educational programmes, in the development of special activities for programmes, in the design of interactive exhibits, in the development of experiments, in museum documentation, in the set-up of exhibitions, in photographing educational programmes and activities, in writing papers for the newsletter, in the designing of data bases for documentation and visitors management.¹⁶

In order to attract university students, the Museum organises special events,

¹³ Some examples of School Networks are 'We and the Others on Internet', 'School Students talk with Museum Collections and they are Inspired, they Learn and they Create', 'Science and Technology', 'Volunteering and Education', 'Radio: Communication, Education and Enjoyment'. See Koufou and Penelope Theologi-Gouti, 'Science and Technology Museum'.

¹⁴ Right at the beginning there is an agreement on the general theme of the Network and a general work plan. Every participating teacher chooses a sub-theme and makes its own plan. Teachers work with their students during the year. They also participate in meetings with Museum staff and seminars. School groups with teachers participate in two events organised by the Museum, the introductory and the final event (for the International Day of Museums). At the final event, they present their deliverables.

¹⁵ Ferriot, 'Les Publiques au coeur du Musée'.

¹⁶ From Patras University Departments like Geology, Biology, Physics, Computer Engineering and Informatics, Department of Electrical Engineering and Computer Technology, Department of Management of Cultural Environment as well as from the Department of Museology of the Higher Education Technological Institute.

forums, special projects, workshops, and information events.¹⁷ The Museum also hosts events organised by student associations¹⁸ and informative events on studies and postgraduate studies in different countries organised by the University's Carrier Office. It also encourages students to prepare reports on different themes concerning the Museum, in the context of their courses, diploma, or Master's thesis.

Figure 3
The Day of the Young Scientist



© Museum of Science and Technology of Patras University

The Science and Technology Museum succeeded in approaching the general public.¹⁹ It was able to involve adults, young, elderly, disabled people in Museum activities using interactive and experimental methods. Teachers, young engineers, young scientists from different disciplines volunteer.²⁰ The Science and Technology Museum offers participatory experiences that enable people to develop links to the collections, to connect better with the Museum and to discover something of their own creativity in the process.²¹ It also helps publicise the Museum's ac-

¹⁷ Examples of those events are 'Volunteering and Mobility', 'The Day of the Young Scientist'.

¹⁸ As AEGEE, AIESEC, BEST, EESTEC, IEEE student, Student Guru, Job Fair Athens, Mindspace.

¹⁹ Ferriot, 'Les Publiques au coeur du Musée'.

²⁰ The range of voluntary activities are: design of educational programmes, temporary exhibitions, organisation of events, management and dissemination of museum activities, as well as the design, creation and communication of the Museum's Newsletter.

²¹ Bourke, 'Public Engagement: Museums in the Age of a Participation Culture'.

tivities in society. The Museum organises special events, forums, special projects, workshops, and information events, concerts targeted at different categories of people. To publicise these activities, the Museum always sends out press releases, publishes articles in local or national media, produces communication material, is present in social media, has developed targeted mailing lists and publishes an electronic newsletter, the 'Ana-MET-adosi'-Broadcast, every two months. The development of the Museum's website may take a little time as it is being designed by university students.

An Association of Friends of the Museum was established on the initiative of a number of university professors, supporting the Museum's activities and connecting members of Patras society and the university society to the Museum. It also approaches sponsors for the Museum in order to facilitate the financing of a number of activities.

Achievements and Perspective

The Science and Technology Museum of the University of Patras has achieved its core goal, the connection of the university and society. The challenge now is to strengthen this connection. The Director, the staff, the volunteers and the student interns are working to achieve the other goals like scientific and technological literacy, linking the three degrees of education, being an important educational tool for teaching the history of science and technology, satisfying the needs created by the lack of technical museums in Greece and especially in Western Greece, and giving an audience development perspective to every activity of the museum that will permit to successfully face this challenge. In 2009, the first year of the Museum opening, the number of visitors was 10,000. In 2014, the number of visitors exceeded 40,000.

Today it is clear that the demonstrable and visible social use of museums justifies support, whether from government, sponsors and other development bodies. The public face of museums demonstrates clearly value for money. Funding is demanded ever more loudly and frequently by museums.²²

The Science and Technology Museum has proved its visible social use and is looking at new challenges, opening new paths to a perspective of development. It intends to open up to new collaborations with development agencies in order to obtain and ensure funding for new mediation activities²³ and for completing the museum building. So far, only the 25 per cent of the building designed for the museum is constructed. It has also proposed to the academic community that it is welcome to use the Museum in research projects as an implementation and dissemination tool. New plans include the collection of new research material and

²² Hooper-Greenhill, 'Education, Communication and Interpretation'.

²³ As the Region of Western Greece, the Municipality of Patras, EU, etc.

the development of exhibitions on important engineering projects of the region.

Finally, another very important project is to create a new structure for all the museums of the University.²⁴ This perspective will grant new mediation opportunities and it will reinforce the Museum of Science and Technology. Thus, the Museum will obtain a central role in the academic heritage within the university society, greatly contributing to the cultural mission of European universities.²⁵

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²⁴ Patras University includes two more officially founded museums, the Museum of Zoology and the Museum of Botany, a non-officially founded museum, the Museum of Education, and a number of collections (geological, mechanical, electrical machines, etc.).

²⁵ Hanna, 'Roles and Responsibilities of the Universities' Museums'.

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Athens University History Museum: A Platform for the University Community and the Wider Audience

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The Athens University History Museum (AUHM) is administered by the Department of Museums and Historical Archive of the Directorate of Public and International Relations and History, governed directly by the administrative bodies of the National and Kapodistrian University of Athens (NKUA). Since its inauguration in 1987, AUHM has undertaken the initiative to host a variety of cultural and scientific events organised by and open to non-members of the NKUA academic community. The fact that AUHM does not belong to any School underlines a key point of the vision of its foundation: to serve as a medium of communication and interaction between the University community and the wider public and as a vehicle to promote the University's heritage. This vision of the University's administration has been realised with the efforts of the Heads of the Museum over the years,¹ and transformed it into an inspiring platform for cultural creation and scientific thought.

The AUHM may attract audiences of various backgrounds thanks to the interdisciplinary nature of its collections, the history of the building, which houses them and its strategy in museum programming. Moreover, at this particular moment of Greek history,² it seems to offer visitors a kind of exaltation. It brings to

¹ Since February 2015, the Head of the Department of Museums and the Historical Archive is Dr Evangelos Papoulias.

² Greece has been under an economic crisis and as a result under consecutive economic adjustment

the fore collective historical memory, and reminds visitors of the sacrifices and struggles waged by eminent NKUA figures in order to consolidate education, science and knowledge in our country.

The Museum and contemporary art

In line with contemporary international museological trends, AUHM launched in 2012 a dialogue with contemporary art, and has functioned as a platform for the exchange of views and ideas and also as a source of inspiration.³ It invited the artists involved in the ‘Sanatorioproject’ visual project (2012) “to a dialogue” with its collections and the historic building itself. Most notably, 17 contemporary Greek artists were inspired by both the exhibits (scientific, artistic or historical documents of the collections) and the premises, and created works of art specifically designed for AUHM. That was the final stage of ‘Sanatorioproject’, a visual project launched one year earlier at Hania, Pelion, dedicated to the first high altitude sanatorium⁴ established by the doctor Georgios Karamanis (1873–1964), a graduate of the School of Medicine of the NKUA.

The exhibition began a dialogue between the past and the present and hopefully contributed to the emergence of new readings and new meanings between the interdisciplinary collection (paintings, rare scientific instruments, anatomy atlases, etc.) and contemporary art. Our personal contact with the visitors and data from the visitors’ evaluation reports suggested that the exhibition met its learning goals and demonstrated the warm reception of the event. The encounter with contemporary art of audiences who are familiar with it, as well as of social groups (e.g., students) who might have never before come in contact with it was considered to be a successful initiative, leading to the extension of the exhibition and an increased number of visitors.

We pursued this new approach with artists who combine art with science such as Yannis Papadopoulos. In 2013, the artist created a drawing instrument entitled ‘The Nothing Machine’ which designs ellipses manually. At the same performance, Takis Lazos, educator and historian of science, presented to the public an electrically driven tuning fork from the Museum’s collection.

Renowned artist Kyrillos Sarris’ installation ‘Bibliotheka’ (2014) in a hall in AUHM further broadened its audience and attendance, particularly among those familiar with contemporary art who had not visited its premises.

The British artist Rowena Hughes was invited by the arts organisation Locus Athens to research in the archives of the Gennadius Library of the American School of Classical Studies at Athens and the AUHM, and to produce a body of

programmes since 2010.

³ Putman, *Art & Artifact*, 132.

⁴ The sanatorium opened in 1909 and closed in 1966.

new work based on her research. Supported by the Arts Council, England, Hughes was inspired by the Museum's collections and created the exhibition—specifically designed for the Museum—entitled 'Liquid Library' in March 2015 (Figure 1).

Figure 1
Rowena Hughes, part of the exhibition 'Liquid Library',
Athens University History Museum, 2015.



Curated by Locus Athens // Maria-Thalia Carras
© Photo: Rowena Hughes

Last but not least, the role of the Museum with regard to the youth needs to be highlighted. Through guided tours, young school students come in direct contact with works of contemporary art. They often express their surprise or their interest. We have been often faced with questions like “Is this a work of art?” The answer, of course, is given by the students, through the communication bridge built by the curator during the guided tour. One of the most pleasant moments was when we asked, in 2015, a group of first grade junior high school students if they had ever seen a work of contemporary art before, and the answer was: “Yes, here!” These students, while in elementary school, had visited the ‘Sanatorioproject’ in 2012.

Learning conditions and alternative museum interpretation

Art techniques also shape the Museum’s learning strategy. By investing on their learning potential, we expect to trigger the participants’ imagination and encourage their critical thinking within a safe environment.⁵

For example, for a programme addressing primary school students, we take advantage of the visual economy of puppetry. This enables us to present not only crowd scenes in historical re-enactments, (such as the celebrations for the inauguration of the NKUA), but also imaginary scenes which involve stories of real people who interact with museum exhibits. In one scene, for example, Sevasti Kallisperi, the first woman who tried to enroll at the NKUA in the late 19th century, is represented by a puppet which enters into a dialogue with a replica of the University’s first registry book exhibited in the Museum (Figure 2). The book is anthropomorphised (it has a mouth) and the confrontation is vivid and effective. The same book is used for a programme on object handling and preventive maintenance addressing preschoolers. The book here complains about damages (“wrinkles”, yellow spots, dirt, stains, etc.) caused by people’s inappropriate object handling and the environmental conditions.

⁵ Tsitou, ‘Puppetry in Museum Communication and Interpretation’.

Figure 2

Photo from a scene of the learning programme
'Why on Earth would you study Science?'



© National and Kapodistrian University of Athens – History Museum

We often close our programmes with improvised and participatory drama in education sessions. These are used as evaluation tools, which give us access to the participants' inner thoughts and feelings before they leave the Museum. This is a way to learn in what way visitors embody and express the new knowledge, what they remember from their visit, whether they are inspired and/or entertained.

The challenges and difficulties we had to face were:

- **Confusion**, especially when using replicas in our narratives along with original exhibits—we realised we had to be very clear about this distinction;
- **Authenticity**, especially in historical re-enactments—we find it hard to be authentic with texts (how far can someone go when improvising with famous people's words?), props, stage settings and costumes. On the other hand, the use of puppets facilitated reenactment-especially in crowd scenes—as puppets are custom built and inexpensive. Moreover, it seems that they do not leave much space for misinterpretation (puppets are merely objects and can never pretend to be real human beings). Obviously, we also realised that fictional characters could be an alternative, effective and less time consuming

solution to deal with authenticity issues. However, participants' feedback indicated that, once the metaphor is established and the convention is agreed between the action on stage and the visitors, if the narrative is well documented and does not contradict reality (such as dates or historical facts) then the audience is voluntarily involved in the story and uninhibited when faced with new knowledge.

Furthermore, visitors might enjoy the effect of participatory exhibits or activities "but [are] making no effort to understand them," as the American museum educator Lisa Roberts wrote⁶. To overcome this effect, we try to motivate our audience to observe the Museum exhibits. We also try to insert unobtrusive hooks in the dramaturgy or the presentation of props, in order to organically link our story with the official stories of Museum exhibits and the Museum's narrative.

To further develop the revised exhibition of the science gallery, we plan to use formative research (questionnaires) to collect information about what else visitors would like to learn, and in what way (live experiments, written texts, film, discussion with experts, etc.).

Finally, in collaboration with the educator and historian of science Takis Lazos, the Museum developed a student contest for secondary schools titled 'The Museum Exhibits Through the Eyes of the School Students: In the Tracks of the Positive Science History'. Students were invited to identify and document science instruments from the Museum's collection and to design temporary exhibits inspired by them. The contest was very well received both by students and educators; for the academic year 2016–17, the contest will be organised in collaboration with museums of the National and Kapodistrian University of Athens' School of Medicine. Among other prizes, the two best presentations will be used to design and install, in collaboration with the students, a temporary exhibit in the science gallery.

The Museum and Networks / the Museum and the city

In 2011, and along with our strategic plan to develop diverse collaborations with other institutions and attract new audiences, the Museum became a member of the Athens Network of Museums and Cultural Organizations. The Network has 33 members, either private or state-run Museums or Cultural Institutions situated in the centre of Athens. The Network initiative is based on three trajectories:

1. the creation of a common ground for communication,
2. the exchange of expertise and the cooperation between members in addressing specialised problems,
3. the organisation of joint events and shared plans.

⁶ Roberts, *From Knowledge to Narrative*, 8.

The Network's aims are:

1. to strengthen participants' voices,
2. to elaborate multifaceted schemes,
3. to approach and involve larger audience groups in cultural agendas.

The collaboration of the members is established with a memorandum and a monthly meeting facilitates communication and the organisation of common activities. Since 2011, the Network has organised one or two common events per year and the AUHM has participated in all events. AUHM has also co-curated and coordinated two of them, 'Our own Athens' in June 2014 and 'Athens: Neighborhoods and Museums' in May 2012. Both had interactive activities for adults with a focus on the city of Athens. All Network activities are for free or reduced admission fee for the public. The participation of the Museum in the Network has contributed to the increase of its reach to a wider audience. Other benefits include the exchange of knowledge and ideas and the advancement of cooperation with other institutions.

In the context of increasing the activities of the neighbourhood the Museum is situated in, and in order to strengthen the bonds with neighbouring institutions and the inhabitants of the city of Athens, the Museum initiated the 'Two Museums in One Day' activity in 2013. The activity consists of free-of-charge joint guided tours starting from two neighbouring museums and concluding at the AUHM. On Sunday, 16th June, the activity started from the Museum of Folk Art Instruments and on Sunday, 29th June, from the Alexandra and Pavlos Canellopoulos Museum. The initiative attracted a lot of visitors and contributed to the rejuvenation of the neighbourhood as well as the exchange of audiences between the two institutions.

The Museum and exhibition planning: the Story of the Building and its Tenants

The building's long and significant history makes it one of the most important exhibits of our Museum. Throughout its long life, the building had many uses: private home, high school, university, infantry barracks, refugee residencies, grocery store, tavern, and, finally, museum.

The building's different uses inspired us to plan a permanent exhibition dedicated to its history by revising one of the Museum's galleries. Besides our research into historical records and archives, visitor participatory techniques were used in exhibition planning.⁷ From 1870 to 1970, the building had served as immigrants' residencies and tavern; this gave us the opportunity to invite the children of past

⁷ Simon, *The Participatory Museum*, 3.

tenants who had lived in the building between 1940 and 1970 to contribute with their own testimonies on its history (Figure 3).

Interviews were conducted to document their origins, everyday life, their relationships, the circumstances under which they lived during these years and to describe the neighbourhood back then. The stories told were question driven but at the end of each interview, the interviewees, as co-creators, were encouraged to talk about what was most meaningful to them. All these different aspects of their lives have been integrated in an audio exhibit. However, instead of using a common audio handset, we transformed a telephone dating from the 1930s into an interactive device of recorded oral testimonies. The visitors choose which story to listen to by dialing the number that corresponds to various themes.

Furthermore, this collaboration generated a range of mediums and artefacts (photos, video footages, oral testimonies, everyday objects, etc): remnants of the lives of everyday people during this period, which add to the history of this site.

The exhibition development is still in progress with the principal aim to create and manage more vibrant and valuable museum experiences 'with' and 'for' the non-experts, such as the previous tenants and the surrounding community of the neighbourhood, instead of launching an exhibit 'about' the building's history only relying on the Museum's experts and their research.

Conclusion

Not all museums are the same. Some favour art and science interpretations, communication based on drama in education techniques and first person interpretation, or oral testimonies by experts or everyday people. Others favour these less.

Some museum educators find the involvement of visitors in interpretation risky or chaotic. Some might even find it closer to the heart of learning and a useful tool to deal with extreme specialisation and experts' elitism.

Some find decision making processes within networks of institutions endless and disappointing. Others think of them as a rich and rewarding experience at the end. Some may fear the museum fatigue symptom and hesitate to organise visits to two museums the same day. Some are excited about this option and collaboration between institutions.

Also, it is true that not all visitors are the same. In the contemporary culture industry, some prefer to read or to listen to hard facts to learn or even to be inspired. Others prefer to be moved by a meaningful but imaginative stimulus.

From our experience we learned that it is us, the museum staff, who should approach, attract, meet and listen carefully to our visitors; we should welcome and discuss with them in a friendly environment, instead of waiting until they

Figure 3

The Moudakis family in the upper courtyard, 1960s



© Moudakis family archive. Used with kind permission of the Moudakis Family.

discover our collections. We should turn our working space into an open platform with diverse interpretation and communication options if we want to refresh the love for knowledge, science, and for sharing experiences, not only for our visitors but equally for ourselves.

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The Ubiquitous University Museum: A case study from the University of the Aegean

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Introduction

The University of the Aegean is a network university: it is situated on six islands of the Aegean archipelago. Since its foundation in 1984, it combines two main aims: to introduce new approaches to higher education in Greece and to promote regional development. As a result, it works in close collaboration with local communities, while it has also evolved into an international research-oriented university offering interdisciplinary studies in many fields.

In terms of heritage, the University is currently in the process of organising its historical archive and has developed an active interest in collaborations with museums and other cultural institutions of the islands it is located in. For instance, the University is closely related to the operation of the Petrified Forest Museum of Natural History and the Museum-Library Stratis Eleftheriadis-Teriade in Lesbos, the Porfyrias Library in Samos; some of its facilities are housed in the Industrial Museum of Syros, and so on.

Most importantly though, over the last 10 years, in the main campus in the island of Lesbos, a rather different approach to the typical university museum is under development: instead of creating a museum focusing on the University's history, as is often the case, two exhibition spaces were created within the main University buildings hosting/safeguarding important historical artefacts from and for the local community. In the atrium of the Administration Building, there is an exhibition of ancient architectural remains originating from the city of Mytilene

(Figure 1). In the atrium of the Marine Sciences Building, there is an artefact of strong emotional importance for the local community—the vessel *Evangelistria*, a historical boat which was one of the last ones (if not the last) to bring refugees to the island of Lesbos after the 1922 events of the Asia Minor coast, which were disastrous for the Greek community (Figure 2). These two exhibition spaces serve as a ‘ubiquitous museum’ since they are part of everyday life for both the academic community and the local community, who visits on different occasions (graduations, talks, school visits, etc). They offer the opportunity for various initiatives in collaboration with the students, such as a Facebook project in 2014, but they are also an integral part of the University’s identity as an institution oriented towards its community and its symbols. This paper will discuss this approach and will focus on the relation between universities, their museums and their communities, both local and virtual.

Brief history of the University

The University of the Aegean’s historical roots date back to 1918, after the Armistice of Mudros had been signed (17–30 October 1918) between the Ottoman Empire and the Allies of World War I. As a result of this Treaty, Greece was assigned by the Allies to control the area of Smyrna in the Asia Minor coast, in order to maintain stability and peace in the wider area. In this socio-political context, Professor Constantine Caratheodory—renowned mathematician and a Professor at the University of Berlin at the time—after meeting with Eleftherios Venizelos in Paris, proposed to the Greek government the establishment of a new university. He submitted a “plan for the creation of a new University in Greece,” called “Ionian University” (since this part of Asia Minor was the centre of Ionia in antiquity) on 20 October 1919. Caratheodory argued—within the concept of the Great Idea¹—that Athens, being the only educational centre in the area at the time, could not adequately deal with the growing needs of the eastern part of the country. Greece needed a university that would combine humanities with technological sciences and would cater to the needs of the regions.² He suggested three possible administration centres for this new university: Smyrna, Thessaloniki and Chios. The Government decided upon establishing the Ionian University in Smyrna (contemporary Izmir) on 1 December 1920. Constantine Caratheodory undertook the task of coordinating the initial efforts and was appointed the first rector of the University.

¹ The term ‘Great Idea’ refers to an irredentist nationalist concept, which defined Greek politics and identity formation from the middle of the 19th century to the first quarter of the 20th century. The main concept was that all the areas in the Balkans and the Mediterranean region, mainly in Asia Minor and the islands, where the Greek Orthodox population lived at the time should be united in a single state (see also Clogg, *A Concise History*, 46ff).

² Solomonidou, ‘Ionian University’, 389.

Figure 1
Atrium of the University of the Aegean



Photo: M. Bakas © University of the Aegean and M. Bakas

Figure 2
Atrium of the University of the Aegean



Photo: M. Bakas © University of the Aegean and M. Bakas

The plans included the establishment of Schools, which would promote the development of the area as a centre for overseas Hellenism; at the same time, the University would strive to become an internationally acclaimed institution, as important and academically worthy as any other European university. However, the Ionian University never opened its doors to students, since the plans of both Caratheodory and the Greek government were annulled due to the end of Greek control of the area and the subsequent expulsion of the Greek population from Asia Minor, an event recorded in Greek history as ‘the 1922 Disaster’.

The University of the Aegean was considered to be the continuity or revival of Constantine Caratheodory’s initial vision. As already mentioned, it was (re)established in 1984 as a network University on the islands of the east borders of the country. Administration is located in Mytilene (the capital of the island of Lesbos), while various departments have been also established in Chios, Karlovassi (on the island of Samos), Rhodes, Ermoupoli in Syros and Myrina in Lemnos. The University today runs 16 departments, offering 17 undergraduate and 45 graduate programmes, a large number of summer schools, life-long learning programmes and vocational training courses.

One of the principal characteristics of all departments of the University of the Aegean is that they develop new academic domains, usually interdisciplinary, which adhere both to the needs of contemporary Greek society and the global community, as well as to students’ requirements and expectations for high-quality studies and good career prospects. The University relies heavily on the use of Information and Communication Technologies (ICT) for its everyday activities, and experiments as much as possible with the use of new media for teaching and research.

The University of the Aegean and its ‘Ubiquitous Museum’

The term ‘ubiquitous museum’ might sound very contemporary to many of us dealing with new media as a reflection of terms like ‘ubiquitous computing’, highlighting the possibilities of mobility and multiplicity offered by new technologies. But the term is not that new; it was first—to our knowledge—used in 1969 by Edward Patterson, director of the Nassau Museum of Natural History in the United States, to describe his museum in an article in the journal *Curator*. He said that the museum was designed to “be housed in many separate buildings scattered within an area of almost 300 square miles.”³ After talking about his institution in detail, Patterson said: “Though ... our dispersal was enforced by Nature, it could justifiably have been scattered on purpose. By being part of many communities, we have gained a greater measure of proprietary feeling on the part of the public.”⁴

³ Patterson, ‘Ubiquitous Museum’, 110.

⁴ Patterson, ‘Ubiquitous Museum’, 124.

This view reflects in many senses the concept along which the University of the Aegean's approach towards museums has been developed. The difficulties 'enforced' by the special conditions of the University's establishment and shape were turned into a great advantage, i.e., a greater relationship with the communities surrounding and supporting the University, and an opportunity to develop this relationship further by encouraging student's interaction with local history.

In 2006, the University's authorities decided to use the atria of the three main buildings of the Lesvos campus as cultural spaces where historical artefacts would be exhibited. The decision has to be credited to Andreas Troumbis, then rector of the University. The choice of artefacts was very specific and addressed archaeological, historical and aesthetic concerns. One of the atria would hold a selection of ancient architectural fragments that would be loaned by the local archaeological service; the second would become the new home of a vessel with important historical links, declared a historical monument by the Hellenic Ministry of Culture; the third—and this is the only part of the project that has not materialised as yet—would become the display space for olive-pressing machinery of the previous century that would be saved from the many factories still present on the island. Alternatively, this space would host a large sculpture donated to the University by the School of Fine Arts in Athens.

The decision of creating a museum is usually either the result of the realisation that there are artefacts that need to be protected and saved for future generations, or of the donation of one or more collections to the institution. In our case, searching for donors who would be willing to donate their collections to the University of the Aegean would have been a relatively easy and expected move—considering the local communities' support for the University, materialised in many donations of buildings in all islands and the presence of 'Friends of the University' associations in almost all of them. And it has been undertaken at least partly, as for instance in the case of the plans about a Caratheodory museum in Samos.

But this was not considered enough. Local people and the students who come to the island come across fragments of ancient architectural remains almost everywhere—while walking in the city, in the yards of the two archaeological museums, in the castle. Their presence is often invisible to them as it is so common. By taking a few of these objects, not the most interesting or aesthetically pleasing ones, we wanted to provide a new focus for them, to let the city flow into the University campus (which is approximately 3 km away from the city centre), and also to create a starting point for many of our projects involving students and the city, for instance the video-walks that the Department of Cultural Technology and Communication worked on in 2015 in collaboration with students.

In addition, there are artefacts that have special relationships with the local population. One of these artefacts is the vessel Evangelistria, chosen as the cen-

trepreneur of the second atrium. The vessel, a *kourita* in terms of its type, was built in 1883 in Old Phokaia in Asia Minor to be used on the salt works there. After a rather long and emotional history, in 1922 the vessel became the property of the Charalambous family who used it to cross over from the coast to Lesvos safely. This vessel also became their means of work, a tool and at the same time a symbol of home, of refugees. The vessel was first donated to the municipality of New Phokaia, close to Athens today. It was soon claimed back by the Phokaians of Lesvos who thought that it was not well taken care of and that the vessel should come back to the island of Lesvos. The University claimed that it should be considered as the most appropriate place for hosting the vessel and making it a centre of its 'ubiquitous' museum.

It is around this particular vessel, today located next to the coffee shop of the University, that many student projects are organised. Once the students find out about 'this old boat', they are very easily involved in its interpretation. The story of the vessel itself has been fully documented as a result of students' work. Vassiliki Psatha, a postgraduate student of the Department of Cultural Technology and Communication, has fully documented the story and created an educational programme for school pupils regarding this vessel. Further work was done by other departments and other students, for instance, the Department of Marine Sciences that has brought to light interesting aspects of shipbuilding, of the history of similar vessels, but also more archival photographs and other documents.

A more recent project is the one on Facebook that took place in 2014, which is worth discussing in more detail. The cardinal idea behind this project was to set up a Facebook page for Evangelistria in order to attract the attention of more (student and staff) visitors from the campus, people from the town of Mytilene, and also 'virtual' visitors (i.e., people and groups who would want to know more about Evangelistria—and the stories surrounding it—but had no means of accessing it physically, for instance people from other parts of the country, other campuses of the University or even people from abroad). A ubiquitous museum today does not only aim at integrating exhibits within the physical experience of the everyday, but also has to take into serious consideration the so-called virtual experience, or better, the virtual aspect of everyday experience. Nowadays, the virtual is as much part of the everyday as physical presence, action and practice. For this reason and especially as far as younger generations are concerned, it is highly important that we conceive/describe the 'ubiquitous' as a combination of the physical and the virtual. Social media, in particular, provides a novel reading of this combination, a hybrid type of interaction: a 'meeting point', an event and a place within which Facebook users 'stroll'/'walk around' every day—or any hour of the day—in order to find information and discuss a particular topic. By doing so in the case of Evangelistria, we found a way to introduce a topic in the everyday discourse of the people of the campus (students and staff) and to recommend a new

way of experiencing the exhibit (partly through the sharing of virtual information and partly through interaction with the physical object).

Project description: a Facebook event entitled 'The Boat'

The page designed for Evangelistria was entitled 'The Boat' and was set up as a Facebook 'event'. An event in Facebook is essentially a public profile that may be used by businesses, brands, cultural organisations and/or institutions to notify users of upcoming occasions. The event's creator may invite friends, members of a group or fans of a page. Facebook events operate under the same logic as an individual Facebook profile, in other words, as a page for uploading photos, videos, links and status updates, all appearing not only on the page itself but also the users' personal newsfeeds. It is also noteworthy that a Facebook event is a calendar-based resource and for that reason precisely, a great way to spread information fast, since they are able to reach thousands of users in a short amount of time. Those invited are placed in 'attending', 'not attending', 'may be attending', or 'hasn't responded' lists, giving a rough estimate of 'visitors' as in the case of temporary museum exhibitions.

In the event profile description of the 'Boat', a short text explained the aims of the project. This event was a temporary digital exhibition for Evangelistria, which also paved the way for a long-term interaction with the exhibit in physical space.

Students participating in the project were divided into two groups: [1] administrators (they received all information and material produced from other groups and uploaded them to the Facebook page); [2] communication and media group (they produced advertisements and punch-lines or promo images of the event for Facebook and Twitter, mailing lists, etc). The remaining groups designed and produced information related directly or indirectly to Evangelistria. Each group worked with a different medium (text, image, sound, video). Many decided to focus entirely on the boat and its history; other groups juxtaposed the past and the future (especially through the comparison of past and present refugee waves on the island). Each group uploaded its work on the page once per week (roughly speaking). Particular hours of the day were selected for uploading, mainly in order to attune newsfeed with the working hours of university staff and the times when students log into Facebook (late hours). An innovative part of the project was a QR code game revolving around 'The Boat', whose promo was conducted mainly on Facebook but also with posters within the campus and the town. Through participation in the game, users found out more information regarding Evangelistria, produced information themselves (through the uploading of questions, comments and images) and, finally, had the chance to win a ticket to Aivali/Asia Minor, in order to complement the story of the boat through a visit to the 'other side', in other words, its place of origin (Figures 3, 4 and 5).

Figure 3
Facebook project, Screenshot 1, Despina Catapoti



Figure 4
Facebook project, Screenshot 2, Despina Catapoti



Figure 5
Facebook project, Screenshot 3, Despina Catapoti



What did we want to accomplish through this project? We wished to move the notion of the 'ubiquitous' beyond the physical so that the 'virtual' was also incorporated in the discourse. 'Ubiquitous' is a term implying the integration of something (in our case a museum, or a museum exhibit) in the everyday; it also implies a de-centring of that something. At times at the fore, at times at the periphery of everyday performance, a thing (like 'The Boat') is enmeshed in life not so much to attract surplus attention, but to enable the construction of relations around that object. Both physically and virtually, the boat at the university campus is not an endpoint (a capsule of historical information); it is more of a 'history' with an open end, a fulcrum for the activation of problematisations over present situations, current ideas of loss, memory and departure. This history is not only inclusive but also a product of participation. Both physically and virtually, 'The Boat' operates as a participatory platform, open to everyone's gaze, accessible all hours of the day (at the level of the physical), imbued with extra stories, dimensions, words, sounds, images (at the level of the virtual), thus initiated by a variety of people (i.e., those participating in the project, users who upload information themselves, users who observe and comment, users who observe and 'like' in silence). These types of museums have the potential of securing the return of visitors more than a traditional museum. When the object is not the centre of attention but rather an aspect of a wider social space, people return to that space more often than in a museum space. Moreover, the virtual context—and more specifically, the constant uploading of information on social media (in our case Facebook)—also constructs a regime of return. Users return to the page in order to find out more, 'what's new' but the more they do, the more this page is registered algorithmically as a 'frequent visit' of the user (so even

if the user does not visit the page, the news of the page visit him/her, they appear in his/her newsfeed).

Conclusions

How should we organise a university museum around the trope of the ‘ubiquitous’ and why would the undertaking of such an enterprise be considered necessary or worthwhile? As a vehicle of memory a museum is organised around objects which can “stimulate and structure people’s capacities to reminisce about the past, to day-dream about what might have been, or to recollect about how their own lives have intersected with those of others.”⁵ The value added to this process by the ubiquitous museum is that these memory activations occur within the experience of everyday life, often without warning, and make the past incredibly vivid within the present. This is even more so within an environment like a university, a place already vibrant and vivid, a place within which various social groups work together at producing knowledge and meaning within a wide variety of social contexts. Both at a physical and virtual level, in other words in highly hybrid conditions, university museums establish a regime of coexistence between past and present which does not establish static relations nor distance; instead, it allows for the constant reaffirming of fluidity as people, materialities, places and stories are compared, evaluated, purchased and even consumed in everyday discourse. As Urry rightly argues, such places can be viewed as the particular “nexus” between “propinquity characterised by intensely thick co-present interaction and on the other hand, the fast flowing webs and networks stretched corporeally, virtually and imaginatively across distances.”⁶ This interplay between propinquities and extensive networks make up the museographic vision of the University Museum of the University of the Aegean and, in fact, the academic vision of a network university such as ours.

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⁵ Urry, *Sociology beyond Societies*, 137.

⁶ Urry, *Sociology beyond Societies*, 140.

BIOS

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Despina Catapoti is an Assistant Professor in cultural theory and digital culture at the University of the Aegean, Department of Cultural Technology and Communication. She studied archaeology and history of art at the University of Athens, Greece, and prehistoric archaeology and archaeological theory at the University of Sheffield, UK. Her research interests centre on cultural theory, history of science and epistemology with particular focus on the history and philosophy of archaeology. Her latest work investigates the impact of New Media on cultural heritage outreach.

SECTION 2

**THE MOST CRUCIAL ISSUE(S)
WITH UNIVERSITY HERITAGE TODAY**



Building a collection with an army of seniors

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The Department of Biosciences at the University of Oslo was the largest public building in Norway when it was built in 1971. The building houses a wide range of science departments: botany, zoology, zoo-physiology, marine biology, limnology, genetics and biotechnology.

A large building contains a lot of objects: objects in use, historical objects, biological specimens, personal items and waste. University heritage is vulnerable and is constantly thrown away.

A project is born

In 2014, the Museum of University History launched a pilot project in cooperation with the Department of Biosciences leadership. The goal was to move the objects of historical value out of the different storage spaces, offices, labs and lunch areas and gather them in one place inside the Department of Biosciences.

Retired professors from the different special fields of the Department would assist us in locating and selecting the objects. We got funding to hire Dannevig to coordinate the project and two assistants to move, clean, register and photographing the items. Our plan was that our experts would register information about the objects on their own.

Figure 1

Some of our good informants-experts in one of the basement levels in the biology building. From the first stage of the project



© Photo: Ragnhild Dannevig

The ideal plan vs the reality

The plan for building a collection did not go according to script. Our museum was reorganized and a side-effect was that we were not able to hire the assistants. Our long-promised database was also put on hold. The reality is that we are two busy people doing this project in between all other tasks. We realized that we had to be much deeper involved in the process on registering the historical information on the historical instruments. We interview the informants about each object. The whole project became fundamentally different from our plan, where we thought the project could live its own life with assistants and self-sufficient specialists.

We are building a representative collection, with instruments from general biology and special fields. Through close collaboration with retired professors and lab technicians, we are able to make a selection and get the much-needed information about the objects. We try to involve many informants to get different perspectives. This is also a way to verify the information we collect. It is not easy to remember for example when an object went out of use. Some items have been used for research by one person and for teaching by another person in the same period, or after the research project were concluded.

Old enough to be a museum object?

Experts from the various special fields have differing views about what should be discarded and what should be preserved. We also see an interesting pattern regarding value and age. Our retired informants started out telling us that almost everything old and valuable is thrown away. Their conception of 'old' and 'museum object' naturally does not include their own generation. We explain that in our perspective the instruments they used in their research from the 1960s to the 1980s are just as important to save as the older objects.

Home-made

Instruments that were made at the University, designed for a special task in someone's research or teaching are treasured by our Museum. One example is a tin of canned cod roe transformed to a transportable oven for drying large insects during fieldwork. It was made by an internationally known researcher on insect physiology, Arne Semb-Johansson.

Figure 2

Senior engineer Erika Leslie explains to Dannevig how the tin of canned cod roe was used. Leslie never used it herself, but remembers the description given many years ago by the professor who made it. She saw the historical value of the instrument and kept it safe after the professor passed away.



© Photo: Anne Vaalund

Our curiosity, their generosity

The project is delayed because of the lack of assistants. But we see some positive effects. In doing all the work ourselves, we learn about the history of the objects and the scientific practice. Our involvement also makes it a lot easier to present and exhibit the collection in the future.

Figure 3

We have brought with us objects from the collection to the weekly senior coffee.
It was interesting to hear the retired researchers discuss
the use of the different objects



© Photo: Ragnhild Dannevig

This is a slow way of working. It is a large-scale saving operation but at the same time a qualitative operation. We spend a lot of time with our informants, taking part in their weekly 'senior coffee', listening to their stories and asking about their research fields and their teaching. Without our informants, this collection would get a different form. And we have to reflect on how their perspectives are influencing how we collect and organise the collection.

We want to create a collection where the faculty's history of science is incorporated. And we also want to collaborate with scientific communities without blindly adopting their values and perspectives.¹

¹ Visit our website to see how we present some single objects from our different collections under the theme: 'The State of Things—The History of Objects', <http://www.muv.uio.no/uio-historie/specialtemaer/tema-instrumenter/>

BIOS

Ragnhild Dannevig deals with ongoing management and research concerning the medical collections. She ensures the sustainability for objects and collections in storage and on site. She is currently project coordinator for building a collection in the department of Biosciences. Master in museology in 2012: artist-in-residence in Norwegian Folk museums.

Anne Vaalund's main responsibility since 2003 is to administer Oslo University History Photobase. She is interested in the wide range of angles we need for understanding the complexity of a university: research, teaching, working conditions, staff, students and organisations. Master in university history in 2001: Botany as a research field in the University of Oslo, 1880-1920.

Cultural Use of the Astronomical Heritage at Besançon Observatory (University of Franche-Comté, France)

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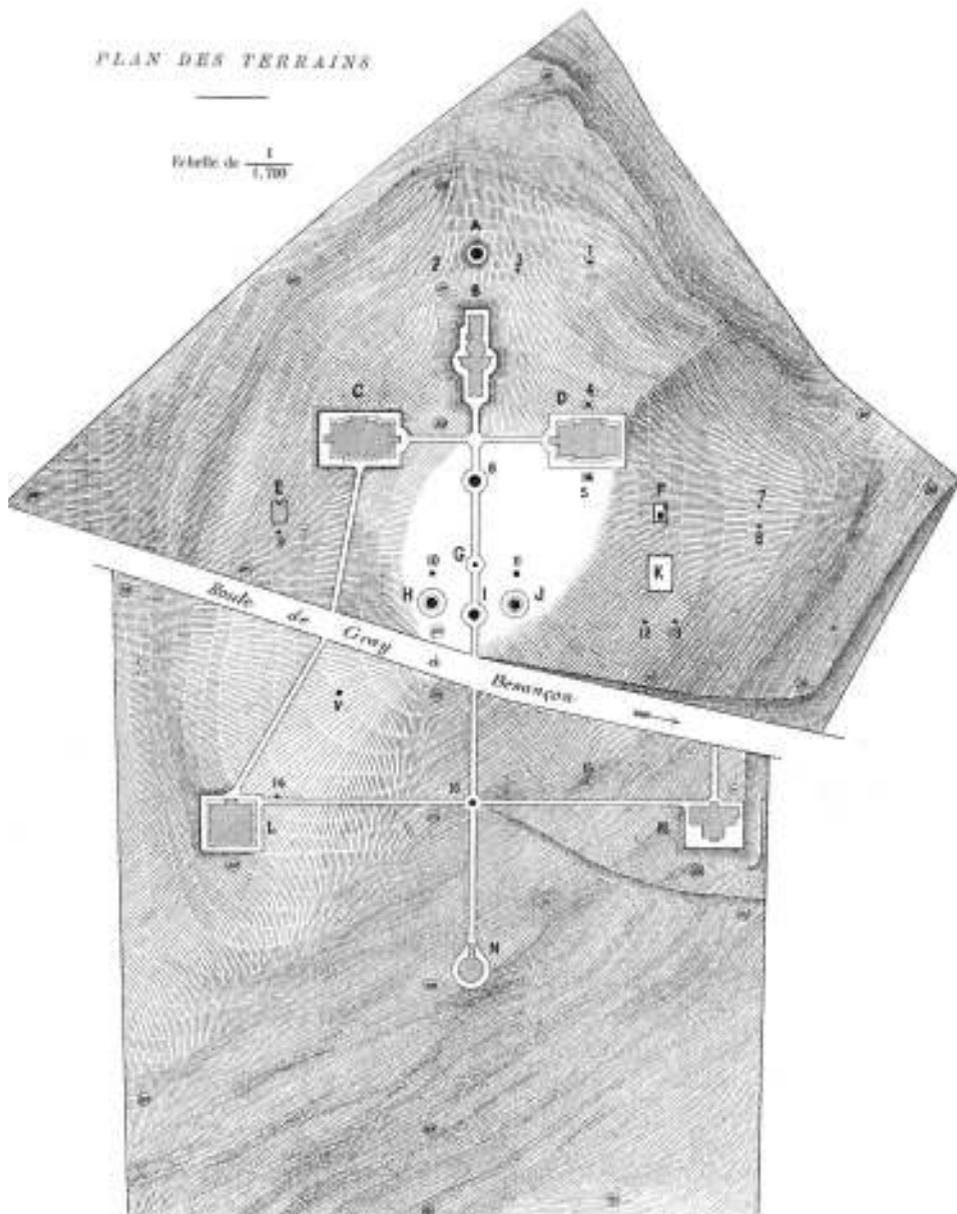
From clock making to time making in Besançon

Soon after the French Revolution, a national watch manufacturer was established at Besançon in order to rival those of the Swiss industry. However, it was not until 1862 that the first clock-making school was created. As early as 1868 the foundation in Besançon of a state observatory was requested to “produce precise time”. However, the political time was not right and the decree settling an “astronomical, meteorological and chronometrical observatory” was issued only 10 years later, under the new Third Republic. The official inauguration of the service in charge of rating timepieces took place in 1885. The first chronometrical competition was organised in 1889, and the following year French President Sadi Carnot himself awarded the prizes to the winners of the watch competition.

Besançon Observatory was set on an isolated hill outside the city, not very far from the Faculty of Science. Its buildings were arranged over a 7.5 ha domain at an altitude of 310 m. They are set along NS and EW axes, as recommended by Struve at Pulkovo. The main astronomical instrument for time determination was a large meridian circle. Other instruments included a 21 cm visual refractor, a 33 cm coudé refractor, an altazimuth and a small photographic refractor, as well as meteorological instruments.

Figure 1

Map of the observatory, *Annales de l'Observatoire de Besançon*, 1892.



On the map, the North is looking up. Ice house (A), coudé refractor (B), library (C), meridian circle (D), small meridian circle (E), meteorological park (K), photographic refractor (H), altazimuth (J), director's residence (L), pavilion for assistants (M), pavilion for small equatorial refractor (N).

© Région Franche-Comté, Inventaire du patrimoine, ADAGP; © Observatoire de Besançon

Main changes at Besançon Observatory in the 20th century

With the passage of years, the scientific equipment at Besançon Observatory evolved. The main additions to the initial endowment occurred in the 1930s with the construction of a new building for chronometrical activities—especially for the certification of watches, an activity that started in 1903—and in 1939 with the acquisition of a very modern triple astrograph.

In 1903 the domain of La Bouloie was planted with a great variety of species, which a century later grew into a beautiful park of large trees. However, the original 19th century buildings and instruments became obsolete and some of them were left to decay or were dismantled, while others suffered drastic modifications, e.g., the coudé refractor.

Because the coudé was the most powerful of the equatorial instruments, the place chosen in the 1880s for installing it was the highest point of the domain. However, after the installation of the new astrograph, it was used less. As a result, when in the 1960s the University campus moved from the city centre to a site adjoining the observatory, the site occupied by the elegant building designed for the coudé refractor was envisaged as the centre of the new campus. Thus in 1967 it was carefully dismantled and removed from the building, while an adjoining part of the building itself was demolished. However, the University abandoned its original plan and the remaining part of the building was used for installing an instrument for amateur astronomers.

The new impulse given to Besançon Observatory in 1973 with the construction of a modern building for astronomical research led, a decade later, to the end of observations with the last original 19th century instrument, the meridian circle.

From obsolescence to heritage via the Inventory

At the end of the 20th century, the fate of obsolete instruments raised the same questions in all the French observatories established in the 19th century. Due to lack of space, of money or of interest, the main tendency was to ignore the instruments and to let the buildings decay. At the time, urged by a few astronomers, the Ministry of Research set up a working group bringing together historians, archivists, astronomers and conservation specialists. In 1995 an agreement was signed between the Ministry of Culture and the Ministry of Research in order to undertake a detailed inventory of the astronomical heritage in French observatories, using the methodological approach of the French National Inventory. Between 1995 and 2005 the scientific team (JD for the Ministry of Culture, FLGT for the Ministry of Research) visited nine astronomical sites as well as the Algiers Observatory. They produced 25 architectural studies, studied around 900 objects and took over 3,000 photographs.

At Besançon the operation led to a particularly close and fruitful collaboration between the University observatory and its director François Vernotte the Inventory Service of Franche-Comté (Laurent Poupard, researcher, and Jérôme Mongreville, photographer), the scientific team (JD and FLGT), and the city of Besançon as regards the park. Six architectural studies, including one for the park, were produced, 160 objects studied and nearly 300 photographs taken.

Historical studies were then undertaken—history of the institution, architecture, instruments, horology, instrument and clock makers as well as biographies of astronomers, etc.—a database was put online, communications were presented at congresses, articles and a small book were published by JD, FLGT, Vernotte and Poupard.

Meanwhile, in 2003, Vernotte initiated the procedure leading to the historical monument protection of the site, as well as that of the buildings and many of the instruments, including the dismantled coudé refractor and the 'old instruments' and original clocks that were transferred in 1998 to the newly created Museum of Time.

Due to the large variety of items to protect (park, astronomical site, buildings, instruments still in place, dismantled instruments, clocks, etc.) and the number of parties involved in the protection (local and national specialist commissions of the Ministry of Culture, city of Besançon, University), the ministerial *décret de classement* was issued only in 2012. However, from 2003 onwards, the observatory's 'old junk' became respectful heritage.

An active campaign for the cultural promotion of Besançon Observatory's heritage and "savoir-faire"

As early as 2002, Vernotte had launched the restoration of a very rare analemmatic sundial designed and constructed in 1902. Financially supported by the Fondation du patrimoine, this was achieved in 2004. That same year a 3D modelling of the coudé refractor and of its building was made by students at the nearby Belfort-Montbéliard University of Technology. In 2005 the fine chronograph, ordered in 1905 from the famous instrument maker Paul Gautier, was restored.

As regards the chronometry, in 2006 Vernotte and François Meyer (head of the Time-Frequency Service of the observatory) organised the reissuing of certificates attesting the chronometric quality of mechanical watches. This led in 2007 to a request by makers of prestigious mechanical watches to obtain an official certification for their luxury watches. That same year the Time-Frequency Service was reorganised and equipped to improve its primary mission, its participation in the international network that produces time for the whole planet. Whereas a few Swiss laboratories did COSC¹ testing only on the movements of watches, Besançon Observatory became the only laboratory equipped to do the testing on mounted watches. In 2008, on the occasion of the delivery of the first 21st century

¹ Contrôle Officiel Suisse des Chronomètres, founded in 1973.

certification, Meyer and Vernotte decided to reissue the 19th century observatory accolade with the viper engraving.²

Figure 2

First delivery of the new chronometric certificate in the meridian pavilion in February 2008



From left to right: the watch owner, FM and Kari Voutilainen, the watchmaker.
© Ian Skellern

Two years later Leroy, the French maker of high precision watches since 1785 and the property of Festina since 2004, left Switzerland and returned to the city of Besançon to benefit from the *savoir-faire bisontin*—an initiative for the city and for the observatory. This led Vernotte together with the mayor of Besançon to attend the 2011 Baselworld, the annual World Watch and Jewellery Show. It led the mayor of Besançon to undertake the restoration of the very iconic building of the very iconic meridian circle.

In conclusion, twelve years after the beginning of the inventory of astronomical heritage, the previously bulky and embarrassing 'old junk' kept at Besançon Observatory had become precious scientific and technological heritage, the rare analemmatic sundial had been restored, along with the meridian building, its fa-

² Due to technical problems, the first 're-engraving' of the viper on Leroy watches occurred only a couple of years later.

mous time-producing meridian circle and its Gautier chronograph. The 20th century triple astrograph had been turned into an instrument for training students.

Figure 3

Pupils looking through the triple astrograph



© Observatoire de Besançon

In addition, the public is invited regularly to attend conferences and lectures at the astronomical site, guided visits of the historical and present installations are organised by a pool of trained guides chosen among students of the University, teachers and their pupils are received by research workers, etc.

Specificities of Besançon Observatory

We believe that these cultural achievements were attained so rapidly at Besançon Observatory but at none of the other French observatories that were inventoried during the same period, it is very likely because of some specific traits.

Unlike other observatories, since its early days in 1882 Besançon Observatory has had strong links with local industry and always had shared interests with the city.

Moreover the astronomical site is only 4 km from the city and was never surrounded by walls. Consequently, from the start its relationship with the Faculté

des Sciences and with the students was much easier and closer than in Bordeaux, Lyon, Marseille or Toulouse. Contrary to what happened at these other observatories—historically isolated on top of a hill, embedded within walls and far from the city—the 20th century university campus has moved very close to the astronomical site, reinforcing the links between the two. Since for obvious reasons the historical buildings of the observatory occupy the highest area at La Bouloie, they are now located right at the centre of the new campus and their existence cannot be considered as a burden for the University as it is elsewhere.

Last but not least, a specific trait is the existence of the Museum of Time, which from its early days in 1998 developed a close relationship with the Observatory, contributing to the cultural use of some of its best clocks and of small instruments such as a very rare altazimuth.

Of course, without the right people at the right place at the right time, these specific traits would have remained unnoticed and the inventory of the 'old junk' would not have produced such unusual/exceptional cultural results.

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BIOS

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How to Raise the Scientific Community's Awareness of its own Heritage

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In 2008 the Institut National des Sciences Appliquées (INSA), Rouen's School of Engineering and the University of Rouen joined a national programme headed by the Musée des arts et métiers, the National Mission for the Preservation of Contemporary Scientific and Technical Heritage (PATSTEC)¹ for the preservation of both the tangible and intangible heritage of the scientific community.

Contemporary scientific heritage is famous for being complex and quite difficult for laymen to grasp. Indeed most of its instruments are black boxes, electronic devices or computer parts. Most of the time, the very concept of scientific heritage has not yet sunk in in researchers' minds. It is a process that takes time and opinions must be more broadly exchanged.

After a few years spent on making an inventory of instruments, we decided to set up a project with several colleagues to address both the tangible and intangible heritage of the scientific community.

In this paper, we plan to share our experience of collecting intangible heritage between 2011 and 2013 on a specific scientific instrument, an atom-probe in a Rouen-based laboratory. This experience started a sort of virtuous cycle: collecting memories of stakeholders raised their interest in preserving and creating an inventory that helped us to extend the knowledge of scientific objects.

Our paper highlights how interviewing scientists on their past research and team work helped enrich oral archives, furthered knowledge of material tools

¹ www.patstec.fr

and enabled us to gather more oral data and knowledge of other scientific instruments. Moreover, collecting oral archives helped raise the scientific community's awareness of its rich heritage.

A project to document the intangible heritage of the atom-probe

We set up a working group comprising sociologists, curators, and Rouen-based scientists to supervise a student for three months. This student had to define terms and analyse the concepts of our project. As RéSiTech Normandie's main mission is to establish an inventory of all contemporary scientific objects, our approach was to focus on scientific objects per se (neither the history of the laboratory nor the history of researchers and scientists were the topics of our study).

We decided to work on a particular object: the atom-probe of the Groupe de Physique des Matériaux at the University of Rouen.

The student has been employed to contact relevant people involved in the development of the atom-probe and to propose an interview grid.

What is an atom-probe?

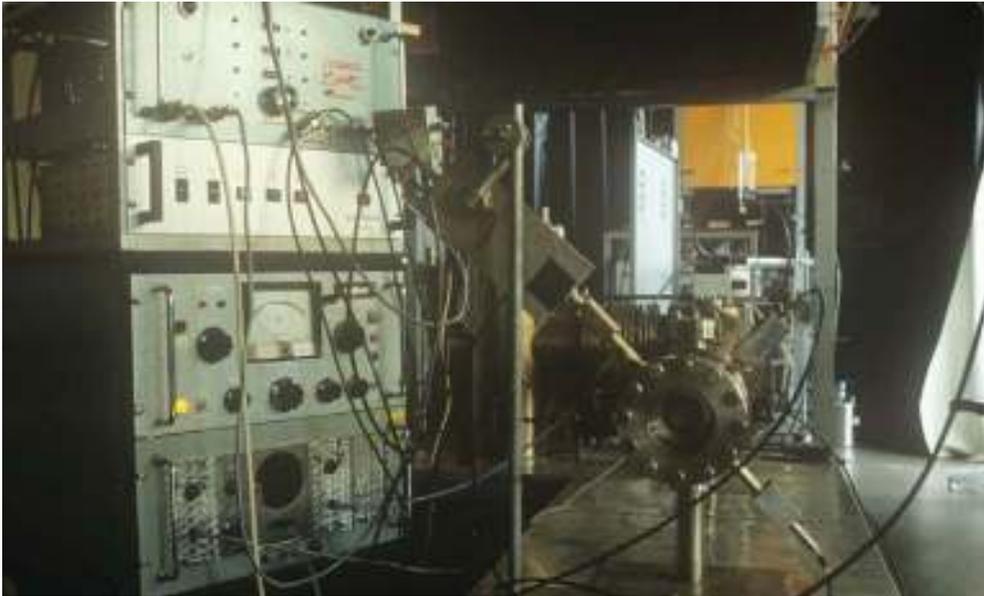
An atom-probe is a scientific instrument used in material sciences research. It has the capacity to determine the nature of one single atom seen on a metal surface. It was invented in 1965 by Erwin Müller² but at that time few research laboratories were interested in this instrument as it was seen as too complex to run.

Yet in Rouen, a very small team of six persons decided to design and build their own atom-probe, which was to become the first French atom-probe! It seemed a real challenge for a small lab that had limited financial means and little technical know-how in a university that had just been set up. In 1974, the team was able to present their atom-probe (Figure 1).³

² Erwin Wilhelm Müller (1911–74) was a German scientist who worked in Pennstate University in the United States of America. He invented Field Emission Electron Microscope, the Field Ion Microscope and the Atom-Probe Field Ion Microscope.

³ Gallot, Sarrau and Bostel, 'Design and performance of a FIM atom probe'.

Figure 1
Atom-probe (1974)



©Jean-Marie Sarrau

In 1993,⁴ another important step was taken with the tomographic atom probe. The team came up with its first three-dimensional representation of atoms, which enabled them to acquire significant expertise and gain lasting international recognition.

A few years later, the atom-probe was commercialised by CAMECA.

After the collection of oral testimonies, we had obtained 28 hours of video recording, which we transcribed. We chose to base our transcription work on Florence Descamp's methodology.⁵ In addition, we collected more than 30 objects related to the different stages of the development of this atom-probe.

How do we showcase this material?

Using the recordings, we learnt a lot about technical know-how and scientific knowledge. Scientists, lab technicians and engineers talked about their practices and daily professional life. We also built trust with the scientists who were more and more interested in our project. They gave us material from their personal ar-

⁴ Blavette, Bostel, Sarrau, Deconihout and Menand, 'An atom probe for three-dimensional tomography'.

⁵ Descamps, *L'historien, l'archiviste, et le magnétophone*.

chives: pictures, papers, film, slides, etc.

In 2012 we took part in a national scientific event, 'Fête de la Science', presenting a short paper about this exciting adventure: the atom-probe's design and development over three decades. Showing slides of the archives, we could tell a story.

In 2013–14, we were convinced that we had gathered a meaningful collection of data on the development of one instrument in one place. We decided to showcase this material in a documentary film. With CNRS Images, we produced a 28-minute documentary 'Un instrument et des hommes, l'aventure de la sonde atomique à Rouen' directed by Nicolas Mifsud.⁶ We organised a screening in a theatre, produced 700 DVDs and made the film available online on the CNRS Images website.

Review of the experience

We found this project about the intangible heritage of the atom-probe very enriching and it quickly gained recognition. This study had quite an impact. First of all, this project enabled us to raise the local scientific community's awareness of the interest and importance of preserving scientific objects and tools in laboratories. To that effect, laboratory members and laboratory directors wished to upload the documentary on their website.

It also helped initiate fresh contact with other research laboratories and to start new preservation projects. It made it possible to collect lots of archives and documentation.

This experience also paved the way for further investigation. First we focused on both concepts of heritage and intangible heritage. We became aware of the issues at stake in the construction of heritage or the reconstruction of memory. The oral material at our disposal is so rich that it requires thoughtful consideration of the most pertinent ways to further use it.

The selection process to build this intangible heritage required deep thinking. We agreed on one protocol within which we carefully chose people who had been directly involved with the instrument. But in the end, more researchers than technicians agreed to be interviewed. Even if our study really focused on the instrument, technicians and engineers seemed reluctant and felt they were not the right people to be interviewed, as if any scientific or research interest superseded any technical and technological interests. Our study was not able to transcend this way of seeing things.

This project was a fascinating subject. We learnt a lot about technology, science, laboratory life and local history. We studied new fields as well with the ques-

⁶ Nicolas Mifsud and Anne-Sophie Rozay, directed *Un instrument et des hommes, l'aventure de la sonde atomique à Rouen*. Paris: CNRS Image and RéSiTech, 2014, <http://videotheque.cnrs.fr/doc=4381>.

tion of oral archives. The Groupe de Physique des Matériaux wishes to open an exhibit room, and the collection may fall under the protection of the Ministry of Culture. This would add credit to the importance of preserving scientific heritage and help gain full recognition as cultural heritage. We believe that the construction of scientific heritage requires the involvement of the scientific community. Oral archives are a great way to make connections and to raise awareness. Today we are working on a new project of intangible heritage in a new laboratory, while remaining focused on scientific instruments and technologies.

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BIOS

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Human Remains Collection of the Athens Criminology Museum

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Human remains hold a unique position within museums. They are different from any other type of collection, since the interest of the museum visitors in death and the dead is apparent in museum exhibits around the world.

Collections of human remains have contributed significantly to medical science, anthropology and related disciplines by facilitating the development of knowledge in anatomy and biology, and about various diseases and injuries and their treatment.¹ For these reasons, numerous museum collections of scientific interest established during the 19th and 20th centuries consisted either of historic or non-historic human remains.

The aim of this paper is to promote the Criminology Museum of the National and Kapodistrian University of Athens (NKUA) through its collection of human remains. The Museum, as a place of collection and of history, recognises the importance of making all the exhibits available to external researchers. The aim of the human remains collection is to extract information and knowledge from its items through documentation for educational, scientific, historical and research purposes. Towards this direction, a number of graduate theses have been completed and a major project titled 'Collection, Documentation and Digitalization of the Material of the Criminology Museum of the National and Kapodistrian University of Athens' was completed in 2008.

¹ Working Group on Human Remains, *Report*, pp. 26–27.

A Special Greek Example: The Criminology Museum of the National and Kapodistrian University of Athens

A very special collection of historic human remains is housed at the Criminology Museum of the NKUA. The Museum is unique in Greece as it records the history of crime in Greece during the 19th and 20th centuries. It is dedicated to support the Department of Forensic Medicine and Toxicology, at the Faculty of Medicine, for undergraduate and postgraduate students.² The history of crime has been a sector of interest that can be directly related to scientific disciplines such as Criminology, Forensics, Toxicology, Forensic Anthropology and Sociology.³

Most of the collections of the Museum were established by the distinguished Professor of Forensic Medicine and Toxicology Ioannis Georgiadis (1874–1960), an avid and systematic collector of evidence items.⁴ From 1912 until the end of his life, Georgiadis used to collect, house, organise, study and exhibit, with caution and diligence, heterogeneous objects, specimens and human remains contemporary to his era. He managed to establish the Criminology Museum in the year 1932.⁵ Professor Georgiadis is the one who established the academic profile of the collections.⁶

The collection of human remains is made of various dry and wet—formalin preserved—specimens (Table 1). This collection includes almost 190 osteological and anatomical specimens obtained, between the years 1850 and 1950, from cadavers by the autopsy room housed at the Department of Forensic Medicine and Toxicology, of the NKUA (Figure 1). This collection includes normal human foetuses (Figures 2 & 3) or human organs, as well as human organs and foetuses with congenital malformations. Also included are the embalmed heads of famous Greek outlaws of the early 20th century. Their heads were cut off by the gendarmery and exhibited in public places for exemplary reasons. In addition, there is a collection of the 19th century dry-prepared specimens of tattooed human skin acquired from autopsies. This evidence provides important information about the diseases and unnatural causes of death as well as congenital malformations from autopsies performed during the 19th and 20th centuries. The investigation of these human remains contributes significantly to academic disciplines, since undergraduate and postgraduate university scholars use this material for educational, scientific, research and historical purposes. The Criminology Museum provides an exceptional atmosphere for researchers and visitors to interact with human remains, be it through scientific and medical or criminology studies.

² Maravelias et al., 'Documentation and Digitalization', p.159.

³ Ibid

⁴ Sakki et al., 'The Values and Meanings' p. 2.; Loutsidis et al., 'Educating Health Professionals', p. 42.

⁵ Ibid.

⁶ Ibid.

Table 1
The Human Remains Collection of Criminology Museum
of the National and Kapodistrian University of Athens

Human Remains Collection		189 specimens
Dry Specimens		
Mummified Tissues		
	Body parts (e.g., Piraeus bombardment 1944)	8
	Decapitated heads of infamous bandits (19 th to 20 th centuries)	13
	Foetuses	8
	Mummies (natural mummification)	1
	Skins with tattoos	45
Skeletal Remains		
	Skulls and bones (e.g., political crimes)	10
Wet Specimens (formalin preserved)		
	Foetuses	48
	Organs	29
	Body parts	27

© Criminology Museum

Challenges and the Legal Framework

Nowdays the established collections of human remains are confronted with current ‘challenges’, such as requests for return, questions about legitimacy of retention and objections to particular forms of display or collection management⁷. These ‘challenges’ are made by different groups that express cultural, political, religious or scientific interest on specific human remains.

A considerable section of the scientific community believes that it is of public interest to retain human remains collections for scientific or medical purposes,⁸

⁷ Goodnow, ‘Why and When Do Human Remains Matter’, p. 16.

⁸ Working Group on Human Remains, *Report*, p. 21.

although there is an interesting contrast between approaches adopted by European museums holding indigenous human remains from overseas and museums in countries from which the remains originate.⁹ In the case of Greece, past events as well as cultural perspectives have not produced wide differences of opinion between members of the scientific and museum communities and members of communities of origin about the legitimacy and appropriate use of human remains collections. However, museum professionals and scholars recognise that the public display of human remains may raise ethical considerations, and for these reasons they are very careful in the way they exhibit human remains.¹⁰

The act of holding human remains collections, the manner in which they have been managed as well as their accessibility are subjects under discussion. The fundamental question for all museums is how to deal with human remains in museums and collections. The question can be answered by bringing together the various branches of science and humanities concerned—ethnology, medicine, history, politics, law, ethics, physical anthropology and archaeology—which by themselves are not able to provide satisfactory answers.

The above question is related to ethical and legal issues—whether the act of removing and collecting human remains takes place within a legal or illegal framework. During the 19th and 20th centuries, human remains collections used to be considered standard materials for museums.¹¹ However, nowadays, there are numerous voices to be heard and considered.¹² The acts of collecting and studying human remains have become much more complex, and new unwritten rules of order are slowly developing into standard practice.¹³

Unfortunately, in many European countries, including Greece, the existing legal framework does not provide clear answers to the numerous questions.

Another aspect related with the question of how to deal with human remains in museums and collections is the cultural, political, historical or religious significance of human remains. Museum collections embody different meanings that are in relation to the viewers' or scholars' perspectives.¹⁴ Also, collections incorporate meanings from different periods of time including the era of the viewer or scholar.¹⁵ Moreover, today's generators and scholars of university heritage are in the best position to decide about the appropriate collection management and accessibility. Nowadays, the majority of the debates have settled down, and the generators and scholars of university heritage have the knowledge and experience for discussing such important issues with an open mind and considering all

⁹ Walker, 'Bioarchaeological Ethics'.

¹⁰ *Ibid.*

¹¹ Cassman, Odegaard and Powell, 'Introduction', p. 1.

¹² *Ibid.*

¹³ *Ibid.*

¹⁴ Sakki et al., 'The Values and Meanings', p. 3.

¹⁵ *Ibid.*

aspects, aiming to disseminate the knowledge amongst the university scholars, scientists and in the wider society.

The presence and exhibition of human remains at the Criminology Museum of NKUA raises many issues, concerns, ethical dilemmas and responsibilities. Researchers or visitors should respect the legal and ethical obligations concerning the collection, handling, conservation and exhibition of human remains and should follow the relevant principles of the museum policy.

Figure 1

A section of the left upper limb of a woman, consisting of forearm and arm, holding a bedside lamp that caused death due to electrocution



© Criminology Museum

Figure 2

Embryo (wet specimen)



© Criminology Museum

Figure 3

A mummified foetus (dry specimen)



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Practising Archaeology in the Museum—Livari project: The Experience of Transforming a University Museum from an Exhibition Hall to a Place of Archaeological Practice

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The Museum of Archaeology and History of Art of the National and Kapodistrian University of Athens was founded during the interwar period. For more than 80 years the collections were enriched with donations and long-term loans, including now more than 9,000 items, originals and copies, classified in eleven Educational Collections, dating from prehistoric to modern times, and deriving mostly from Greece but also from other regions of the East Mediterranean.¹

For almost half a century the collections were located in the basement of the Law School building in central Athens. Due to limited space, the Museum was under-visited and accessible only to the students. In 1988, the collections were

¹ For an account of the Museum's history, see Constantoudaki-Kitromilides and Sfyroera, 'Museum of Archaeology and History of Art'.

transferred to the new building of the School of Philosophy at Zografou Campus, where they were exhibited in two halls (one of which was situated in the building's atrium), occupying what was considered a privileged space of 2,000 sq m.

Ever since, the main character of the Museum of Archaeology and History of Art has been educational.² It was designed and is intended to facilitate the theoretical and practical training of students of the Department of History and Archaeology in documentation and interpretation. Recently it extended its role to conservation management and exhibition of archaeological objects and contemporary works of art. In this respect, the Museum has been set up for the benefit of the students: during the 1990s, when its collections became actually accessible and visited, undergraduate and graduate students, under the supervision of their professors, heads of the Educational Collections, worked for the recording, study and exhibiting of the objects. They also designed and produced the information material.

Recently the enrichment of the curriculum with mandatory and optional tutorials exploiting the Museum's objects strengthened its teaching character, always within the context of specific courses. The educational character of the collections, underscored by the unique opportunity for close observation and direct contact of the students with the objects, fully justifies the existence of this Museum in a city with a lot of independent museums thematically covering almost every single educational collection! Courses, interactive workshops and tutorials take place on a regular basis in the Museum. Furthermore, the Museum always seeks to expand its circle of visitors.³

Since 2010 the educational character of the Museum has further been expanded into new directions by the operation of the Museum's Conservation Laboratory and, at the same time, the permission granted by the Hellenic Ministry of Culture to the professors of the Department of History and Archaeology to have their archaeological material transported from the excavation sites to the Museum for a determined period of time for reasons of conservation and study. Both developments have contributed significantly to the Museum becoming a vibrant place of training and study for all students of the Department, regardless of their courses, according to their availability and interests.⁴

² For the character of the Museum, see Constantoudaki-Kitromilides and Sfyroera, 'Museum of Archaeology and History of Art'.

³ See analytically Constantoudaki-Kitromilides and Sfyroera, 'Museum of Archaeology and History of Art'.

⁴ A brief online survey of university museums and collections that operate in affiliated Faculties has shown the following: the Museum of History of the University of Athens also features a Conservation Laboratory, specialising in the conservation of paintings, without the involvement of students. Particularly dynamic in the students' education is the character of the two museums and the three collections of the Faculty of History and Archaeology of Aristotle University at Thessaloniki (<http://www.hist.auth.gr/>, accessed on 27 February 2016). A well-equipped Conservation Laboratory is op-

The first material that was brought to the new laboratory in 2011 was pottery from the excavation of the Minoan cemetery at Livari, in southeast Crete.⁵ The material derived from a closed context and comprised sherds from ritual vases, which were used in ceremonies and were subsequently broken and refused in the open spaces of the cemetery. At first, the material was washed and sorted by the students on the basis of fabrics and ceramic wares (see Figure 1). This work was combined with practical lessons on ceramic technology, namely the identification of inclusions in the fabric, the surface treatment and the firing. Then the students searched for joints between the sherds and glued them together in order to make intact pots. The students devoted many hours and carried out this task with much enthusiasm, particularly because they could appreciate in a direct and immediate way the results of this painstaking job. This work was supervised by the conservator and was combined with practical lessons on conservation of ceramics, such as the mechanical cleaning and the consolidation of the edges but also some mending (see Figure 2). In several instances, the students of archaeology worked side by side with students of conservation from the Technological Educational Institute of Athens, Department of Conservation of Antiquities and Works of Art, who were also doing their training practice in the Museum. The aim of this work was not to transform the students of archaeology into conservators, but rather (a) to initiate them into archaeological conservation, (b) to enhance their practical experience in conservation procedures such as marking and labeling, packing, transportation and storage of antiquities, and, above all, (c) to teach them the importance of the collaboration between archaeologists and conservators in post-excavation study.

erated under the Archaeology Laboratory of the Department of History, Archaeology and Social Anthropology (University of Thessalia). Students are involved in the study of objects and materials (<http://www.ha.uth.gr/index.php?page=arch-lab>, accessed on 27 February 2016). The Department of History and Archaeology of the University of Ioannina also features three Museums (http://www.hist-arch.uoi.gr/index.php?option=com_content&view=article&id=114&Itemid=618&lang=el, accessed on 27 February 2016). The corresponding Department of the University of Crete features two educational collections (<http://www.history-archaeology.uoc.gr/el/Tmima/Tmima/ylikotexniki-ypodomi.html>, accessed on 27 February 2016). A noteworthy addition to the aforementioned academic resources is the University Museum and Teaching Collection of the Department of History, Archaeology and Cultural Resources Management, University of Peloponnese (<http://ham.uop.gr/index.php/ereuna/pams>, accessed on 27 February 2016).

⁵ For the relevant permits, special thanks go to the director of the 24th Ephorate of Prehistoric and Classical Antiquities, Ms Villy Apostolakou, and the director of the Directorate of Museums, Exhibitions and Educational Programs of the Hellenic ministry of Culture, Ms Souzana Choulia-Kapeloni.

Figure 1

In search of the sherds belonging to the same vases



©Museum of Archaeology and History of Art

Figure 2

Mechanical cleaning and consolidation of the edges



©Museum of Archaeology and History of Art

The above phases of work lasted about 4 months. The work was carried out mostly by advanced undergraduate students in their third and fourth year of studies. However, some secondary tasks, such as washing and marking of sherds,

were carried out by first-year students, allowing them to come for the first time in their life in direct contact with ancient material.

The fourth and final stage of the work was the cataloguing, drawing and photographing of the material (see Figure 3). This task, which was carried out mostly by post-graduate students, was supervised by professors of archaeology and had the form of practical lessons on typology and dating of ceramics. This study was also accompanied by lessons on the drawing of fragmented sherds, which constitutes an ideal exercise on the identification and dating of ceramic forms.

Figure 3
Cataloguing and drawing



©Museum of Archaeology and History of Art

After the end of this long procedure the material was moved back to the store-rooms of the 24th Ephorate of Prehistoric and Classical Antiquities, while some of the vases that were mended, conserved, drawn, catalogued and studied are now included in the new exhibition of the Archaeological Museum of Siteia, which opened in June 2012. Furthermore, the first volume of the final publication of the material came out in the end of 2015.⁶ Thus, the long circle that opened in 2011 with the transportation of the fragmented sherds from Siteia to Athens closed in the best possible way—the return of the conserved and complete vases to Siteia, their display to the public, and the final publication of the material.

⁶ Papadatos and Sofianou, *Livari Skiadi, A Minoan Cemetery in Southeast Crete*.

Summary of our experience from the project

First, we were impressed by the participation of many students and the enthusiasm they showed throughout the entire process: about 60 under and post-graduate students participated in this study. They worked voluntarily, not as part of their compulsory academic curriculum or because a university professor invited them to participate, but because they were interested to practise on archaeological material. They participated during their free time, usually in breaks between or after their classes, and they could freely choose the frequency and the intensity of their work. This allowed a large number of students to participate in all the phases of post-excavation work, depending on their free time, academic level and interests.

It is important to note that members of the academic staff always arrange similar practical lessons as part of their excavation campaigns. However, this is for a short period of time, only during the summer months, for a small number of students and in poorly equipped dig houses. The transferring of this work within the University premises during the entire academic year enables us to prolong the post-excavation study season, involve more students, and execute this work in the well-equipped environment of a proper conservation laboratory. Moreover, the students can gain valuable experience by working on fragmented archaeological material that is constantly renewed by the addition of new finds from ongoing excavations. This is a much more interactive training experience than simply studying intact vases or even various sherds from different vases that cannot be glued together.

As a result, the Museum has become a place of training and study for all students of the Department, accommodating their availability and diverse interests regardless of their specialisations. Because of this, the Museum has seen an increase in the number of visiting students and also in the amount of time the students spend during their visits. Through all these activities, the Museum is transformed from a rather passive or indifferent exhibition hall into a lively laboratory, full of people, energy and motion. These observations are further corroborated by the members of the External Evaluation Committee who visited the Museum in November 2010, and concluded in their Evaluation Report that the Museum and the attached conservation laboratory show that "...the Department as a whole is deeply dedicated to providing and maintaining the maximum resources that its budget allows in an effort to instill a research culture among its undergraduates."

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Engaging with University Museum Collections: Paradigms of Participatory Museum Practice

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One exercise I often use in introductory lessons of museology is to ask students fresh on the subject to brainstorm, individually and in pairs, on the concept of 'museum' and draw instant mind maps about it in order to outline personal associations, images and feelings in relation to the museum institution. This spontaneous and honest-in-its simplicity exercise is always useful, as it often reveals stereotypical views about museums or even uneasy associations with them, expressed by individuals who are in fact interested in cultural heritage and choose to pursue studies in this field, but have not yet been exposed to alternative ways of museological thinking and practising. One of many such examples of mind mapping, provided by a smart undergraduate student of archaeology, suggested that the 'museum' was associated with 'antiquity' with a sense of respect but also fear (perhaps the so-called museum threshold fear¹), and with images of long corridors, people and luminous empty spaces. All these elements together led the student to compose the following museum definition: "The museum is a luminous space with very few visitors who encounter with respect remnants of the antique past." Is this an ideal picturing of the museum for fresh student minds?

¹ Elaine Heumann Gurian spoke about the experience of threshold fear in museums. See Gurian Heumann, 'Threshold Fear'.

We know that museums mean different things to different people. Their value-laden analysis² is an important tool for assessing their societal impact and their appreciation by different stakeholders. In this value-laden approach, where do we place university museums and how do we perceive the roles embodied by them today? Where and what type of priorities do we set with regard to their rich heritage? Is it on their collections, their educational value within academic communities, their connecting value with society at large, or rather it is on their potential to create meaningful experiences to their target audiences or/and affect real economy and the economy of knowledge produced by academia? All aforementioned values are undoubtedly important, but in times of crisis as the one we experience today, we may have to decide which value we acknowledge as the most important one and thus demonstrate intentional or unintentional value-laden ideologies that eventually lead to policy making and specific strategic plans in university museum administration.

So, the question posed in this paper is two-fold:

- Can we reimagine and reinvent university museums as labs of experimentation within the academic community and as connecting platforms with society at large?
- Can we take up new initiatives that unlock the critical and creative potential of students as interpreters of the university museum heritage and as co-creators of museum work?

I will try to respond to these questions by using, as a telling example, an experimental initiative I co-developed with undergraduate students of archaeology during a seminar course of museology in 2014. The activity took place at Galleries of Cast Collection of the Museum of Archaeology and History of Art, which is located within the building of the School of Philosophy of the National and Kapodistrian University of Athens. The seminar was about the social role of museums in contemporary society and the assessment of the students (24 of them) was based on individual oral and written assignments on a variety of topics, which were related to the main theme of the seminar. Additionally, the preparation of a demanding team activity in the Cast Collection grew organically and based on free choice in the course of 40 days before International Museum Day 2014. This activity was developed due to an array of reasons. First it resulted from students' interest to explore their creative talents and skills in a museum context. It was also related to their willingness to use and appropriate a museum space, which is in

² There is extensive literature on the cultural value of museums in the 21st century. As an indicative sample of key sources, see Holden, *Cultural Value and the Crisis of Legitimacy*; Scott, 'Using Values to Position and Promote Museums' and 'Exploring the Evidence Base for Museum Value'; Raemaekers, *The Social Significance of Museums*; Black, *Transforming Museums in the Twenty-First Century*; Nicholls, Pereira and Sani, *New Trends in Museums of the 21st Century*; Scott, Dodd and Sandell, *User Value of Museums and Galleries*. In Greek see, Mouliou, 'Ta mouseia ston 21o ai'.

close proximity to them daily yet at a psychological distance as they would not usually visit it on their own free will. Last but not least, it was connected to their wish to contribute something back to their neighbouring museum and to their wider social circle (relatives and friends) as a cultural experience on the occasion of International Museum Day. In fact, the theme for the 2014 International Museum Day ('Museum Collections Make Connections'³) was particularly inviting to reconsider the empowering role of museums in making meaningful connections between their collections and their diverse audiences.

Under my coaching and coordination and within the spirit of participatory⁴ teamwork (Figure 1), 24 students worked step-by-step on the project as follows:

Figure 1

International Museum Day 2014 at the Museum of Archaeology and History of Art, Athens.

An interactive museum experience co-created by the lecturer of museology and undergraduate students of archaeology



©Photo Archive: Marlen Mouliou

1. They developed the overall concept of the activity, which turned out to be an interactive tour in the museum collection based on 14 puzzles and an equal number of short narrative stations in front of selected sculpture casts, all set together as a game performed by two competing teams of guest visitors whose

³ Plenty of material is available about the International Museum Day 2014 at <http://network.icom.museum/international-museum-day-2014>

⁴ For the definition of participatory museum, see Simon, *The Participatory Museum*; Kreps, 'Participation, Museums, and Civic Engagement'.

members were mostly newcomers to the Museum of Archaeology and History of Art and the Cast Collection.

2. They researched the biographies of the casts and original sculptures in order to write and then edit appropriately informative but also evocative storyboards about them.
3. They created accompanying material (audio, visual and audio-visual) to assist their narrative performance.
4. They chose the motto of the activity ('A museum among us'; Figure 2) as a reference to the literal spatial co-existence of the museum in the university building, but also as a connotation to the symbolic role museums can play in their daily life. They then transformed the motto into a wearable message reproduced on our t-shirts used during the activity.

Figure 2

International Museum Day 2014 at the Museum of Archaeology and History of Art, Athens. The activity team with the wearable motto of the activity 'A museum among us'



©Photo Archive: Marlen Mouliou

5. They developed simple and inexpensive solutions to signpost the activity within and outside the museum space.
6. They promoted the activity by outreaching out to audiences that the university museum does not traditionally attract;
7. And, generally speaking, they worked with passion, creativity, dedication and much fun to engage with a university museum collection, an experience that proved to have a lasting effect.

The enduring impact of this participatory experiment in the context of a university museum and the value of learning by doing within the frame of constructivist and critical pedagogy⁵ was tested a year later (2015), when another smaller group of students, composed by members of the 2014 team and a few other students newly recruited in the challenge, decided to organise a similar event on the occasion of International Museum Day 2015. This time, the students mostly developed the whole project and my mediation was discreet (Figure 3). The new activity, designed totally on a voluntary basis with no strings attached to course obligations, was equally successful. It resulted from the students' essential need and wish to co-create a meaningful experience in their university museum, acting as prompters rather than consumers of this experience and as hosts rather than guests in this context.

Figure 3

International Museum Day 2015 at the Museum of Archaeology and History of Art, Athens. An interactive museum experience managed by undergraduate students of archaeology



©Photo Archive: Marlen Mouliou

As a result of this 'experiment' and the lessons learnt, let us ponder on the following questions: What is the museum we envisage in the global contemporary? Does the university museum of the 21st century divert from such new arising principles?

⁵ The constructivist museum as a concept and experience is almost 20 years old already. For a general overview of the theory and its application in museums, see George Hein's seminal work and his numerous publications at <http://george-hein.com/>

If we set off to plot the different keywords speakers of the UNIVERSEUM 2015 Conference used in order to outline the core subject of their paper and poster presentations, we would realise that the words 'heritage' (which appears 17 times) and 'collections' (which appears 13 times) continue to be the driving forces in our current museological language and thesaurus. Heritage and Collections as key words are followed by a number of other expressions which together form the new building blocks of the university museums management in the 21st century: public and social engagement (four), participation (three), the public/audience and connection with society (four), human geography, museum pedagogy (two each), new usage/dialogue/synergy/outreach/accessibility/networks (six), semantics and values (two each), let alone sustainability (four). Research and traditional teaching driven words were much less found in the aforementioned selection.

During the last year, the International Council of Museums (ICOM) has again put much emphasis into redefining the museum in the 21st century, in view of current trends in museum theory and practice and pressing social challenges. Museum theorists and practitioners stress that museums have been founded on the passionate belief in the value of knowledge, but museum professionals must be urged to continuously ask who is missing from the museum collections and who is missing from museum audiences. They also urge their peers to lead their everyday work based on principles of empathy and connection with visitors of all types, for audiences experience museums differently. Museums, university ones included, must seize the opportunity and challenge to customise their services to accommodate this diversity.

Museums in their long history are once more in a turning point that demands their moving away from lecture-based approaches to more storytelling practices, from teaching and didactic pedagogies to more collaborative formulae and constructive experimentations, from passive and individualistic views of their visitors to more active and relational connecting experiences with them.

A special workshop on the redefinition of the museum that was organised at the Annual Meeting of ICOM's Advisory Committee in Paris (June 2015) revealed that the 2007 ICOM definition we still use today is mostly legal and technical and focuses mostly on the nature and functions of museums. What we need is to rethink a hybrid definition that takes into account the social role and human dimension of the museum—a definition which acknowledges that the museum needs to remain relevant to society as a lovable, evocative and co-creative space based on the principle of empathy. The museum receives and absorbs knowledge, ideas and creativity from the public and contributes to healing and well-being of individuals and communities through culture.

This is a very promising and challenging new era for all museums, university museums alike.

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BIO

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Teaching through historical scientific instruments: the material culture of science as an opportunity to explore science, history of science and science communication issues

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Introduction

During the last decades, there has been a rising interest in the preservation of historical scientific instrument collections and the development of research activities related to them. In Europe, the restoration of physics cabinets and historical laboratories, the replication of historical experiments and science communication events, as well as the online display of historical scientific instrument collections are only a few examples of this multifaceted activity. In Greece too, initiatives for the preservation of historical scientific instruments have been undertaken during the last two decades. The Greek scientific instrument collections that have survived to our days belong mainly to three categories. The first comprises scientific instruments that equipped historical school laboratories. The second comprises instruments that were part of the university laboratories. The third comprises instruments of various kinds that equipped factories, hospitals and individual laboratories. I will refer to the first two categories of scientific instruments and I will comment on the way they can be centres of teaching processes. Furthermore, I will try to show that these two categories of scientific instrument

collections are linked due to historical reasons that concern the cultural framework that generated them and the similarities of the instruments they included.

19th and early 20th century scientific instruments in Greek schools and universities

During the early 19th century, instruments for the teaching of science were brought to few important schools of the Greek Enlightenment. These schools were created by scholars who aimed at linking the ancient Greek cultural heritage with the European scientific culture.¹ The teaching of science had a place in their curricula whereas scientific instruments such as telescopes and globes, air pumps, electrostatic generators, and chemical glasswork could be found in their laboratories. Some of these pre-revolutionary Greek schools had the role of colleges and constituted the highest level of education. They received students from many regions of the Greek intellectual area² and sometimes from abroad. From this period, no instruments or laboratories have survived, as the majority of the pre-revolutionary schools were destroyed during the Greek Revolution of 1821. After a transitional period lasted for about two decades, the schools began to operate again and new scientific instruments reached the laboratories of a few schools that became important for the teaching of sciences. At about the same period, university level institutions were founded.³ The National and Kapodistrian University of Athens (NKUA), which was the most important of these, began to equip its laboratories with scientific instruments during the 1840s. Until the end of the 19th century, the scientific instruments brought to schools and universities were mostly created by French instrument makers,⁴ while during the next two decades the scientific instruments that equipped the teaching laboratories were

¹ See Karas and Vlahakis, *Sciences in the South-Eastern Europe during the 19th Century*.

² The term 'Greek intellectual area' is used to describe the areas within the Ottoman empire that had characteristics of Greek civilization. See Karas and Vlahakis, *Sciences in the South-Eastern Europe during the 19th Century*.

³ The Athens University was the first University founded in the Greek State in 1837. However, some historians consider as the first Greek university the Ionian University founded in Corfu in 1824, under English rule. During the last decade of the 19th century the Technical Schools of today's National Technical University of Athens (founded in the 1830s) were upgraded from secondary technical schools to university level ones. Finally, the Hellenic Military Academy founded in the 1820s was considered as an institution of the highest education level. See Karkanis, 'Natural Sciences and University in Nineteenth-Century Greece'.

⁴ The school laboratories hosted instruments created by Alvergniat, Breguet, Pixii, Jules Richard, Duboscq, Ducretet, Salleron and others. See Bournias, 'The Physics Museum of Chios'; Paparou, 'Following the Traces of Science Education in Greek Schools and Institutions'; 'The Hellenic Archives of Scientific Instruments' www.hasi.gr, accessed March 2015.

mostly created in Germany.^{5,6,7}

Through this brief analysis we can say that the spirit of the pre-revolutionary period was what laid the foundations of science education in the Greek world. This spirit was maintained through the difficult years of the war. In the post-revolutionary period, it led to a second period of glow for the teaching of science in important Greek schools. It also led to the establishment of higher scientific education in the free Greek state. The similarities in the equipment of the school and university laboratories in the 19th and early 20th century provide significant evidence of the cultural connections between these different educational institutions. However, despite the similarities one can easily discern important differences between school and university historical equipment. The school scientific instruments were simpler than the university ones. They were mainly used to teach⁸ and were appropriate to introduce the main principles of physics, chemistry or astronomy.⁹ The university collections comprised both instruments for teaching and research. They included instruments for the demonstration of the highlights of the history of science, as well as instruments that represented new patents and cutting-edge technologies.¹⁰

Weaving educational activities around historical teaching collections

The different style of each collection poses different teaching queries. The School of Chios and the Athens University History Museum scientific instrument collections will be utilised as case studies to explain the various challenges and opportunities they offer to the museum educator.

⁵ The instruments brought from Germany were mainly constructed by Leybold's Nachfolger and Max Kohl.

⁶ After the First World War, a large number of scientific instruments were offered to important school laboratories from the University of Athens. These were instruments received from Germany in the framework of the First World War reparations.

⁷ Instruments were also bought from the UK and other countries. During the 20th century, teaching instruments were also constructed in Greece. See www.hasi.gr. See also Athens University History Museum '*Scientific Instruments: Tools for Research and Education*'.

⁸ Sometimes the school laboratory instruments were used to gather meteorological measurements or to conduct chemical analyses. See Paparou, 'Following the Traces of Science Education in Greek Schools and Institutions'.

⁹ The instruments were utilised to teach the main principles of mechanics, hydrostatics, fluid dynamics, heat, optics, oscillations and waves, electricity, magnetism, electromagnetism. They were also utilised to teach meteorology, astronomy and chemistry. See Bournias, 'The Physics Museum of Chios'; Paparou, 'Following the Traces of Science Education in Greek Schools and Institutions'.

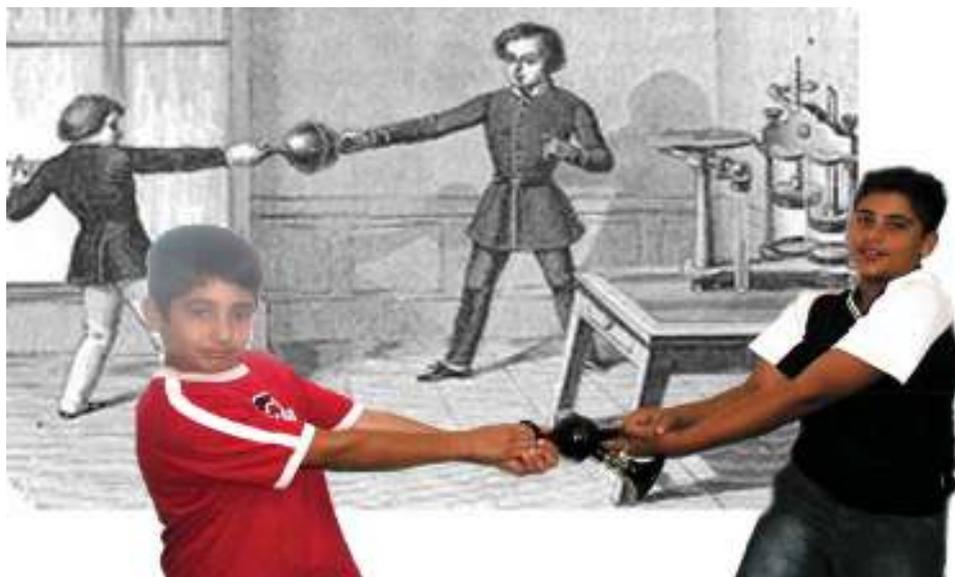
¹⁰ Athens University History Museum '*Scientific Instruments: Tools for Research and Education*'.

a) Organising educational activities at the School of Chios historic laboratory.

The scientific instrument collection of the School of Chios is still kept in its original place as the whole 19th century laboratory has been preserved. As there has been an effort to preserve all the equipment of the historic laboratory,¹¹ one can trace the developments in the teaching equipment over a long period of time. The older part of the collection comprises demonstration apparatus with fascinating forms and shapes designed to produce impressive phenomena. A great part of the teaching instruments are replications of the equipment used in historical experiments. They can be used to study and understand historical set-ups, such as J.J. Thomson's experiment for the discovery of the electron, Rontgen's experimental set-up for the discovery of the x-rays, Crookes' experiments on the properties of the cathode rays. Many scientific instruments of the collection help to trace past theories and scientific controversies. Thus, the idea that electricity is a subtle fluid can be recognised in the shape of the Leyden jars; the idea that there are two kinds of electricity, the vitreous and the resinous one, can be recognised in the design of the Ramsden electrostatic generator. Finally, it is clear that the design of the Volta electrophorus incorporates the idea of electricity as a quantity.

Figure 1

Decoding the style of the School of Chios scientific instrument collection with the help of 19th century popular scientific textbooks



¹¹ See Bournias, 'The Physics Museum of Chios'.

It is obvious from these examples that the School of Chios' scientific instrument collection is a valuable source for the study of the history of science, the history of education and the history of scientific instruments. A museum education programme woven around this collection can be created on these axes. At the same time, it can focus on revealing the 19th century science culture of teaching through entertaining. The 19th century popular textbooks by Ganot and by Figuier,¹² which were used in this historical laboratory, can be basic tools for the creation of such a science education programme.¹³

b) Working with the scientific instrument collection of the Athens University History Museum

The scientific instrument collection of the Athens University History Museum dates from the late 19th century and the first decades of the 20th century. Most of the scientific instruments hosted in this collection come from the NKUA laboratories.¹⁴ One of the basic problems in the documentation of this collection lies in the fact that it comprises objects removed from the places where they operated. Furthermore, as these objects have been extracted from complicated experimental set-ups, it is difficult to show today how they operated.

As many instruments of this collection are highly specialised, the general physics textbooks are not sufficient for their documentation. The main tools for their identification are scientific instrument trade catalogues. During the late 19th and the early 20th centuries, some of these catalogues were very detailed. They included thousands of instruments, pictures of experimental set-ups, as well as information on the way the instruments functioned. Sometimes they offered information on different experiments that could be performed with the help of the instruments described, or information on patents and inventors. This information helps us to date the instruments precisely.

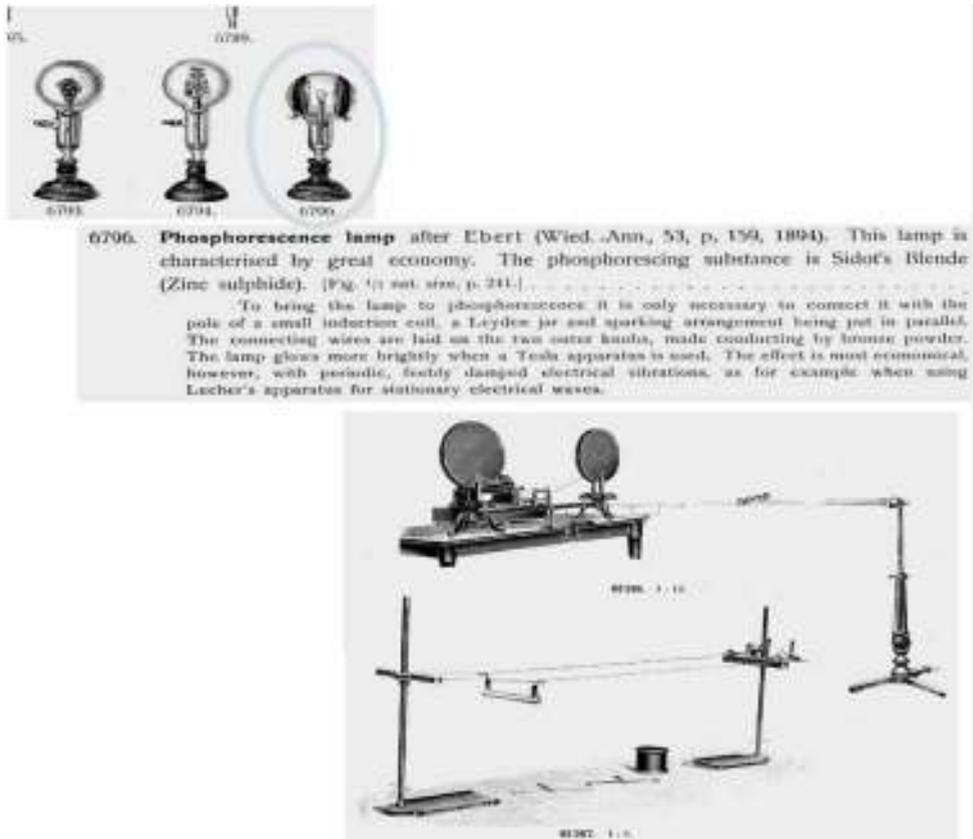
¹² See, for example, Ganot, *Cours de Physique Purement Expérimentale* and Figuier, *Les Merveilles de la Science*.

¹³ A science education programme created for this collection during the period 2003–08 combined teaching and entertaining. Lecture demonstrations that included historical experiments as well as in situ activities that highlighted the style of the historical instruments have been used. See Pappas, 'The Utilization of the History and Philosophy of Science in Science Teaching'.

¹⁴ Some instruments come from other sources such as donations by doctors and private laboratories. Athens University History Museum 'Scientific Instruments: *Tools for Research and Education*.

Figure 2

The process of identification: a) upper: identifying the instrument (in Leybold's trade catalogue), b) centre: extracting detailed information about the instrument (patent, method of operation), c) down: finding information on the missing equipment (Max Kohl catalogue)



By combining the information offered in the trade catalogues with information found in archival catalogues describing the equipment of the university labs, we can estimate the time that the instruments were purchased and the special framework in which they were utilised. In addition, the information of the trade catalogues combined with the archival catalogue information help us to determine the missing equipment and find ways to reintroduce the instruments in experimental set-ups.

The short analysis presented earlier reveals the fact that the Athens University History Museum's scientific instrument collection can be an important source for research on the history of scientific instruments and the history of the University. Questions on the methodology of identification, on instrument dating and on the

determination of the missing equipment can have a central role in this research. Also, questions on the degree to which the Greek University followed the contemporary European scientific developments and on the research undertaken by the different faculties can find interesting historiographical answers.

Educational material addressed to the general public and woven around the instruments of this collection can focus on popularising the historical questions or the identification problems mentioned earlier. Besides, it can equally focus on revealing the use of the instruments and their place in the history of scientific culture. References to instrument makers, videos of similar instruments in use, stories that link the instruments with 19th century cultural events or with popular literature texts constitute valuable sources for the creation of such an educational material.¹⁵

Conclusion

The exploration of the teaching collections in historical Greek school and University laboratories leads to the tracing of the history of science education in Greece. Among the themes that this exploration reveals is the high educational level of the pre-revolutionary Greek schools and the identification of the cultural links between the pre-revolutionary period and the late 19th century, which is the period when university science teaching was organised. The exploration of the historical teaching collections in Greece also reveals the common European cultural framework that characterises science education at both the school and university levels. On the other hand, the specific problems posed by the different scientific instrument collections hosted in schools and universities can lead to the creation of educational activities that can highlight the biographies and the function of specific scientific instruments, the personalities behind the organisation of the laboratories, and the different style of each teaching collection.

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BIO

Flora Paparou holds a PhD in science education. Her research focuses on the utilisation of the history of science and historical scientific instruments in science teaching. She currently works in secondary education. During the period 2003–08, she was in charge of creating the science education programme of the Science Museum of Chios. During the period 2013–15 she collaborated with the Athens University History Museum on the identification of its scientific instruments, and the organisation of science popularisation activities around them.

SECTION 3

**UNIVERSITY HERITAGE IN EUROPE TODAY:
CRUCIAL ISSUES AND SHORT CASE STUDIES**



A Better Future for the Past? Vulnerability and Sustainability of University Museums and Collections

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At Universeum conferences we hear how university history museums or academic heritage projects succeed in documenting, saving or preserving historical artifacts. The preservation of immaterial heritage and knowledge of the past is being recognised as a great asset for the future. We hear about successful *ongoing* research projects, student activities and outreach aimed at a broader public. There are many examples of how the interest and attitude of university staff and students have changed for the better. Saving and stressing our academic heritage increase and create knowledge, understanding, creativity and identity.

Still, many of us struggle. For each story of success there is one—or more—about unfulfilled promises, neglect by university authorities or personal sacrifice. Valuable pieces of our material or immaterial heritage go into oblivion or out of memory. Primary sources for future scientific activities are lost. Universities miss unique possibilities of connecting with new groups of people. University history museums themselves tend to spend a large amount of time on survival, efforts which could or should have been spent on something as simple as doing our jobs.

There may be many reasons for these situations. Here, I will try to identify some. Of course, weak economy and lack of funding are basic problems of many

academic institutions, shortage of staff another. The ongoing economic crisis represents a standstill or timeout. However, even in better times, the financial situation for a lot of museums or heritage projects are hardly any different. Priorities made by the university leadership or administration are often not in our favour. Museum work is in many ways an investment for the future and not always easy to measure in numbers and figures. Also, the values of heritage can be hard to understand, not the least within the model of New Public Management, which many public European academic institutions have adopted. Here, the concept is that principles and methods taken from the private sector will be successful also in public institutions, enhancing productivity and improving quality. This way of thinking was established in the late 1980s and started influence academic institutions and museums in the 1990s. Critics have regarded its focus on output control and competition to be in conflict with the need for long-term strategies or steady funding. Also, it has been criticised for not being able to present sufficient tools for documenting or focusing on various aspects of quality or values, if such a tool exists. Instead, the short-term output rate defines the success of the museum, which is a demanding situation for museums short of staff or already in need of funds. Many museums regard their work as a long-term investment aimed at future generations, a policy which may be hard to adapt to a system of more short-term funding based on output rate or number of publications. As a result, long-term planning can be hard to achieve. And if the output is not meeting expectations, the only immediate understandable figures can easily be the costs.

Preserving heritage can be regarded as of great value or as a waste of resources. Heritage, though, can also be regarded as a threat to the possibility of renewing buildings, the reuse of space for new purposes or as an unwanted basis for critical discussion. A university history museum may feel inclined to speak up when university heritage is threatened. In our experience, sadly, this discussion is not always welcomed by university leadership. The staff of the university history museum may have other ideas of its role than only showing off the sunny side of the university. Many constantly face a dilemma—should the museum act as a critical museum, based on research and knowledge, or as an institutional museum loyal to the university's heritage policy? The consequences for either may not be easy to deal with.

Collections and objects which have not been part of more traditional university museums are often virtually unknown or suffer from low status. Occasionally they have been managed by idealists within the various institutes or departments. More often than not, these objects are of particular value for university history museums, which may even establish new collections for documenting and understanding nearly forgotten pieces of the past. Also, our views on artifacts are changing with time. A university history museum may look upon a scientific instrument with interdisciplinary eyes and a focus on broader context. Perhaps the

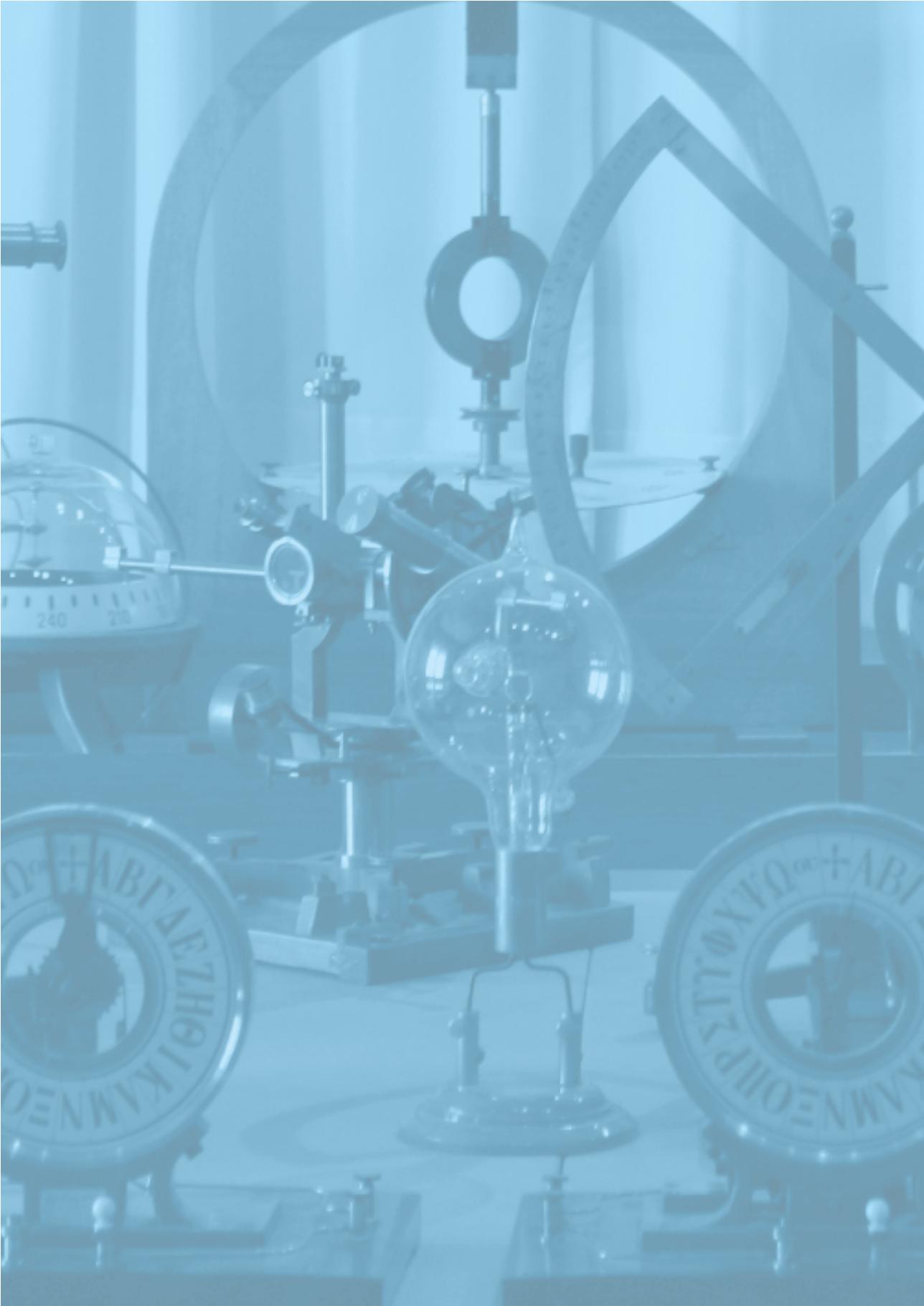
original wrapping is equally interesting as the instrument itself. These approaches are not always understood by university communities. The low status of the objects in question rubs off on the museum. And, is it a 'real' museum anyway?

It takes time to build the identity of a university history museum. Many are unique creations within their institutions. A common challenge for most, though, seems to be the difficulty of fitting into the university's institutional structure. More often interdisciplinary than not, they can be hard to place when not properly understanding their purpose, methods or needs. Also, the staff normally holds few employees. This results in plenty of opportunities for placing museums somewhere in the organisation where they decidedly should not be.

In conclusion, it is a challenge for university history museums to find their place, to rise above their apparent vulnerability and to survive in the long run. In many respects, the universities may themselves be the worst enemies of their heritage. The struggle for better conditions is something which concerns many of us. Still, most of us love our work passionately. We believe in its importance for bringing the past into the present and the future. But the question is, how can we, as university history museums or employees of academic institutions, create a higher understanding and respect for heritage within our own institutions? How can work conditions be improved? And, not the least, how can we achieve long-term sustainability?

BIO

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Defining University Museums' Objects for the Web*

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Introduction

The University of Padua is developing a project to harvest selected data from the databases of the University's various museums and import them into a single repository called Phaidra. From this repository, the selected data can be reused, i.e., directed to Europeana for instance, or made available to the public in other different ways. The project is carried out jointly by the University Library Centre (CAB) and the University Museum Centre.

One of the crucial issues consists in defining what data to harvest, in this case, the minimum necessary fields that can define university heritage objects for the public. Of course, providing filtered data may be regarded as a limit to the freedom and creativity of the public, but the intent here is to present easy-to-consult scientific information. This can be interesting for the public and specialists of different fields, and it can provide a useful working tool for object-based teaching and research in several fields.

* We would like to thank our colleagues for their support and help: Y. Carrer, L. Del Favero, G. Drago, M. Menguzzato, G. Peruzzi, G. Turetta.

The first phase of the project was developed in 2014–15 by the CAB and three museums of the University—the Museum of Archaeological Sciences and Art, the Museum of Geology and Palaeontology and the Museum of the History of Physics.¹ This first phase is the subject of the present paper.

After a short presentation of the three involved museums and a brief description of the cataloguing system they currently use, we will introduce the University Library Centre and the Phaidra repository. We will then outline the steps of the project that have been achieved as of now and the semantic analysis that was carried out to identify the data to be harvested for archaeological findings, art objects, geological and palaeontological heritage, and scientific instruments. We will finally discuss the strengths and weaknesses of the project and outline further developments.

The museums involved and the cataloguing system in use

Several museums of the University of Padua originated from Antonio Vallisneri's collections, which were donated to the University in 1734. Vallisneri, professor of Practical Medicine at the University of Padua, was passionate about naturalistic studies. His collections consisted of archaeological and natural findings, as well as of rare and ancient objects. The donation led the University of Padua to found an impressive Museum of Natural History, later subdivided into several smaller specialised museums, such as the Museum of Archaeological Sciences and Art (MSA) and the Museum of Geology and Palaeontology (MGP), which were further enriched throughout the centuries.²

As for the Museum of the History of the Physics (MHP), its history is related to the introduction of the teaching of Experimental Physics in Padua in 1738. The first holder of the chair, Giovanni Poleni, acquired instruments for research and teaching and so did his successors. This gave birth to a prestigious collection of instruments from the 16th century onward.³

Concerning the cataloguing system currently adopted by these museums, it is worth underlining that in Italy cataloguing guidelines for cultural heritage are provided by the ICCD (Central Institute for Cataloguing and Documentation of the Ministry of the Cultural Heritage), which aims at the preservation and promotion of Italian cultural heritage. For every kind of cultural asset, the ICCD has developed a specific cataloguing template,⁴ which collects information according

¹ The University of Padua has 11 museums and several collections (about 1 million items), coordinated by the University Museum Centre, <http://www.unipd.it/musei/en/index.html>, accessed 29 February 2016

² <http://www.musei.unipd.it/archeologia>; <http://www.musei.unipd.it/geologia>, accessed 29 February 2016.

³ <http://www.musei.unipd.it/fisica>, accessed 29 February 2016.

⁴ <http://www.iccd.beniculturali.it> and <http://www.iccd.beniculturali.it/index.php?it/473/stand->

to an organised schema with descriptive technical details to highlight the cultural value of the asset, geographical information to connect the asset with the territory, and documentary information. Data recording is governed by regulations.

Each cataloguing template has more than 300 fields, some of which are specific to the single discipline, while other fields are common to all templates. The museums involved in the first phase of the project (MSA, MHP, MGP) use four cataloguing templates, the so-called RA template for archaeological objects, OA for art objects, PST for scientific and technological heritage, BNP for palaeontological heritage, respectively. The first three templates deal with artefacts and the last one with natural items.

As for the cataloguing software, all museums of the University currently use Artin XML-web system, developed by the Conference of Italian Universities Rectors (CRUI).⁵ This database allows the insertion of data according to ICCD's cataloguing standards. Artin XML-web was originally created to set up a centralised database for all Italian university museums, thus providing a platform to develop shared projects. The CRUI also intended to transmit the collected data to the ICCD.

The CAB and the Phaidra repository

The University Library System (SBA) includes the library resources and services of the University of Padua.⁶ The SBA, coordinated by the CAB, consists of 33 libraries and one digital library. The mission of the SBA is to preserve, update and promote the use of the University's bibliographic and documentary collections; to guarantee the widest possible e-access to scientific information through the University Digital Library; to support University research and teaching activities.

Permanent Hosting, Archiving and Indexing of Digital Resources and Assets (Phaidra) is the digital collections environment used by the SBA.⁷ It is based on Fedora Commons open source software and is maintained by the Computer Centre of the University of Vienna, with which the University of Padua has been collaborating since 2010. From 2014, Ca' Foscari University and IUAV University of Venice also publish their digital collections in Phaidra. Phaidra's main features are: i) management of large multimedia data collections; ii) long-term archiving of digital objects; iii) description and indexing of digital objects; iv) interoperability through structured metadata; v) multilinguality; vi) permanent links to the digital objects; vii) management of licenses and access rights; viii) enabling web users to access rare and culturally interesting documents.

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⁵ <http://www.liberologico.com/en/default/340/ArtIn-XML.html>, accessed 29 February 2016.

⁶ <http://bibliotecadigitale.cab.unipd.it/en/>, accessed 29 February 2016.

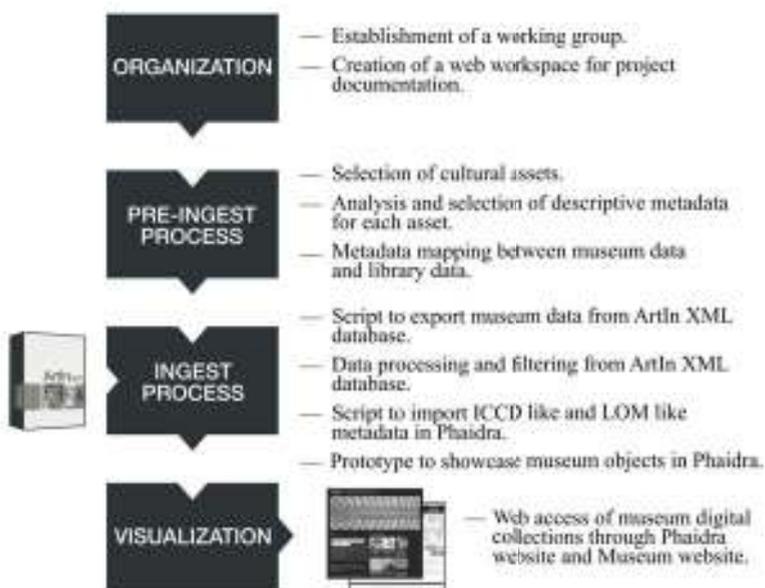
⁷ <https://phaidra.cab.unipd.it/>, accessed 29 February 2016.

The project: web access to museums' collections

As we already mentioned, the ongoing project aims at developing a 'tool' that harvests data from the different cataloguing templates of Padua University museums' databases, and transfers the selected data into the Phaidra repository. The intent is to give accessibility and visibility to the Museums' collections in a transversal way, and to provide the public with links between the Museums' items and the rest of Padua University's heritage (libraries, archives, etc.). The three Museums involved as of now have worked on the cataloguing templates of archaeological objects, art objects, geological and palaeontological heritage, and scientific instruments (Figure 1).

Figure 1

The different steps of the project



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It was, of course, central to identify the data to be harvested, i.e., the minimum necessary fields that can describe university heritage objects for the public. No standard is defined for short public-oriented cards in Italy nor in other countries, as far as we know. For each cataloguing template, we have defined a set of fields for these public-oriented cards. Some of the selected fields (about one-third) are common to all the cards and others are specific. Six main common semantic sections emerged, common to the four cataloguing templates: data about the defini-

tion of the object, dating, description, provenance, access information (catalogue number, name of the museum...) and bibliography.

Detailed information on topics related to administrative matters, security and conservation have been discarded, as well as specific historical data, like historical inventory numbers, details about collections of provenance, etc. (Figure 2 and Figure 3).

Figure 2

Example of a public-oriented card for palaeontological heritage



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Figure 3

Example of a public-oriented card for archaeological and art heritage



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As already mentioned, data from the different Museums can be presented in Phaidra in a transversal way. For instance, a collection called 'The Eighteenth Century in Padua' presents part of the 18th century heritage of the three Museums involved in the project.⁸

Strengths and weaknesses, further developments

First of all, we have to say that the cataloguing software proposed to be used by the Museums of the University of Padua is a proprietary software. Maintaining the data could thus become a problem and a feasibility study is planned to find a sustainable solution.

On the other hand, Phaidra is based on Fedora Commons open source software. It is also very important to point out that the updating of data (transfer from cataloguing databases to Phaidra) occurs in real time. The uploading of museums' data into Phaidra does not require any additional work besides the cataloguing activity. This is an important point for the long-term sustainability of the project.

A further step forward has been achieved by the University of Padua in the context of the project. Thanks to a specifically developed web application, the digital museum objects in Phaidra will be used for staging virtual online itineraries.⁹ Moreover the CAB is testing MOVIO, an open source software for virtual online exhibitions.¹⁰

As for the future developments of the project, the work done as of now for four typologies of items will be extended in the coming months to the whole heritage of the University of Padua. This will lead to the setting up of a portal presenting the University's heritage.

Furthermore, the project could be easily extended to other Italian university museums. Finally, the definition of a common standard for the web 'showcase' of the various museum collections of the University of Padua could be proposed to the ICCD to be adopted at a national level.

BIOS

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⁸ https://phaidra.cab.unipd.it/collections/musei_settecento_a_padova, accessed 29 February 2016.

⁹ <http://itinerarivirtuali.musei.unipd.it/>, accessed 29 February 2016.

¹⁰ <http://www.movio.beniculturali.it/index.php?en/1/home>, accessed 10 March 2016

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Alessandra Menegazzi is curator of the Museum of Archaeological Sciences and Art at the University of Padua. Her main research interests are the history of collections of classical sculptures and antiquities (16th to 19th centuries) and in the issues related to the use, display and conservation of plaster casts.

Sofia Talas is curator of the Museum of the History of Physics at the University of Padua. Her main research interests are the history of scientific instruments and the history of physics from the 18th to the 20th century.



LUX, LUCIS. Knowledge is Light

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The Virtual Museum of the University of Barcelona (MVUB) wanted to celebrate the International Year of Light 2015 with a virtual exhibition displaying items from the collections that constitute the heritage of the University of Barcelona (UB).

As a starting document, we developed a poster showing the thematic core of the exhibition with the relevant explanations. We presented this poster at the XVI Universeum Network Meeting. The poster shows on a small scale the idea reflected in the virtual exhibition—speaking about light from different perspectives. The exhibition consisted of objects and images that have a common denominator, light.

We classified objects according to various aspects or characteristics that surround the world of light: abstract concepts, physical properties, shapes, artistic concepts, scientific instruments and apparatus related to the world of light.

Light is life. It highlights its presence. Matter becomes visible. It is relatively easy to find objects that may be related to this topic, with connections that are explicitly clear in some cases or more subtle and imaginative in other cases.

The central idea of this virtual exhibition came from the coat of arms of the University of Barcelona in which there is a representation of Minerva with the slogan, “Libertas perfundet omnia luce”, freedom and knowledge illuminate everything

with their light.

The first section focused on the sun as an inspiring light. The light of wisdom, illustrated in paintings that symbolise this concept visually: the light of God through the Holy Spirit and the radiant energy of the sun. We then examined the artistic effects of light: different light intensities generate volume and shape, *chiaroscuro* shadows.

Then we move to the world of physics talking about the properties of light. Several paintings, photographs and objects illustrate some physical properties of light:

- Reflection is manifested on a flat polished surface as water or white colours.
- Transmission, the passage of light through glass, slides, holes. The change in direction of propagation of light passing through a transparent medium to another generates refraction.
- The absorption of light by matter, such as live plants through photosynthesis, or instruments that allow us to observe various effects based on selective absorption such as polarised light through bodies.
- The concentration of light in spots of high intensity and contrast is seen.
- The shadows generated from different routes or directions of propagation of the emitted light.

In the following section, we mainly used the collection of Zoology to illustrate the adaptation to light and darkness by certain zoological species, in this case very well adapted to the dark.

Moreover, it seemed interesting to show images of antique books and scientific instruments of our collections that were used for the study of the stars and planets.

Finally, as a curiosity, several star-shaped elements, considering that the stars are the points of maximum brightness of the universe, were shown.

The three images that accompany this paper are representative examples of some of the areas mentioned. The image chosen to symbolise the artistic effects of light, the shadows and *chiaroscuro*, is a picture from the Miquel Porter i Moix collection, specialising in cinema (Figure 1). It is a portrait dated around 1920 of the mime actor Joseph Alvarez 'Yo', who took part in small roles in films of the 1920s. The shadow on the wall dramatically enhances the expressiveness of the face of the character.

Figure 1

Joaquim Alvarez 'Yo', ca. 1920, Miquel Porter
i Moix collection



© University of Barcelona

The popular albino gorilla 'Snowflake' (Figure 2), that the famous ethologist Jordi Sabater Pi brought to Barcelona from Equatorial Guinea, illustrates one of the physical properties of light—light reflection, enhancing in this case the white intensity.

Figure 2

'Snowflake' drawing by Jordi Sabater Pi, 1992.
Jordi Sabater Pi Collection



© University of Barcelona

In the section dedicated to scientific instruments for Astronomy, a planetarium for the study of the motion of planets is shown (Figure 3), belonging to the Collection of Scientific Instruments MVUB. This orrery or planetarium model was developed by the London instrument maker George Adams in the late 18th century, on the basis of a model designed circa 1764 by Benjamin Martin for teaching and used at Harvard in 1766. This mechanical device illustrates the relative positions and movements of the planets and moons in a heliocentric model. Such mechanisms became popular in the 18th century when Copernicus's theory was fully accepted.

Figure 3

Orrery or planetarium model, made by George Adams in the late 18th century, Collection of Scientific Instruments



© University of Barcelona

In the virtual exhibition, there is a greater number of objects, thus enlightening more clearly the relationship between the object and its connection to the world of light.

The exhibition shows the multiple possibilities of analysing, grasping and understanding the phenomenon of light from multidisciplinary approaches, such as art, physics, religion, astronomy and philosophy.

Interdisciplinary projects based on the symbiosis between the sciences and humanities constitute a priority objective of the University of Barcelona, a mixed model of knowledge. This exhibition is a good example in this sense.

BIOS

Lourdes Cirlot is Professor in History of Art and vice-rector for Institutional Relations and Culture at the University of Barcelona. She is the main researcher of the investigation group of art, architecture and digital society (www.ub.edu/artyarq).

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Pilar Mateo Bretos is a graduate of Geography and History from the University of Barcelona. She has a Master's degree in Museology and Cultural and Ethnological Heritage from the University of Barcelona and also a Certificate in Didactic Museography from the University of Barcelona. She is working with the vice-rector Department for Institutional Relations and Culture at the University of Barcelona as the coordinator of exhibitions.

Isabel Garcia Malet is a graduate of Philosophy and Arts from the University of Barcelona and she has worked at this University in the field of culture for more than 20 years. She is now coordinator of the University of Barcelona Museum Project.



The Past for the Future of Geography: Introducing the Padua Museum of Geography

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The Cabinet of Geography at the University of Padua, at the time of its establishment in 1873, represented the doorway to modern geography in Italy. In the 18th century, geography made its appearance at the University of Padua as a minor part of the course in Astronomy and Meteorology. Between 1746 and 1749, the new Chair of Nautical Science and Geography was assigned to Gian Rinaldo Carli Rubbi,¹ In 1764, the word 'Geography' appeared in the title of the course *Ad lecturam Astronomiae, Geographiae et Meteorum*.² At the beginning of the 19th century, when the discipline was little more than an inventory of names and statistical data, it disappeared from the University of Padua until 1855, when a lectureship in geography was assigned to Francesco Nardi.³ In 1867, after his studies in Vienna, Giuseppe Dalla Vedova started teaching in Padua where he introduced Ritter and Humboldt's new approaches to geography, making Padua a leading centre for geography in Italy. Five years later he was given the Chair of Ancient and Modern Geography within the Faculty of Letters and Philosophy and, thanks to him, in 1873 the Cabinet of Geography was established. The same chair, after him, was held by eminent professors such as Giovanni Marinelli, Giuseppe Pennesi, Roberto Amalgia, Arrigo Lorenzi, Giuseppe Morandini. In 1904, at the Faculty of Science, the Institute of Physical Geography was created under the direction of

¹ Almagià, 'Padova e l'Ateneo Padovano nella storia della scienza geografica', p. 488.

² Lorenzi, 'L'insegnamento della geografia nello Studio di Padova', p. 464.

³ Lorenzi, 'L'insegnamento della geografia nello Studio di Padova', p. 465.

Luigi De Marchi, where Bruno Castiglioni and Francesco Vercelli also worked until its fusion with the Institute of Geodetics and Geophysics in 1942. Giuseppe Morandini, who from 1946 taught physical geography, was also assigned the Chair of Geography at the Faculty of Letters in 1948, finding himself in an emblematic situation, reflecting what became his life's work—the uniting of all geographical institutions into one single department. This came about in 1984 at Palazzo Wollemborg, where courses in both geography and physical geography were held from 1972.⁴ The Department of Geography was the first and only one of its kind in Italy until 2012 when, within the general reform of the Italian university, the Department of Geography became a section of the larger Department of Historical and Geographic Sciences and the Ancient World (DiSSGeA).

The heritage

Over the years, in Padua, geographical research and teaching have built up a unique set of both material items⁵ (atlases, maps, terrain models, globes, instruments and photographs)⁶ and distinctive research practices (excursions, field-work, photography used as a geographical tool, etc.). An intense survey activity carried out from 2012 to 2014 made it possible to proceed with the cataloguing (via ArtinXML software) of the material heritage, which was acknowledged in 1996 as a 'collection' by the University Museums Center (CAM).

Museum's spaces

The Museum will be housed in Wollemborg Palace in Via del Santo 26 in Padua, within the area (four rooms, amounting to 160 m²) which has been reserved for it by the Section of Geography of the Department of Historical and Geographic Sciences and the Ancient World (Figure 1). It will be closely related to the areas and activities of the Section itself, of the Geography Library and the Periodical Section linked to the Social Science Pole of the University Library Centre (CAB). According to the museographical issues and the logistic situation, an initial set-up project has been sketched; the intention is for it to be simple but dynamic, able to adapt to exhibit variations.

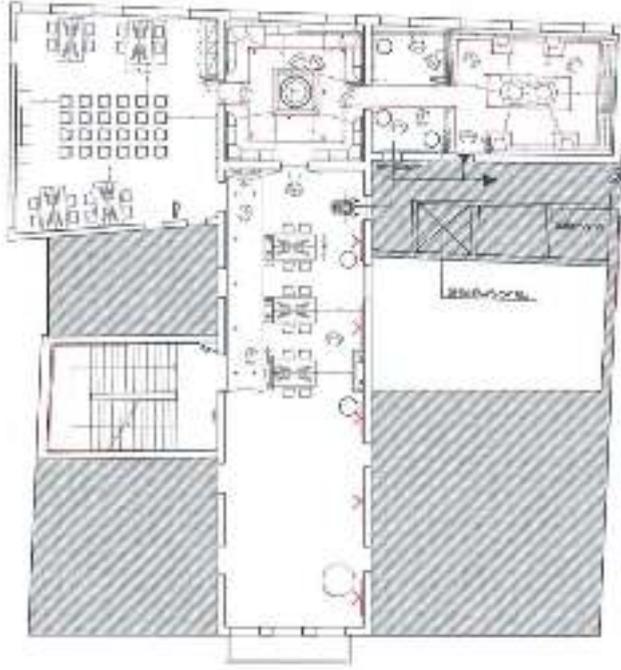
⁴ Bondesan, 'Il Dipartimento di Geografia «G. Morandini»', p. 6.

⁵ Vallerani, 'Oggetti di interesse storico del Dipartimento di Geografia'.

⁶ Rossetto, 'Gli archivi fotografici della geografia italiana'.

Figure 1

Plan of the first floor of Wollemborg Palace, where the Museum of Geography will be housed



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Mission, aims, target and activities

The idea of a Museum of Geography in Padua was suggested by Lorena Rocca in 2011 with the double purpose of preserving and promoting the heritage accumulated in 140 years of research and teaching, and creating new perspectives for the education and dissemination activities currently in practice. The Museum will involve every year around 2,000 university students and 700 pupils of the pre-schools, primary and secondary schools.⁷

The Museum of Geography is an absolute novelty on a national level. The project, approved by the Department of Historical and Geographic Sciences and the Ancient World on 7 March 2015, intends to revitalise the relationship between university and society. Therefore, enhancing procedures will be combined with

⁷ Babetto, 'Una geografia da Museo?'

dissemination activities allowing visitors to discover a discipline made up of engaging practices and pressing topical themes. The project proposes to extend the involvement of visitors beyond the museum tour, by providing preparatory steps (via a web portal, social network, online catalogues) and follow-up initiatives (engagement and visitor retention projects, packets or proposals for further in-depth study).

The objective is for the Museum to act as an ‘incubator’ of the Third Mission of the University, an innovative hub capable of creating communication and aiding reciprocal legitimisation of the three university functions: scientific research, education and social responsibility.⁸

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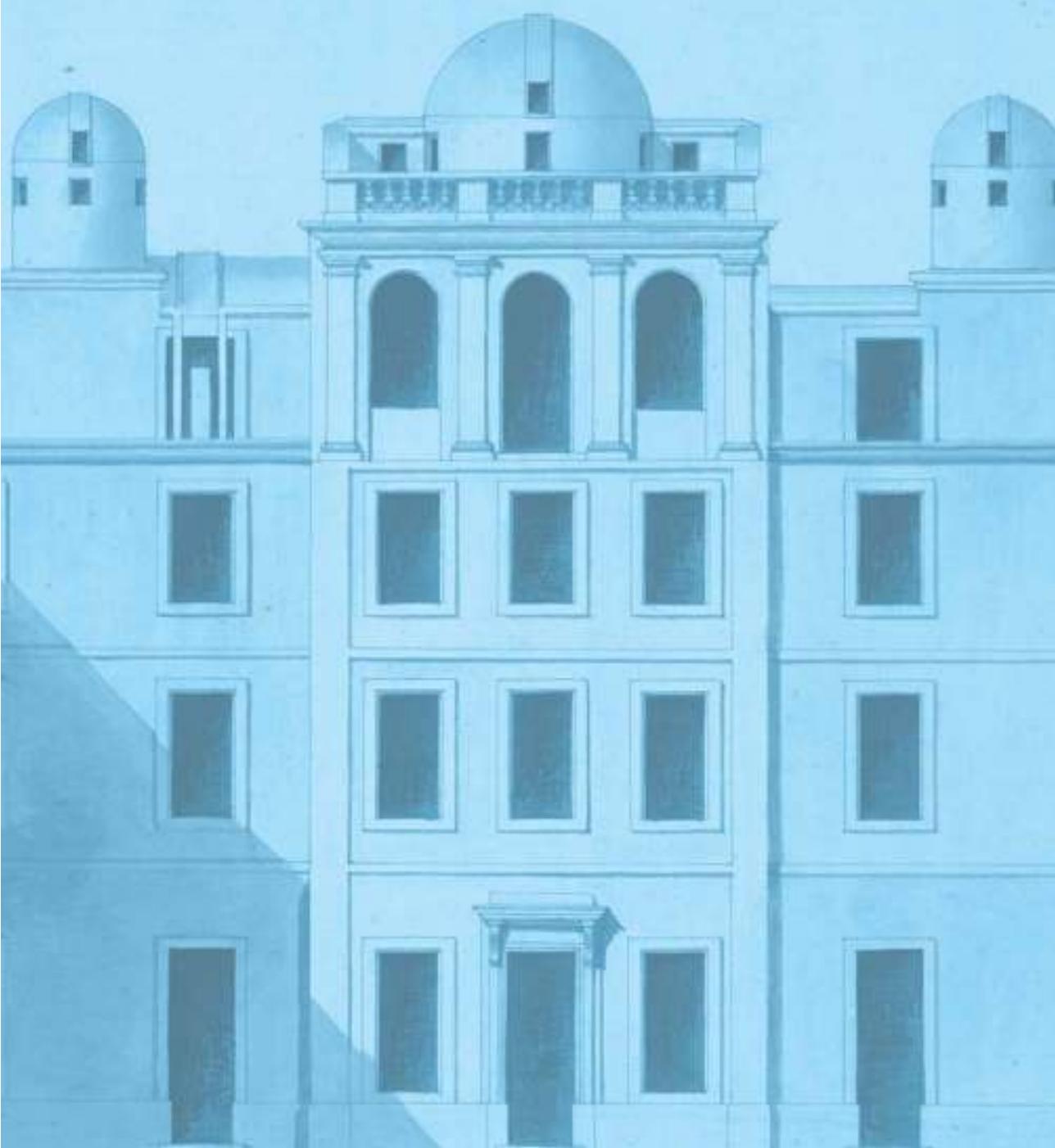
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⁸ Varotto, ‘Tertium non datur’.

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Lorena Rocca is professor of Geography/Didactics of Geography at the University of Padua and researcher in Human Geography and Education. She also collaborates with the University of Applied Sciences and Arts of Southern Switzerland (SuPSi). She is member of the Scientific Committee of the Museum of Geography at DiSSGea.

Mauro Varotto is associate professor of Geography and Cultural Geography at the University of Padua. He is coordinator of the Scientific Committee of the Museum of Geography at the Department of Historical and Geographic Sciences and the Ancient World. His researches are mainly in human and cultural geography.



Marseille Observatory Museum: A Proposal

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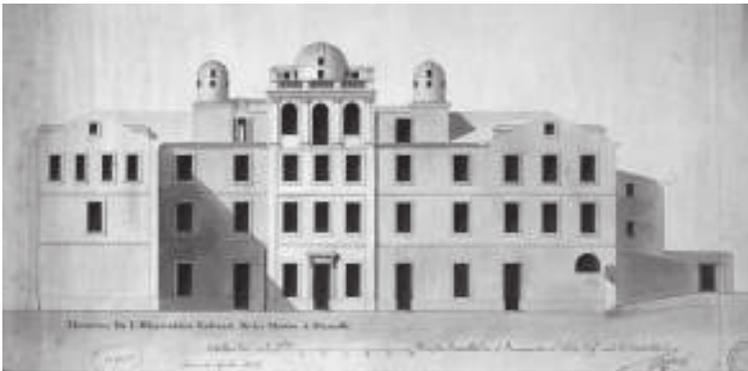
The Marseille Observatory (now LAM) has abandoned its 1860s site. How can we preserve its centuries-old heritage?

History of the Marseille Observatory

The original massive observatory (Figure 1) was built at the end of the 17th century in the old quarter, 200 m from the Vieux Port. Directed by the Jesuits, it was funded by the Naval Ministry. Observations had begun by 1701. When the Jesuits were expelled in the 1760s, the Royal Navy continued its funding, first directly, then via the Academy of Marseille. In 1795, during the Revolution, supervision was transferred to the new Bureau of Longitudes. Later it passed to the Ministry of the Interior. In the mid-19th century the observatory was attached to the Ministry of Education and thence to the University of Aix-Marseille.

Figure 1

The Old Observatory in 1794. Note the early hemispherical domes



© Bibliothèque municipale, Marseille.

The Old Observatory still exists. Mainly a primary school, it also houses the Préau des Accoules, a children's museum.

In the early 1860s, Urbain Le Verrier, director of the Paris Observatory and an influential senator, attached the Marseille Observatory to that of Paris. The astronomers moved to new quarters on the Longchamp Plateau, 2.5 km to the east, where in 1864 Léon Foucault's largest telescope was installed, with its revolutionary 80-cm silvered-glass mirror. A decade later Le Verrier was fired and the Marseille Observatory (Figure 2) regained its independence as France's main 'provincial observatory.

Figure 2

'The New Observatory' (Woodcut by Cosson, Smeeton, Blanchard)

The cylindrical 'dome' (demolished circa 1965) housed the Foucault telescope. The Meridian Pavilion was totally transformed in 1959 and is now referred to as 'The Cube'.



Photo © Marc Heller, Inventaire général.

By the mid 20th century, the Marseille Observatory had ceased to be a significant observing site. By then its astronomers observed mainly from the then-new Haute-Provence Observatory, 100 km to the north, and later at high altitude sites around the world (Chile, Hawaii, Mexico, etc.).

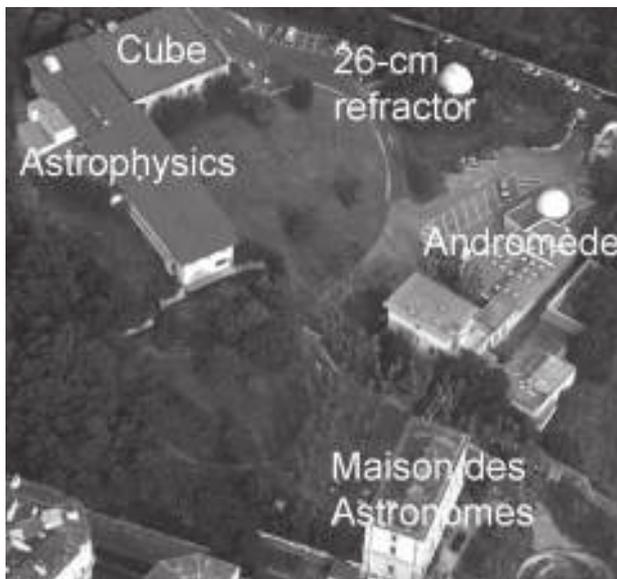
The astronomers leave the Observatory

In 2008–09 the observatory staff abandoned the Longchamp Plateau for the new Laboratoire d'Astrophysique de Marseille (LAM), a modern building with no telescopes, far from the city centre. The old 'New Observatory' site was allocated principally to IMÉRA, a university interdisciplinary centre, although the astronomical outreach organisation, the Association Andromède, remains; it operates a planetarium, and displays Foucault's historic 1862 80-cm silvered-glass telescope as well as the 26-cm Merz-Eichens refractor of 1872 in its nearby original building (but with a newer dome).

The Observatory site today

Figure 3

Photo from the 1990s. Aerial view of the Observatory in the 1990s. Above the upper edge of the photo is the Parc Longchamp, which shares the plateau with the Observatory. The Palais Longchamp with its two museums is off to the right.



© Marc Heller, Inventaire général.

The aerial photo (Figure 3) shows the main buildings on the 1.7 ha site. The Maison des Astronomes, originally the residence of the director, and housing the library, was built between 1868 and 1879. The architect, who died in 1874, was Henri-Jacques Espérandieu, who also designed the neighbouring Palais Longchamp and many other well-known Marseille buildings. Our historical museum was located in the Maison des Astronomes from the 1990s until 2009. It is now occupied by IMÉRA.

The Foucault telescope is under the care of the Association Andromède, in the (non-opening) white dome. Above and to the left of Andromède is the dome of the Merz-Eichens refracting telescope (1872). Andromède's planetarium is in another dome, not yet built when this photo (Figure 3) was taken.

'The Cube' is the new designation of what we used to call the Radial Velocities building. It was built in 1959 by essentially destroying the 1862 Meridian Pavilion (see Figure 2), the first building of the New Observatory. This is where we hope to install our exhibition area.

As for the former Astrophysics building, dating from 1967, the ground floor and the upper floor have been entirely renovated and reconfigured for IMÉRA, principally for lodging visiting scholars. However, the basement of this 60 m by 10 m building has not been modified, except that (conveniently for our plans) it no longer communicates internally with the upper levels. This is where we hope to locate our storage rooms.

The collection

Among our more prominent objects are two reflecting telescopes of James Short (1756), two meridian circles (early and late 19th century), several surveying instruments including a trigonometre signed by Danfrie about a century before the founding of the observatory, and Lenoir's 'n° IIII' repeating circle (the only one extant) of the Delambre-Méchain meridian expedition which served to define the metre. Many instruments have been inventoried by the Ministry of Culture and some have been declared 'monuments historiques'. Suffice it to say that we have a fair number of valuable and voluminous instruments that are deserving of display.

In addition, there are many less valuable but often cumbersome objects that have not yet been inventoried, let alone studied, due to lack of space. Note that archives (no longer on the site) exist that go back to the 18th century. Much historical research remains to be done on this material. Objects were gathered together in great haste when the observatory staff emptied their offices and laboratories prior to moving to LAM. Little has been properly identified. Components of instruments are separated. These are of no immediate interest to the public (and of no use for university 'communication'—it is just 'junk') but it is essential to conserve and sort this material in proper facilities with tables and shelves.

What goes where?

If the university grants the Cube and the basement of the former Astrophysics building for an observatory museum (as had been proposed for many years, and was supported by Bruno Vila when he was *chargé du patrimoine scientifique*), we plan to use the Cube as the exhibition area. The most valuable objects, currently in a secure location by arrangement with the municipal museums, would be brought back. The massive 1876 Eichens meridian circle would probably be set up at the bottom of the spiral staircase, close to its position when it was disassembled over a century ago. With relatively little modifications (but much paint), a visitors' circuit could be set up to follow the history of the Marseille Observatory, and in parallel the history of astronomy and its instruments, over three centuries.

The Astrophysics basement would be cleaned for use essentially as stores. Much shelving will be needed and, of course, security equipment. The numerous objects currently piled together in a few rooms would (finally!) be cleaned and inventoried. The basement is relatively isothermal; with very little additional technology, it would provide an acceptable environment for conservation. The risk of flooding would be avoided by proper attention to internal sources (water pipes) and by assuring drainage. Although the basement is below ground level, passive drainage should not present any fundamental problems since the building is on a plateau and the ground slopes down sharply on three sides of the building.

Exhibition ambitions

With only minimal operating funds, and a (probably) entirely volunteer staff, our initial ambitions will be limited to reviving, in these new quarters, our former operations in the Maison des Astronomes—general public opening one Saturday of each month (more often if possible), group visits by appointment, participation in Heritage Days (several hundred visitors with time slots), etc. We had the experience, in 2009–10, of a major exhibition, 'Telescopium', presented for more than a year in the nearby Natural History Museum, where huge crowds could pass before many of our objects, followed by a few months at the Natural History Museum of Bourges. However, it is more efficient, and I believe more appropriate to an academic institution, to receive visitors in a more structured way, whatever the level (school pupils, students, general public, researchers, etc.).

Despite our modest initial means, our ambition is to substantially conform to the standards of the Musées de France. Our programme will be described in a 'guidance document' (simplified academic and cultural project).

We cannot do everything *and* do it well. Our collection relates to the history of science, not to science itself. It is the role of the Association Andromède, on the same site, with its planetarium and exhibition area, to disseminate knowledge

about astronomy to the public. We have often collaborated with Andromède. But we need to focus on history. The principal narrative—the ‘guiding thread’—for visitors will be the evolution of professional astronomical instruments, in the context of the history of the Marseille Observatory, and of astronomy in general.

BIO

James Caplan studied physics at the University of Chicago and obtained a PhD in astronomy from North-western University before moving to the Marseille Observatory for research on the interstellar medium (using Fabry-Perot interferometers), and now the history of astronomical instrumentation. He is an astronomer emeritus at the University of Aix-Marseille.

Multi-interest Collections in a Digital Repository: The 'Pergamos' Case at the University of Athens

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Introduction

Curating digital collections has been a priority for the National and Kapodistrian University of Athens (UOA). This has been accomplished through the 'Pergamos'¹ Digital Library System (DLS), which was designed, developed and supported for more than eight years by the Libraries Computer Centre (LCC)² of UOA. It is the life cycle of Pergamos that will be briefly presented in this paper, alongside its current transformation in order to fully support the needs and demands of the University in terms of storing, preserving and promoting digital content in our modern 'digital' era.

It is well known that the various types of material found in libraries, museums and archives are organised in collections that differ substantially in all aspects of preservation, promotion, maintenance and handling procedures. These differences also emerge when a digital curating project is carried out by an organisation such as UOA. The Digital Repository 'Pergamos' has been developed to cover in an integrated way the needs of digitising, curating, (web) access, presentation and technical specifications for the earlier mentioned various types of material.

¹ Pergamos, pergamos.lib.uoa.gr

² UOA Library and Information Center, www.lib.uoa.gr

Pergamos in the past

It all began in 2004–05 when the idea of Pergamos was conceived and achieved.³ Pergamos was developed to be a feature-rich integrated DLS that would support heterogeneous digital collections already existing in various University units such as the Historical Archive, the Libraries, the Geological Museum, etc.⁴

In addition, Pergamos:

- offered flexibility to design and metadata policy for each digital collection
- had its digital content indexed by Europeana⁵ and OpenDOAR⁶
- has been referenced as a typical example for best practice in Digital Libraries.⁷

Figure1

Screenshot of old Pergamos interface



New Pergamos

It is widely known that over the years a lot has changed when it comes to using an information system like Pergamos. The changes are multidimensional and at least include (but are not limited to):

³ Pyrounakis et al., 'Designing an Integrated Digital Library Framework to support Multiple Heterogeneous Collections'.

⁴ Pyrounakis et al., 'Introducing Pergamos'.

⁵ Europeana, www.europeana.eu

⁶ OpenDOAR, www.opandoar.com

⁷ Witten, Bainbridge and Nichols, *How to Build a Digital Library*.

- the needs and demands of the agents involved;
- the advances in technology and infrastructure;
- the tools being offered and used especially concerning the Internet and the web;
- the types of material that need to be supported.

In order to keep up with current needs and new technology data, Pergamos had to be harmonised with modern design and new features. In this sense, Pergamos has been redesigned through the co-funded project under the Digital Convergence Business Program of National Strategic Reference Framework 2007–13. The new Pergamos will provide a new integrated platform, built to operate both as an Institutional Repository for UOA and a Digital Library System.

In this respect, Pergamos will cater not only for cultural heritage collections,⁸ but also for collections such as Grey Literature, Research Data, Old Books and Periodicals, etc.

The new platform leads to a set of implementation features that includes:

- structural enhancements and new functionality of Open Access;
- fine grained and flexible digital collection definition, management and maintenance (Table 1 depicts the old and new collections that are supported);
- fully searchable and reuseable digital content;
- better user experience;
- flexible self-deposit workflow for multiple types of University users (professors, students, librarians);
- providing modern and flexible ways to preserve, promote and access digital content;
- facilitating the educational process as well.

Table 1
Old and New Collection Types

Old collections	New collections
<ul style="list-style-type: none"> • Cultural Heritage Material • Museum Objects • Archival Content 	<ul style="list-style-type: none"> • Institutional Repository Content • Grey Literature • Rare Printed Library Items (books, journals, etc.) • Research Content and Data • Educational Material for Disabled Students

⁸Lourdi, Nikolaidou and Papatheodorou, 'Implementing Digital Folklore Collections'.

Technical aspects of Pergamos

The new Pergamos is fully based on Open Source back-end software, and is implemented as an integrated platform that serves both as a Digital Library and an institutional repository in a consistent and transparent manner.

The new platform offers:

- flexibility;
- better user experience;
- self-deposit workflow;
- roles and content for multiple types of University users;
- support for students with disabilities.

Moreover, Pergamos boasts new features, including:

- Open Access;
- metadata and digital content licensing;
- interoperability through multiple protocols (OAI-PMH, RESTful Web Services, structured export text files);
- Web 2.0 technologies.

In addition, Pergamos can show its content facilitating various metadata schemes such as:

- OpenDOAR;
- Europeana;
- HEAL-Meta;⁹
- OpenAIRE.¹⁰

The new platform includes:

- 12 new collections;
- more than 1,000,000 digitised and born-digital items;
- more than 3,000 digitised old books;
- more than 25,000 journal articles;
- Grey Literature (more than 7,000 theses and dissertations);
- research content and data;
- Cultural Heritage material;
- Museum/Archive/Library content;
- hierarchical subject thesaurus.

⁹ 'Provisioning HEAL-DSpace Software as a Service', <http://www.seab.gr/index.php/repositories-databases-menu-en/39-services-en/repositories-databases-en/289-provisioning-heal-dspace-software-as-a-service.html>

¹⁰ OPENAIRE, <https://www.openaire.eu>

Figure 2
Screenshot of new Pergamos interface



Το Α.Κ.Ο. σε μια πορεία

107	320	282
Επιστήμη και Κοινωνία	Αγωγή, Εκπαίδευση και Κοινωνία	Εκπαίδευση και Κοινωνία
1368	31	642
Εκπαίδευση και Κοινωνία	Εκπαίδευση και Κοινωνία	Εκπαίδευση και Κοινωνία
30551	8508	2026
Αγωγή	Εκπαίδευση και Κοινωνία	Εκπαίδευση και Κοινωνία

Last but not least, it is important to emphasise that, although Pergamos is a technology platform that provides a lot to digital collection management, it also offers new important benefits to the academic community:

- continuous access to multi-disciplinary digital collections;
- easily expandable and maintainable collections;
- digital content preserved, promoted, fully searchable and reusable;
- digital content that expands between the 9th and 21st centuries;
- user authentication and self-deposit workflow;
- indexing and reporting results for multiple types of University users (professors, students, researchers, librarians, etc.)

Conclusion

Pergamos has been supported over the years, and the LCC will continue to do so with consistency and vision to expand its content in the best possible way. In this sense, the LCC personnel aims to provide:

- means and tools in order to incorporate more collections from various museums and libraries of UOA (technological infrastructure, repository, storage, preservation, public common interface, etc.);
- compatibility with various metadata standards;
- technical support;
- awareness and publicity to enable more users and content expansion.

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The Sound of Silence: The Unspoken History of the Scientific Instruments of the Athens University History Museum

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During the 18th century a powerful scholarly movement flourished in the Greek speaking lands of the Ottoman Empire. This movement was inspired by the European Enlightenment and its main aim was to liberate Greeks from ignorance and superstition. Among the tools used for this purpose by the Greek scholars was the adaptation of their contemporary scientific theories. Newtonian physics and chemistry were taught systematically in the Greek schools of the time. The experimental teaching of physics and chemistry at least was considered by the enlightened scholars of the time as a prerequisite for the proper understanding of the nature of science. Therefore, in spite of huge financial difficulties, with the support of wealthy merchants of the Greek diaspora, scientific instruments have been acquired for use in secondary education schools and higher education institutions in Greece since the mid-18th century. We have written evidence and some instruments which still survive from this time which prove that experiments were performed, both in the school classes and in lecture rooms, for the benefit of the wider public.

After the establishment of the independent Greek state the new authorities, under the Bavarian King Otto, founded the first University in Athens. Sciences were part of the School of Philosophy and at the beginning very few students attended the relevant lessons. The first professors of physics had studied in Eu-

rope and they were acquainted with developed experimental methods in the European universities. After their return, they made significant efforts to organise experimental laboratories in the University, but in the beginning what they could do was to establish just a kind of Physical Cabinet. For this reason, they bought numerous instruments from certain European instrument makers like Max Kohl and Ducretet. Unfortunately, due to the lack of properly trained staff to use them, professors kept them mostly in the safety of their boxes. Having this in mind we argue that in many cases, including the preservation of the instruments, the boxes have their own value and importance. Wooden in principle, they had to keep out moisture and dust, even the destructive nature of sunlight. Their quality varied and was proportional to the value of the instrument. Expensive instruments were kept in boxes of good quality wood and they were covered with a protective fabric. Medicinal instruments, pharmaceutical and chemical products were kept in boxes and bottles with particular care for safety. In general, all these scientific paraphernalia were treated not only with professionalism but also with a kind of unspoken affection. Some of the boxes were transparent, with walls of glass or crystal, so that one could see and admire them.

Many of these items valuable for the history of science are now exhibited in the Athens University History Museum.¹ The Museum itself is part of the history of education in Greece as its building initially hosted the National and Kapodistri-an University of Athens (1837–41). The instruments now in the collection of the Museum may tell the story of the early days of scientific activity in the Greek state. Despite a persisting myth that sciences in Greece at that time had nothing important to show, there is evidence for the opposite. The instruments on display show that the science professors had certain research programmes on subjects of their interest. It seems, for example, that electricity and optics were among their scientific priorities. In fact, Dimitrios Stoumbos, professor of physics, announced a series of experiments performed with some of these instruments in the Academy of Sciences of Paris; the same was the case with Timoleon Argyropoulos, his successor in the Chair of Physics. Argyropoulos was the first who performed experiments with x-rays in 19th century Greece. Their paradigm was also followed by the professor of chemistry, Anastasios Christomanos who was PhD student and assistant of Bunsen. Christomanos used, among others, the spectroscope now in the collection of the Museum for the analyses he performed, most probably for the first time in Greece.²

As a conclusion, one may argue that the collection of scientific instruments in the Athens University History Museum, though small in number, is big in value. These instruments, though silent, whisper to us stories from the past that are al-

¹ Tsitou et als.

² Vlahakis, 'Introducing Sciences in the New States'; Tampakis and Vlahakis, 'Merchants, Scientists and Artists'.

most forgotten but still alive; peoples' stories which lie behind these instruments, their construction, their use and function despite their apparent silence. These are the stories which ultimately shape the history of science in Greece and highlight the relationship and connection with relevant stories in other university museums in Europe. Stories and institutions which suggest that through the university heritage, one can attempt to creatively reconstruct the past and possibly use it as an optimistic starting point for the future.

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The Bombardement of the Piraeus Harbour by the Allied Forces in 1944, through the Exhibits of the Athens Criminology Museum

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The aim of the Athens Criminology Museum is to extract information and knowledge from its collection items through documentation and to use all these data, not only in an informative way, but also for historical, educational and research purposes. The bombardment of Piraeus by the Allied Forces is a historical event which can be explored through the following exhibits of the Criminology Museum:

- The Collection of War Objects, which includes ammunition, such as explosives and an incendiary bomb fragment.
- The Human Remains Collection, which includes various human remains, such as burned and mummified human limbs, collected among the ruins.
- The Collection of Shoes, which includes shoes of the victims of the bombardment, found among the buildings' ruins. The shoes were removed from the victims during their autopsy.

On 11 January 1944, three air raids were carried out for over nine hours at Piraeus by the 301st Bomb Group of the Allied Forces, leading to the almost total destruction of the city. In the first raid the American Air Force participated. In the second and third raids, airplanes from the British Royal Air Force participated. The third raid was characterised as the most terrible one. This brutal attack followed

the withdrawal of German troops from the country.^{1,2}

Airbombers aimed to target German navy facilities, but they scattered the bombs all over the city of Piraeus. In the mission calendar there is no reference concerning the targets, and the complete mission failure was attributed to heavy cloud cover and frost that led to the collision of two aircrafts in the air. Maybe this is the only reason for the complete failure with regard to military objectives. According to the mission calendar of the USAAF, it seems that the 301st squadron flew over Athens-Piraeus for the eighth time since 10 September 1943 and the pilots thus had knowledge of the aerial map and were familiar with air raids.^{3,4,5}

It is estimated that 4.000 buildings were seriously damaged or destroyed by the bombs. Electricity and telephone networks were completely destroyed. The historic centre of Piraeus and the port facilities suffered serious damage. The destruction cost was estimated at around 325 million of pre-war GRD, or 6.5 million dollars today.^{6,7}

Apart from the immeasurable material damage, many innocent civilians met a horrible death getting blown up, burned alive or suffocating beneath the ruins. Those who survived, in a miserable situation, left their property, their homes and their belongings. Crowds of impoverished Greeks who lost their belongings in the bombardment began to move en masse to Athens, which was marked as an 'unfortified town' or to other districts of Greece. So Piraeus was emptied of its inhabitants.

Although the facilities of Piraeus harbour were mainly targeted, the victims of this bombardment numbered 5,500 of which only eight were German soldiers; an unknown number of citizens were wounded. Among the victims were 85 female students with 15 teachers of Primary housekeeping and Vocational School Piraeus who suffocated to death, buried under the remains of a shelter in the building of the Electricity Company (Figure 1).^{8,9,10,11}

A research in the Autopsy Archives of the Department of Forensic Medicine and Toxicology revealed that only 18 autopsies were performed by pathologists

¹ Archives of the USAAF301st Bomb Group / Wings Association.

² The National Archives of UK, WO 252/1428-1431.

³ Archives of the USAAF301st Bomb Group / Wings Association.

⁴ Department of the Air Force/ Air Force Historical Studies Office (Archive USAAF).

⁵ <http://www.milhist.net/usaaf/mto44a.html>.

⁶ Chandrinos, I. *The Big Bombardment of Piraeus of 11th January 1944*. Historical Aspects, Selections. Gnomon Publications, 2016.

⁷ Archives of the Employees of Electric Railway.

⁸ Chandrinos, *The Big Bombardment of Piraeus*

⁹ Archives of the Employees of Electric Railway.

¹⁰ Chatzimanolakis JE. *The Bombardment of Piraeus by the German and Allied Forces*. Peiraika, pp 5-17, January 2003. Journal edited by the Institute of Research of Local History and History of the Enterprises of the city of Piraeus.

¹¹ oralhistoryzanneio.blogspot.gr

on the victims of the Piraeus bombardment. The cause of their death was mainly due to multiple injuries, in some cases after long-term hospitalisation. Most victims were buried in massive tombs and an autopsy was not performed.¹²

For many years, one of the questions was whether the Piraeus bombardment was conducted by British or American planes. The recovery of an airplane from the sea that was shot down by the German forces during the first raid showed clearly that this was a purely American bombardment carried out by Flying Fortress bombers (Figure 2). Flying Fortress was a four-engine heavy bomber built by the company Boeing to satisfy the needs of American wartime aviation. These bombers were used during the Second World War mainly for the bombardment of German targets. They could fly to a great height, over long distances, carrying heavy load and could defend themselves against hostile attacks. It was this type of airplane that dropped more bombs than any other during the war.

Piraeus harbour was not an obvious target for the Allies, since its strategic importance was reduced during that period. The objective of the bombardment was to cut off the Occupation Forces from the outside world, in order to lead to capitulation. As a matter of fact, German forces were retreating on all war fronts and it was a matter of time before they left Greece. Finally, the bombardment was a potentially avoidable military operation that did not change the course of the Second World War.

Unanswered questions remain on the reasons why the Allies bombarded unselected military installations of the Piraeus harbour. It was never known whether there was an order according to which the population was mercilessly pounded rather than military targets, or whether it happened because of bad weather conditions.

The aspects of this bombardment are the following:

- No international court convicted this war crime, no one was punished.
- No municipal or other authority requested for compensation and no one compensated.
- No allied city was bombed by its own allies.

The Criminology Museum of the National and Kapodistrian University of Athens has a unique position in Greek history that deserves to be saved for future generations of scholars. A lot of information about the exhibits of the Museum and the autopsies of the victims related to the Piraeus bombardment can be drawn from the Archives of the Department of Forensic Medicine and Toxicology, where the Museum belongs. The historical record of the war exhibits was also done through 'oral history'. The professors of Forensic Medicine who performed the autopsies of the victims of this bombardment transmitted what they knew

¹² Autopsy Archives of the Department of Forensic Medicine and Toxicology, School of Medicine, National and Kapodistrian University of Athens, Greece.

about this event, and correlated these autopsies with the exhibits of the Museum (war objects, human remains and shoes), that consist evidence of this event.

Oral history passes from one generation to the other and it is very strong in cases when official history is missing. The oral account is an equal partner of the written record and the memory saves the history that is reproduced through the Criminology Museum.

What the Museum offers society is an understanding of history, through the written and oral history and through the experience of the protagonists of each historic event. The Museum potentiates historical memory and strengthens the relationship between exhibits and visitors.

The oral history in the Criminology Museum may function as a supplementary source of historical information. It acts as an auxiliary source providing illustrative contextual information and the oral testimonies were used to document the exhibited evidence of the bombardment. Each evidence in the Museum has its unique voice to reveal different events, leading to the incorporation of oral testimonies as a vital element in museum exhibitions. The public, through the evidence and oral testimonies, has discovered new ways of seeing, understanding and representing different historical events. A future more thorough investigation of the Department's archives will probably upgrade the already existing items' documentation concerning the Piraeus bombardment in 1944.

Figure 1

Facilities of the Electric Railway Athens-Piraeus



Source: Archives of the Employees of Electric Railway

Figure 2
Boeing B-17 Flying Fortress



Source: https://el.wikipedia.org/wiki/Boeing_B-17_Flying_Fortress.
Accessed 26 September 2016.

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The Heritage of the University of Ioannina

ANDREAS FOTOPOULOS

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The University of Ioannina¹, founded in 1964 at the north-west part of Greece effortlessly blended with the local community. This symbiotic process created a strong interaction and promoted cultural expression and creativity. The impact of the engagement with the local community led to the foundation of two museums and a collection, which we will present in this paper. The Museums² and the Collection of Typography Exhibits were designed to play a significant role in both research and aesthetics. Most of all, they are an educational resource for students, researchers, schools and members of the public.

The Folklore Museum and Archive³ (see Figure 1) was founded by a Presidential Decree in 1977 (P.D. no. 89, issue no. 30/3-12-1977). It is supervised by and functions under the Folklore Section of the Department of History and Archeology of the University of Ioannina. The idea of its foundation dates back in the period 1964–69 when the first Professor of the Chair of Folklore of the Faculty of Philosophy, Dimitrios Loukatos, started gathering the first collections. In 2005 the collection of the Museum and the Archives numbered 1,400 objects approximately.

The Folklore Museum holds outstanding acquisitions related to the pre-industrial production era and the agricultural or cattle-breeding culture. The classification method has been based on their functional value and everyday use, following the basic international prototypes of data for the documentation of folklore and ethnographic museums. The Museum's aim is the teaching and training of

¹ <http://www.uoi.gr/>

² <http://www.uoi.gr/panepistimiaki-zoi/politismos/>

³ <http://folklore-museum.uoi.gr/>

students, the protection and conservation of the existing objects and their methodic exhibition, the organisation and systematic enrichment of its collection.

The Museum of the History of Medicine,⁴ (see Figure 2) inspired and founded by Dr Stefanos Geroulanos, former Professor of History of Medicine at the University of Ioannina, is the first and biggest one in Greece. It houses a large variety of items including ancient Greek and Roman coins bearing medical illustrations and 2,500 surgical tools from the 1st century BC to our time. It also owns a vast variety of cast replicas depicting ancient medical personalities and medical healing scenes, a small chapel with 65 male and 12 female sainted physicians, an immense pharmacy with pharmaceutical preparations from herbs to current medicaments, two whole surgical/gynaecological operation theatres, three complete dental cabinets from the late 19th century, the 1950s and 2000s, and a huge collection of stamps with medical depictions.

The School of Medicine encouraged the academic community to reconnect to and explore the tradition of medicine in the region of Epirus. The Museum provides an insight into the history of medicine and displays a large collection of medical heritage, equipment and facilities.

Finally, the idea for a Museum of Typography⁵ and Technology was first conceived in 1991. The founder of the collection of typography exhibits is George Ploumidis, Emeritus Professor of modern history at the University of Ioannina and Director of the Hellenic Institute for Byzantine and Post-Byzantine Studies in Venice.

It was more than obvious in those days that the old technology of transmitting the written word had been irrevocably superseded by new means of transmitting information, more efficient, reliable and widely accessible. As the idea began to materialise, the initial anxiety that it might be too late to rescue part of the 'old world' of written communication was soon replaced by a hidden optimism that there is always something somewhere left which can be saved and preserved. All it takes is good will and sensitivity from a few experts coupled with a positive inclination from some supporters. Despite initial financial difficulties and other adversities, the collection of valuable 'pieces' and abundant material historically related to the transmission technology of the written word was made possible in a very short period of time. Alongside the search for typographical machines, a concerted effort began to collect any item which would reflect the outdated technological culture.

The collection of typography (see Figure 3) includes lithographic plates, typewriters, polygraphs, photostatic, typographic type, matrix type, blocks, etc., as well as many other technological articles, dating from the 18th century until the mid-20th century. Our findings also include some well-known (eponymous) ma-

⁴ <http://www.uoi.gr/panepistimiaki-zoi/politismos/mouseio-istorias-tis-iatrikis/>

⁵ <http://mtt.unit.uoi.gr/index.php?lang=el>

chines, such as the press of Gazzetta Jonica (Corfu), the press of the Turkish newspaper Yanya (Ioannina), a German linotype-composing machine, the lithographic press of Diakides (Patras), a wooden photographic camera of the Dalabekis House and a Strachan and Heneman press from Great Britain.

Moreover, efforts are underway for the establishment of a library (in Greek and other languages) specialising on the history of books, the art of typography and bookbinding. The collection, apart from its educational mission, aspires to become a cultural centre hosting exhibitions, lectures and symposia closely interrelated not only with the academic community, but also with the social and cultural life of the city of Ioannina.

From a broader societal perspective, our vision is to relocate the museums and collections and to convert them into a modern and functional complex of museums, accessible to the public. Interestingly, our University Museums and collections reflect the history, heritage and standing of a university and the intellectual and cultural life of nation, participate in the continuing excellence of teaching, learning, research and community engagement of the University, and actively engage in cultural, social, historical, scientific and artistic exploration and debate for the benefit of the University's students, staff and wider community. Fundamentally, their mission is to interpret history for a range of audiences, and to mediate between the academy and the public.

Figure 1

Folklore Museum



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Figure 2
Museum of History of Medicine



© University of Ioannina

Figure 3
Collection of Typography Exhibits



© University of Ioannina

BIO

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The University of the Peloponnese Archaeological Museum

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The University Archaeological Museum (UAM) of the Department of History, Archaeology, and Cultural Resources Management of the University of the Peloponnese was inaugurated in December 2014 at the School of Humanities and Cultural Studies campus in Kalamata. Created with funds from the University of the Peloponnese and the ‘Equipment Infrastructure in Higher Education—University of the Peloponnese’ operation (Regional Operational Programme of Western Greece–Peloponnese—Ionian Islands 2007–2013, European Regional Development Fund), it is housed in a semi-detached structure, adjacent to the Department’s other laboratories and specially renovated for this purpose (Figure 1). The UAM was conceived and realised by the Department’s faculty members Evridiki Antzoulitou-Retsila, Emily Banou, Evgenia Giannouli, Maria Xanthopoulou, Nikolaos Zacharias, Eleni Zimi, with the assistance of doctoral student Evangelia Kyriazi.

Figure 1

Interior of the University of the Peloponnese Archaeological Museum



© University of the Peloponnese Archaeological Museum

The collections

The UAM's collections consist of a selection of casts of representative works of Greek art, an extensive ceramic teaching collection, and a small collection of papyrus fragments.

The casts (Figure 2) range chronologically from Prehistory to Late Antiquity and represent various arts and crafts, such as sculpture, metalwork and pottery. These include characteristic marble, terracotta and plaster figurines and statuettes from the Prehistoric Cyclades, Crete and mainland Greece; marble and bronze statues and reliefs of the Geometric, Archaic, Classical, Hellenistic and Roman periods; clay and stone vases and lamps; a Linear A tablet; and a Byzantine steatite icon. The casts are grouped by period and, in the case of Archaic-Hellenistic reliefs and statues, in chronological sequence for educational purposes.

Figure 2
Selection of casts (not to scale)



The ceramic teaching collection (Figure 3) currently consists of 161 fragments of pottery from the American School of Classical Studies at Athens (ASCSA) excavations at ancient Corinth, on loan from the former 25th Ephorate of Byzantine Antiquities. This pottery represents a cross-section of periods (Roman, Late Roman, Byzantine, Islamic, Medieval Italian and Modern), functions (table wares, cooking wares, amphorae, pithoi, lamps) and origins (Aegean, Asia Minor, Cyprus, Syro-Palestine, North Africa, Italy). The UAM intends to enrich its ceramic teaching collection with pottery from earlier periods (Neolithic to Hellenistic) through further loans from the local Antiquities Ephorates.

Figure 3

Selection of Late Roman and Byzantine pottery fragments from the ceramic teaching collection (not to scale)



The papyri, which date from the 3rd/2nd centuries BC to the 6th century AD and are mostly unpublished, were donated by Vasileios G. Mandilaras to the Department of Philology. They include literary works, official documents, private letters and receipts.

Furthermore, the UAM is currently in the process of creating two new study collections, a collection of rocks and minerals of archaeological interest and a coin collection.

Purpose and prospects

The UAM is an integral part of teaching in the Department of History, Archaeology and Cultural Resources Management, particularly for archaeology courses and especially those focusing on sculpture and pottery. The casts and ceramic collection are used for training students in recording/cataloguing and documenting archaeological material, in classification (typological, chronological), and in archaeological illustration. The Department of Philology makes use of the papyrus fragments as part of its papyrology and paleography courses.

The projected creation of an interactive database will help organise and manage the UAM's growing collections more efficiently. It will also be the starting point for the development of educational programmes for children and adults in collaboration with the Department's Cultural Management specialists. These

programmes will contribute to the UAM's role as a public education resource intended to introduce the local public, especially primary and secondary education students, to the discipline of archaeology.

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SECTION 4

**UNIVERSITY HERITAGE AND CONSERVATION
CHALLENGES**

Conservation of Palaeontological Heritage: Laser Cleaning Applications on Fossilised Bones

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Introduction

Paleontological material is the archive of nature that documents the geo-diversity, biodiversity and cultural diversity of the universe. These specimens illustrate a number of diverse conservation issues,¹ cleaning being one of the most important and critical ones. This paper will discuss the series of cleaning tests that were undertaken in order to compare various methodologies. Specified areas of the samples were cleaned with conventional cleaning techniques,² based on chemical and mechanical means, widely used in the field of conservation of paleontological materials and were compared to areas cleaned with two different laser ablation methodologies.³ This procedure was applied on samples of fossilised bones from the entrance of a cave in Kato Zakros of Crete.

¹ Landucci et al., 'Laser Cleaning of Fossil Vertebrates'.

² Lopez-Polin, 'Possible Interferences of Some Conservation Treatments'.

³ López-Polin and Ollé, 'Laser for Removing Remains of Carbonated Matrices from Pleistocene Fossils'.

Materials and Methods

Hippopotamus bone fossil fragments (Upper Pleistocene, Kato Zakros excavation, Rethymnon, Crete, Greece) embedded into insoluble calcareous matrix with quartz impurities were used to test and evaluate different cleaning methods.⁴

The tested cleaning methods were:

A. Mechanical cleaning with ultrasonic scaler

Ultrasonic scaler was used on dry surfaces.

B. Chemical cleaning with acidic acid and formic acid

Acidic acid, in 10 per cent concentration, was applied by poultices, by pipette and by immersion of the specimen in the solution.

Formic acid, in 15 per cent concentration, was applied by pipette.

C. Laser cleaning by Nd:YAG lasers

Laser cleaning was tested by the application of Q-switched (QS) and fibre-coupled short free running (SFR) systems, while the wavelengths tested were the fundamental frequency (at 1064 nm) of both systems and, in the case of the QS laser, also the second (at 532nm) and third (at 355 nm) harmonics.

The evaluation of cleaning methods was based on surface macroscopic and microscopic examination and analysis by Optical Microscopy (OM) and Scanning Electron Microscopy coupled with Energy Dispersive X-ray analyser (SEM/EDS), with emphasis on structural integrity and absence of any chemical alterations.

Results

Mechanical cleaning

Ultrasonic scaler's efficiency in removing the encrustations was limited. The technique is difficult to control and can potentially damage the substrate.

Chemical cleaning

Acidic acid was applied by immersion of the sample. The encrustations were removed but the bone was also attacked by the acid.

Formic acid application was not efficient since the deposits were not removed. On the contrary, flaking occurred leading to loss of bone.

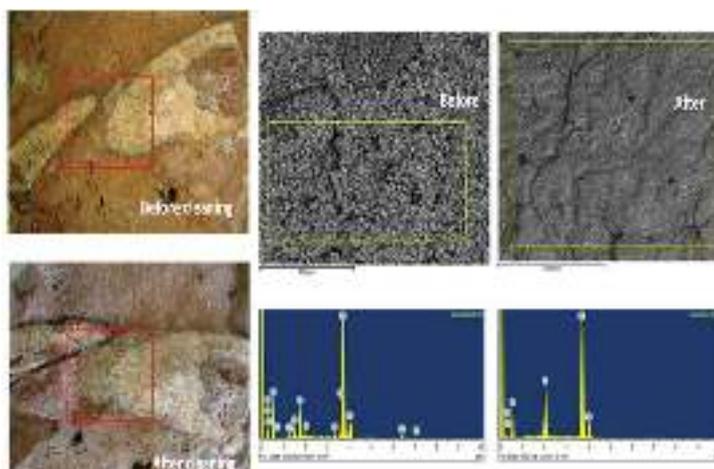
Laser cleaning

SFR Nd:YAG laser system at relatively high Fluence values (> 80 J/cm²) and wet conditions, efficiently removed the bulk of the calcareous matrix. At the chosen optimum laser parameters neither discoloration nor surface damage to the delicate bone fossil was observed (Figure 1).

⁴ Collins, *The Care and Conservation of Palaeontological Material*.

Figure 1

Detail of an area on the fossilised bone before and after laser cleaning and their SEM-EDS analysis



©Alexandropoulou Alexandra, Technological Education Institute of Athens

Discussion

The evaluation of the applied cleaning methods concluded that:

- Mechanical cleaning does not remove any encrustation.
- Chemical cleaning is insufficient when applied on the surface and attacking when the specimen was immersed in the solution.

The preliminary tests proved the versatility of laser radiation as a cleaning tool, while indicating the need for a customised laser cleaning methodology, laser system and working parameters for each individual laser cleaning application.⁵

Following the determination of the most efficient laser cleaning parameters, an appropriate application methodology should be further investigated so as to take into consideration the roughness and 3-Dimensionality of the skeletal material.

Furthermore, analytical assessment of the samples after cleaning, with emphasis on their structural and material integrity, as well as comparative study with other cleaning methods should also be carried out. Future experiments aim at the development of the most appropriate methodologies for the wide use of laser cleaning in every day conservation practice on natural history collections.

⁵ Fotakis et al., *Lasers in the Preservation of Cultural Heritage*.

Acknowledgements

This study is part of the research project titled 'Development of a Standard Laser Technology for Cleaning Evidence of Proteinaceous Cultural and Natural Heritage', which is operating under the Action "Archimedes III" of the co-operational programme 'Education and Life Long Learning', which is co-funded by the Greek Ministry of Education and the European Union.

The research team wishes to acknowledge Dr Ev. Kambouroglou, Head of Geology and Paleontology Department at the Ephorate of Paleanthropolgy and Speleology (Hellenic Ministry of Culture and Sports) for providing the research samples; and the conservator/SEM technician (Technological Education Institute of Athens) Athanasios Karambotsos for his efficient technical support.

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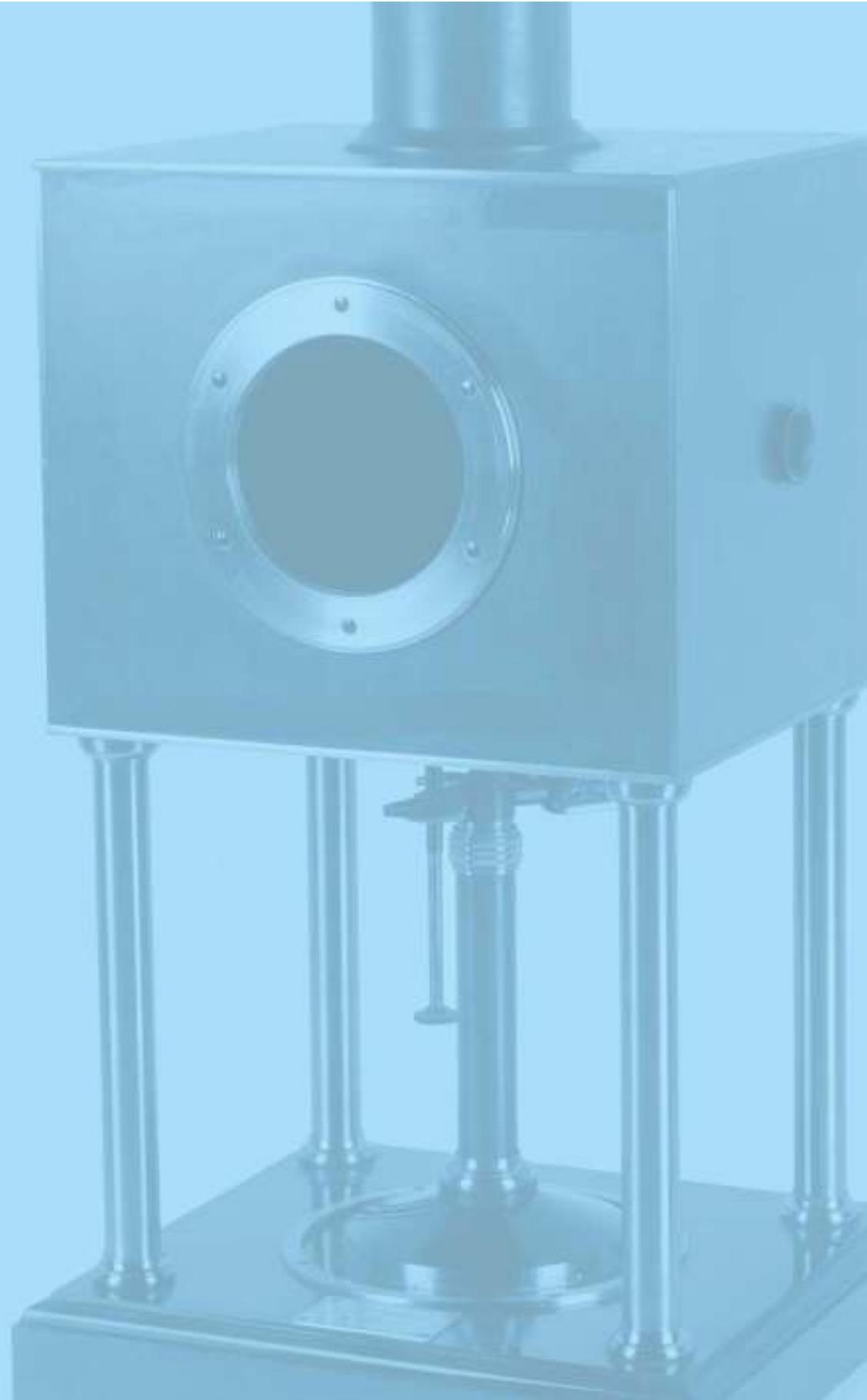
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Laser Cleaning Application to a Taxidermy Paradisaeidae Brown Bird (Zoological Museum, University of Athens)

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Introduction

Natural history collections represent a unique example of multifaceted objects and conservation problems. Cleaning of natural history specimens is a very important and critical issue.¹ In this paper, we examine the issues related to removal of dust and other soiling media that can be found trapped in the delicate structure of taxidermy bird feathers.² The aim of the project was the cleaning of the plumage of a taxidermy Paradisaeidae brown bird from the Zoological Museum of the National and Kapodistrian University of Athens (NKUA). The fine structures of the feathers are extremely efficient dust traps and the cleaning procedure is a particularly difficult task especially because of the feathers' fine structure and their colouration.³ In conservation practice, the removal of dust deposits from

¹ Asmus, 'Laser Divestment for Natural History Museum Collections'.

² Steffen, 'Federn in Völkerkundlichen Sammlungen'.

³ Schaeuffelhut, Tello and Schneider, 'Cleaning of Feathers from the Ethnological Museum, Berlin'; Solajic et al., 'A Collaboration Examination of the Colourfastness of Amazonian Feather Works'

such objects is usually achieved by mechanical or chemical ways, which cannot always ensure an optimum result and thus laser cleaning studies were considered.⁴

Materials and Methods

Preliminary laser cleaning tests were performed on reference pigeon feathers of brown-black colour artificially covered by museum dust. Visible (532nm) and infrared (1064nm) wavelengths of microsecond (μ s) and nanosecond (ns) pulse duration from a fibre-coupled SFR and a Q-switched Nd:YAG laser systems were respectively employed.

The evaluation of cleaning methods was based on surface macroscopic and microscopic examination, and on analysis by Stereomicroscopy and Scanning Electron Microscopy, coupled with Energy Dispersive X-ray analyser (SEM/EDAX), with emphasis on structural integrity and absence of any colour alterations.

Results

Laser cleaning at 532nm (5–7ns), at low fluences (e.g., 0.2 J/cm²) could not remove the deposits, while higher fluences (e.g., 0.25 J/cm²) caused discolouration of feathers barbules.

Laser cleaning at 1064nm (120 μ s) at low fluences (e.g., 0.25 J/cm²) caused insufficient cleaning, while at higher fluences (e.g., 0.7 J/cm²) it caused damage.

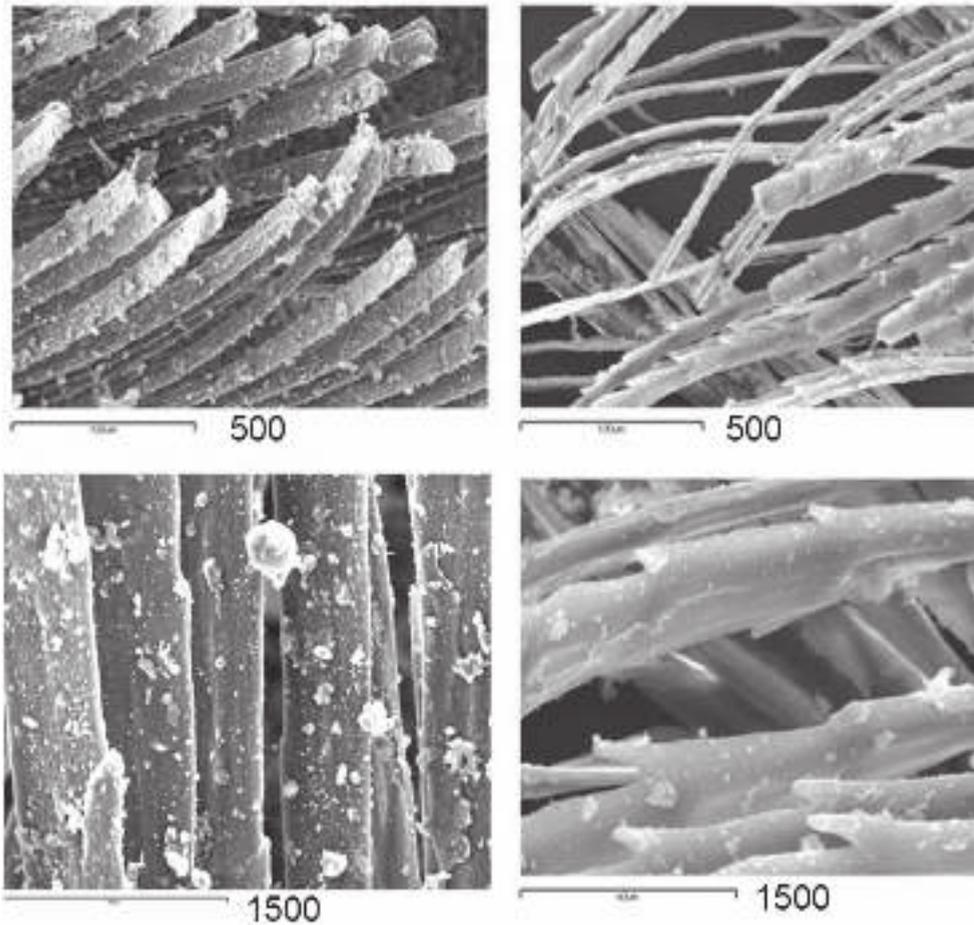
Laser cleaning at 1064nm (5–7ns) at higher fluences (e.g., 0.9 J/cm²) caused damage and discolouration. On the contrary, infrared laser cleaning at 1064nm (5–7ns) and low fluences (e.g., 0.3 J/cm²) allowed the successful removal of the artificially applied soiling from the feather samples without any apparent surface disruption or discolouration. Increase of pulses number resulted in a very clean sample without visually yellowing.

Laser treatment of taxidermy bird

As mentioned, the initial cleaning tests were performed in order to find out the most adequate cleaning methods for the treatment of the Natural Collection Specimens of the Zoological Museum of NKUA. A Paradise Bird, whose brown feathers had iridescence edges, was treated with an infrared Nd-YAG Q-switched laser emitting at 1064 nm with fluence of 0.3 J/cm² (Figures 1 and 2). Delivery of the laser beam was via a single optical fibre. Cleaning was stopped once as much dirt as possible had been removed.

⁴ Dignard et al., 'Nd:YAG Laser Cleaning of Feathers'.

Figure 1
SEM analysis of taxidermy bird feather before (left) and after (right)
laser cleaning application (1064nm , 5-7ns, 0.3 J/cm²)



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Discussion

The evaluation of the applied cleaning methods on reference samples concluded that very promising results, without any discoloration effect or disruption of the feather structure, were achieved with the infrared radiation of 5–7ns pulse duration.

In the case of taxidermy bird, the evaluation of the cleaning method revealed that the deposits, trapped within the microstructure of the feathers, were successfully removed without any discoloration or structural disruption. Furthermore,

the original color and hidden iridescences were revealed (Figure 3).

Although the results of laser cleaning are promising, the research must be continued in order to have reliable and verifiable results. Research should also be carried out to clarify if the yellowing⁵ of the objects, after laser cleaning, is due to radiation or other factors.

Figure 2

Taxidermy bird plumage during laser cleaning.



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Figure 3

Original colour and hidden iridescences of Paradisaeidae brown bird revealed after laser cleaning



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⁵ Dignard, et al., 'Cleaning of Soiled White Feathers using the Nd:YAG Laser and Traditional Methods'; Pacaud and Lemaire, 'Le nettoyage au laser d'un jaunissement observable sur des plumes blanches ayant subi un traitement par laser yag de désincrustation'.

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Indoor/Outdoor Airborne Particulate Matter and Microbial Measurements in the Criminology Museum of the University of Athens

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Introduction

Environmental conditions (e.g., humidity, temperature, light), gaseous and particulate matter (PM) pollution as well as microbes influence the indoor environment of museums^{1,2} and affect the preservation of museum objects.^{3,4,5} In particular, objects made of organic materials have complex structure and deteriorate via complex processes.⁶ Several studies have been performed to determine the characteristics and sources of air pollutants and airborne microbes inside cul-

¹ Camuffo, *Microclimate for Cultural Heritage*.

² Gysels, et al., 'Indoor Environment and Conservation in the Royal Museum of Fine Arts, Antwerp'.

³ Brimblecombe, 'The Composition of Museum Atmospheres'.

⁴ Smolík et al., 'Deposition of Suspended Fine Particulate Matter in a Library'.

⁵ Grau-Bové and Strlič, 'Fine Particulate Matter in Indoor Cultural Heritage'.

⁶ Anaf et al., 'Effects of a Constructional Intervention on Airborne and Deposited Particulate Matter'.

tural heritage collections.^{7,8} The present study focuses on the investigation of the environmental factors, atmospheric pollutants and viable, cultivable airborne microbes which can affect organic materials.

The aim of this article is to determine the role of environmental parameters, atmospheric pollutants and airborne microbes in the decay of organic materials of natural and cultural history, as well as medico-legal collections in museums. Seasonal measurements were conducted in the Criminology Museum of the National and Kapodistrian University of Athens for a period of 2 years.

The Criminology Museum is located in a densely populated urban area of Athens with extensive road network. It is hosted in an air-conditioned building, although the sampling room itself is naturally ventilated. The Museum's medico-legal collections consist mainly of organic materials, such as leather, skin, bones, wood, paper, mummified tissues, and formalin-fixed tissues.

Methodology

The methodology included the collection of samples and measurement of environmental parameters, atmospheric pollutants (inhalable particulate matter and gaseous air pollutants) and microbes in the air (bioaerosols).

The collection of samples and measurements

Air samples were collected using a MAS 100 one stage viable sampler for the determination of microbial concentrations. Measurements of environmental parameters (Temperature *T*, Relative Humidity *RH*, Ultra Violet Radiation *UV*, visible light) were determined using portable data loggers. The air temperature and relative humidity were recorded continuously by three Tiny Tag data loggers on three locations (outdoors, indoors and inside a closed showcase). Mass and number concentrations of particulate matter (PM) were determined using portable aerosol monitors (Dust-Trak and P-Trak instruments, TSI, Germany). An Andersen Cascade Impactor (9-stages non-viable particle impactor; Thermo Electron Corporation, USA) was also used for measurements of the mass size distribution. Gaseous air pollutants (NO₂, SO₂) were measured using passive samplers (NILU, Norway), whereas CO₂ and CO were determined using the Indoor Air Quality instrument (IAQ Meter, Model 8762, TSI).

⁷ Chatoutsidou et al., 'Modeling of the Aerosol Infiltration Characteristics in a Cultural Heritage Building.'

⁸ Lazaridis et al., 'Indoor/Outdoor Particulate Matter Concentrations and Microbial Load in Cultural Heritage Collections.'

Microbial enrichment and cultivation

The analysis of the viable, cultivable, airborne microbes is based on the cultivation of the air collected microbes on microbiological growth media. The heterotrophic bacteria were grown in Tryptone Soy Agar at 37°C for 48 hours, whereas the autotrophic chemolithotrophic bacteria were cultivated in Minimum Mineral Tris Phosphate Agar (MMTPA) without any carbon source. Bacteria with degradation capabilities were grown in MMTPA with the addition of 5 g/L of one specific carbon source (leather, bone, cellulose, gelatine or textile) at 37°C for 8 days. Mesophilic fungi were cultivated in Malt Extract Agar at 20°C for 72 hours. Concentrations of airborne micro-organisms were expressed as colony forming units per cubic meter (CFU/m³).

Results

Microclimate

The microclimate measurements (T, RH, UV, visible light, CO₂ infiltration rate) showed that the indoor conditions are not well controlled. There was no significant differentiation of the microclimate outdoors (site A), indoors (site B) and inside the showcases (site C; Figure 1). The 2-year average values were indoors (site A) as follows: T = 22.3 ± 5.9 °C; RH = 51.3 ± 5.1 %, UV flux = 83.3 μW/lm; infiltration rate = 1.22 h⁻¹.

Atmospheric pollutants measurements

Figure 2 shows the 2-year seasonal variations of the inhalable particulate matter PM₁₀, the gaseous air pollutants nitrogen dioxide (NO₂) and sulfur dioxide (SO₂). The indoor (site B) inhalable PM₁₀ concentrations (43.9 ± 5.3 mg/m³) were higher than outdoors (site A), whereas elevated concentrations of PM₁₀ particles were determined during autumn and winter indoors and inside the closed showcases.

In contrast, the gaseous air pollutants NO₂ and SO₂ showed a comparable seasonal variability both indoors and outdoors, whereas lower NO₂ concentrations were encountered inside the closed showcases. As shown in Figure 2, elevated concentrations of NO₂ and SO₂ were determined in winter outdoors and indoors, probably due to anthropogenic emissions, such as traffic and heating.

Bioaerosol measurements

Figure 3 presents the measured seasonal variation of viable, cultivable airborne microbes during the 2-year measurement period. High variability of airborne microbes was measured in all four seasons, whereas the highest concentrations were determined in summer. Similar to the PM concentrations, the indoor micro-

bial concentration (average value: 909 ± 443 CFU/m³) was higher than outdoors. In addition, a high number of airborne bacteria with metabolising capabilities for bone, leather, cellulose, gelatine and textile were measured.

Figure 1

2-year average microclimate measurements of a) Temperature (°C) and Relative Humidity (%); b) UV flux (μ W/Lumen), and illuminance (Lumen/m²); and c) CO and CO₂ concentrations (ppm; used for the calculation of the air exchange and infiltration rate).

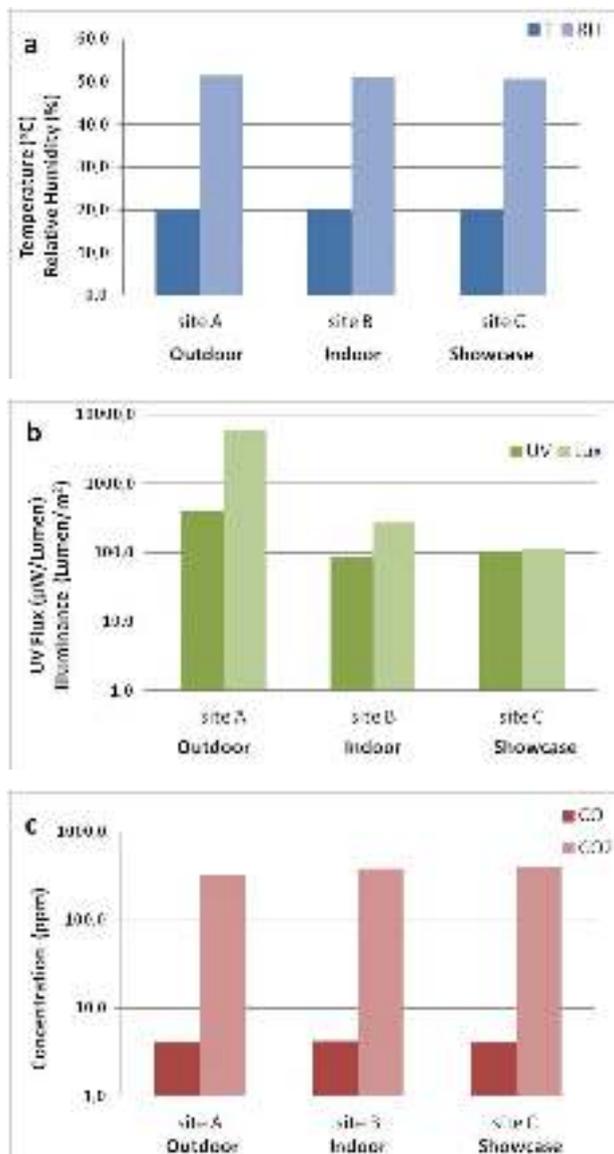


Figure 2

Seasonal variation of a) the PM₁₀ concentration ($\mu\text{g}/\text{m}^3$); b) NO₂ concentration (ppb); and c) SO₂ concentration (ppb)

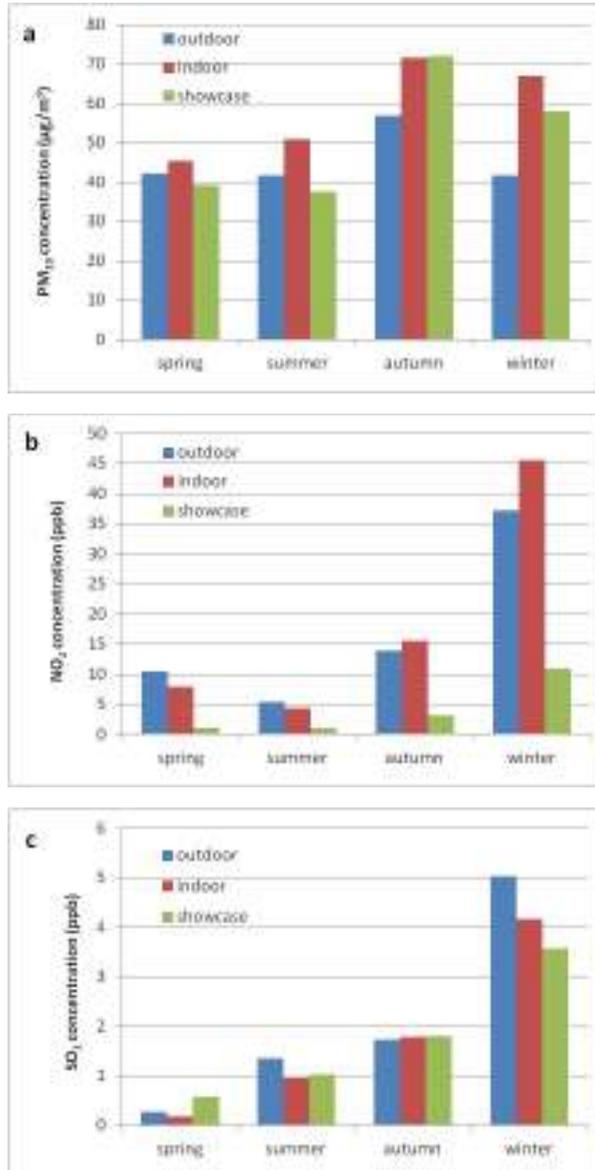
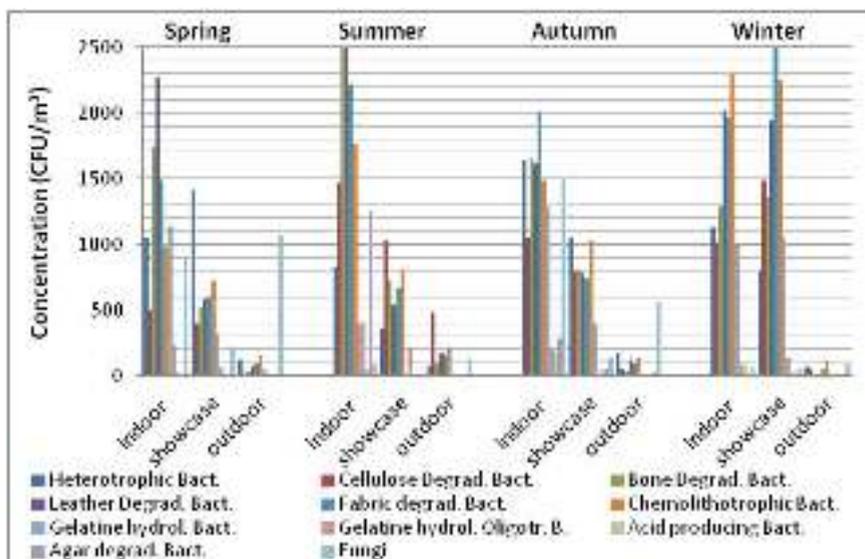


Figure 3

Seasonal variation and enrichment of viable, cultivable airborne microbes



Conclusions

The 2-year seasonal indoor/outdoor measurements performed in the Museum concluded the following:

- The airborne microbial load and the PM concentrations showed a considerable variability, which is related to the outdoor concentration levels, indoor environmental conditions, infiltration rates, ventilation and indoor activities such as the number of visitors and the chemical composition of the exhibits.
- Showcases offer only partial protection from atmospheric pollutants and specific airborne microbes.
- A microbial enrichment of opportunistic pathogenic bacteria and organic material metabolising bacteria was observed indoors and inside the showcases during the 2-year measurements period (Indoor/Outdoor Ratio: 11 - 281; Showcase/Outdoor Ratio: 9 - 358).
- The higher concentrations of airborne bacteria and PM indoors indicate significant indoor sources, such as resuspension, inadequate cleaning and storage conditions.
- The indoor microclimate conditions in the Museum are not well controlled and this poses a significant risk for the preservation of the cultural heritage exhibits. However, an appropriate management of the Museum's microclimate, in accordance with proper cleaning, regular dusting, disinfecting, and disinfes-

tating of the rooms is the best practice to protect the exhibits, and the health of people who consult them or work in them.

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SECTION 5

**NATIONAL AND KAPODISTRIAN UNIVERSITY
OF ATHENS MUSEUMS AND COLLECTIONS**



The Classification of Knowledge: From the Collections to the University Museums—Current Situation and Suggestions for the Future

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Introduction

The National and Kapodistrian University of Athens (UoA) encompasses at least 20 museums and collections. Overall the museums and collections of the UoA encompass a wide range of disciplines, from collections that cover the more traditional fields such as zoology, geology, mineralogy, botany, paleontology and anthropology, to art, archaeology, history of medicine, pharmacy, chemistry and technology. A number of university collections also cover more specialised subjects, such as history of religion, anatomy, pathology, as well as the history of the University and student life.

It is also worth mentioning that, at a typological level, UoA museums and collections include botanical gardens, hospitals and small departmental collections, as well as historical buildings like the Athens University History Museum, which is housed in the first building intended for the University in 1837. The museums and collections of the UoA hold a significant number of our scientific, natural and cultural heritage, and thanks to their attributes some of them could easily be considered not only university but also 'national' museums. Of course, throughout time they have always been linked to the University's two main missions: teaching and research.

In this paper, I will not provide an insight into the history and development of our university museums and collections, since other authors in this volume present aspects of those museums' unique features. I will briefly outline their past and present situation, and I will provide an insight into the problems and possible solutions to what I believe these problems are—if indeed such solutions exist. The points being made are based primarily upon my several years of experience as Director of Museum of Paleontology and Geology of UoA, as well as Dean and Vice Rector of the same institution. An understanding of today's major challenges requires an awareness of how we got here.

The Significance of University Heritage for the Greek State

The historic links between the University and the formation of the Greek state partly determined the purpose for the establishment of university museums and collections. The collections that were amassed aimed at supporting the educational process of the new institution, the Othonian University—known today as National and Kapodistrian University of Athens—which was established in 1837. During the first years of the operation of the University, a significant number of collections were devoted to the earth sciences, and had already been formed by individuals and scientific societies before they were donated to the University. A striking example of the aforementioned situation is that of the Naturalis Society, which in 1858 decided to donate its collected material to the new institution, in order to ensure its long-term existence, due to the financial problems the Society was facing.

From the second half of the 19th and especially the first years of the 20th century, UoA gradually promoted the growth of the existing collections, as well as the organisation of permanent display areas. Originally, the collections expanded through accessions resulting from the University's own research and the increase of interest and scientific evolution in specific disciplines (such as natural anthropology and anatomy), which engendered specialist activities with a view to acquiring material for both research and teaching. For example, the Physics Laboratory, founded in 1837, had acquired all the instruments for the teaching of experimental physics, chemistry and astronomy. In addition to purchase, three other methods of acquisition were used: expeditions, excavations through field research and training, as well as bequests. However, most items have been acquired by accumulation rather than systematic collection. Therefore, in many cases parts of the collections have been developed due to the particular research interests of staff members.¹

During the celebrations of the UoA's centenary (1937), most of its museums

¹ Dermitzakis and Triantafyllou, 'The University Museum. Character and Function.'

and collections were housed in the university building, on 28, Akadimias St., known today as the University Cultural Centre and 'Kostis Palamas' Faculty Club. At that time, the Museum of Anthropology was installed in the building of the Medical Laboratory in the city's Goudi quarter, where the School of Medicine and Dentistry was also housed, while the new Criminology Museum (1933) was located in a room in the city centre (Socratous St.).

Looking back at the exhibition practices during the first period of expansion of UoA museums, exhibits were amassed in rooms, halls, or even underground galleries without some kind of classification.² Over time, however, the focus shifted towards the setting up of classification inventories, ensuring adequate space for exhibitions with an aesthetic layout (see Figures 1 and 2). Each collection was housed in one or more permanent display galleries, with elaborate exhibition equipment. For example, in the case of the botanical, anthropological and mineralogical collections, their exhibits were placed in glass showcases, decorated with motifs and features in neoclassical style, while their arrangement in space followed the interior design of the building where the collection was housed. The display cases were lined up by subject or by chronological order. The information material was almost non-existent, and most UoA museums were open to the public with no admission fee.

The majority of the museums hold material which is important locally, professionally, or in an international spectrum.³ Therefore, throughout the history of UoA an increased public interest was developed for university museums and collections and their scientific work. This is reflected in varying news reported in the press during the early 20th century.

The Current Situation of University Museums and Collections of UOA

Over the years, the number of collections grew considerably. Alongside the teaching collections, the collections of teaching objects, e.g., instruments were incorporated. Their expansion coincided with an increase in the number of students, the decrease in the use of objects and specimens in teaching and research, the reorganisation of collection-based disciplines and poor funding. As a result, UoA has a number of its museums and collections housed in small spaces, with premises that do not provide the appropriate standards of care, and few resources available for the proper long-term management of the material, including conservation, documentation and access.

However, the problems faced by university museums and collections of UoA are not new. In my view, they are related to the following points. The first is that university museums and collections were not developed according to any kind of

² Lavas et al., *Research and Appraisal of the Cultural Management of the University Museums*.

³ Lavas et al., *Cultural Management of the University Museums*, pp. 17–21.

coherent plan. The second is that from the beginning the university became increasingly dependent on the central government for its finance and, consequently, the same applied for UoA museums and collections. The third point is that until 2000 the legal framework on higher education ignored the existence of UoA museums and collections. The Educational Act of 2000⁴ makes, for the first time, a formal reference to university museums. The fourth point is that UoA was always over-regulated and, as a result, the legal status does not allow UoA museums and collections to attract private funding, nor to have more autonomy in governing their own affairs. Finally, it is widely accepted that the significance of university museums and collections remains unknown to the general public while, at the same time, the role they could play in contemporary university and society is neither understood nor established.⁵ Therefore, there are two main problems of university museums and collections of UoA which are worth highlighting: governance-administration and funding.

Governance-Administration

A director of a university museum is appointed to this position usually without having prior knowledge or training in managing this particular institution. Curating and developing collections calls for many skills, quite apart from those of academic knowledge and research. These skills may be combined in one person, or be exercised by different specialists. However, the majority of UoA museums have a limited staff appointed in their care—or no staff at all. In all cases, the University has appointed a professor, on account of his or her specialty, in charge of the collection whose main duties, however, lie in academic teaching. As a result, running a museum tends to be a duty which is carried out during occasional moments ‘stolen’ from regular responsibilities. Therefore, the care of the museums frequently depends on the goodwill and enthusiasm of all permanent staff—namely the academic staff of the department—to which the museum or collection belongs, supported by students, who frequently do part of their internship or other research work within the framework of their study requirements.

Therefore, management skills are acquired on the job, usually under the tutelage of the previous director of the museum. The director responsible for the museum or collection typically reports to an administrator, the department chairperson—if the museum or the collection is departmental—or someone higher up in the hierarchy of the institution. In both cases, the problem is that people in upper-level administrative positions usually have advanced themselves through various chairs, without having knowledge of museum operations or history. In addition, their area of responsibility is so vast that they do not have the time to re-

⁴ Act no 2817 of 2000

⁵ Lourenço, ‘Where Past, Present and Future Knowledge Meet’

spond to the university museum's needs. On the other hand, the museum director does not have the full authority to proceed to the reorganisation of the museum or to research projects, which demand time, money and personnel in order to accomplish these visions.

Finally, as it has already been pointed out by other scholars, the fact that those museum directors have to report to a single administrator, who generally serves a term of 2 to 3 years and rarely for two consecutive terms, creates additional problems to museum services. It is evident that the director must always brief new administrators on the history, functions and plans of the institution.⁶

Frequently, the staff being appointed has no specialist knowledge or background in museum practice or, in other cases, lacks the necessary resources in order to accomplish their work. Another problem is the fact that in many cases a documented strategy, in which roles and responsibilities are set out with clarity, is absent.

Funding

In the competitive world of higher education, where current funding for the majority of universities is inadequate in every comparative measure, extra university expenditure on museums and collections is called into question. The decreasing funding resources of the host institution, poor housing conditions, limited space, the low level of management and care of the collections, lack of resources or public support, lack of donations along with no alternative sources of money stemming from collaboration with the market challenge the existence of university museums and collections worldwide. A number of departmental collections and museums, faced with the aforementioned uncertainties and the need to act as educational agents towards a broader public, were urged to develop techniques in order to effectively meet new economic and social challenges.⁷

The earlier remarks are easily transferrable to UoA museums and collections. For both of them, the methods and extent of the funding present significant problems. Even when UoA received an adequate annual funding from the central government through the Ministry of Education, UoA museums and collections always had a tight budget to manage. Before 1995, the financial requirements of the museums were met directly by the University, which covered expenditures according to museum needs. After 1995, University authorities decided to indicate a special annual fund to be awarded to UoA museums, laboratories and clinics, channeled through the annual budget of the University. The sum allocated annually was not more than 5,079.21 euros. Moreover, university museums were (and

⁶ Genoways, 'Challenges for Directors of University Natural Science Museums'.

⁷ Tirrel, 'The University Museum as a Social Enterprise'; Dermitzaki, 'The Educational Role of University Museums and Collections', p. 10.

still are) eligible to apply for surplus funding from the Special Account of Research Allocation of the University, in order to receive additional financial support. It is evident that most museums used that money for the purchase of technological equipment, care of their collections and maintenance of their exhibiting and storage areas, as well as for research and daily expenditures, and not for particular long-term objectives orientated towards, e.g., display, interpretation and communication with the public.

Unfortunately, in the present financial circumstances, the annual grant allocated to the universities is reduced by 50 per cent. This development has resulted in non-existent purchase grants. Additional funding from other sources (other public authorities, E.U. funds) is unlikely to be forthcoming.

Thus, different academic authorities stress the need for income streams to derive from different functions of university museums and collections, while others focus on more practical aspects, namely management, administration and autonomy. To a number of members of the academic community the potential of university museums and collections to raise revenue from trading activities, such as retail sales, venue hire, teaching and international consultancy, is increasingly vital to the university museums' business models and the answer to their problems. However, in many cases university regulations prohibit or hinder fundraising from private sources or services. So, the government should probably seek views on proposed improvements to the funding arrangements and methods to permit university museums and collections to raise funds from various sources.

Developments

Despite the problems, recent developments in a number of UoA museums suggest a considerable degree of progress in many areas of their care, and demonstrate a shift towards the promotion of their public image within the University itself, as well as towards the general public.

In particular, in the 1980s and 1990s significant changes in museum practice were accomplished. The shift of museum philosophy towards the idea of museums as an educational tool in the service of the public could not leave UoA museums unaffected. In the past, university museums and collections demonstrated considerable efforts towards the promotion of their public image. In the course of their attempts to attract a wider public, especially groups of schoolchildren, many UoA museums renovated their galleries, provided organised tours to the wider public, educational programmes for children, and information material such as brochures and cards. As a result, there has been a rise in the number of school visits. At the same time, it is worth mentioning that many museums have extended their opening hours.

Another point worth mentioning is the fact that many university museums

have designed websites which allow the visitor to navigate through a menu a large amount of information, concerning their concept, history, research and educational activities, as well as other interesting subjects. These websites have been very successful in achieving their goal—to promote the acquaintance of the public with UoA museums. In terms of their technical standards, it is true that some lack a sophisticated interface but, on the other hand, the efficient and effective information counter-balances the absence of a flashy design and the variety of images and interaction styles.⁸ In order to communicate the material of the collections to a wider public, UoA initiated a project of digitisation from 1999 to 2001, funded primarily through national resources. The project, called the 'Virtual Museum',⁹ was coordinated by the UoA Department of Computer Sciences. It aimed at creating a virtual environment where visitors of the participating museums would be able to view the exhibits either through the Internet or locally. When the project was initiated, there was no comprehensive overview of the collections in existence among the nine university museums participating in it. Unfortunately, the project did not go on to encompass all university collections in a digital content.¹⁰

The most important initiative by the UoA for promoting its own heritage was the formation of a standing Committee for UoA museums in 1995. The aims of the Committee were to improve the quality of UoA museums, compile an inventory of existing university collections, deploy the necessary policy for the improvement of the collections, raise awareness of the importance and value of university heritage among the academic community and the public, promote collaboration and exchange of ideas between museums and collections within the UoA and, last but not least, to act as a representative agent between the administration of university museums and the academic community and the top-level administration of our institution. However, the aforementioned Committee is currently not active.

In this climate, the last two important initiatives were the establishment in 2003 of a Master's Degree in Museum Studies and of a Research Centre of Museum Studies in 2007.

The aim of the post-graduate course is to convey to future museologists the theory and practice of museum work and in particular the value of interdisciplinarity and teamwork. The interdisciplinary nature of the programme is reflected first of all in the academic members involved in its implementation, the Department of History and Archaeology and the Department of Geology and Geoen-

⁸ We have to stress that few museums provide an English version in their websites.

⁹ In order to explore the project, visit the following address <http://www.museums.di.uoa.gr/>

¹⁰ Participants in the 'Virtual Reality' project included the Mineralogy-Petrology Museum, the Museum of Archaeology and History of Art, the Museum of Criminology, the Athens University History Museum, the Botanical Museum, the Museum of Geology and Paleontology, the Museum of Zoology, the Museum of Hygiene, and the Museum of Anthropology.

vironment of UoA, in collaboration with the Department of Conservation of Antiquities and Works of Art of the Technological Educational Institute of Athens. A crucial element in the introduction of such a post-graduate course within the UoA is the fact that the stimulus behind the work being done is the University's own legacy. In this regard, a number of students have developed essays and doctoral theses¹¹ based on UoA museums and collections, while others have used the latter for short-term practical internships as well as seminars. However, despite the willingness of the students to explore and research our rich university heritage, only a small number of UoA museums were moved to incorporate any of the actions suggested by the students.

Similarly, the Research Centre of Museum Studies was established in 2007 in response to the growing need for research and rapid distribution, circulation and delivery of cultural experience. Apart from the focus on academic subjects revolving around the discipline of museology, the aim of the Research Centre is to conduct research projects in a variety of ways, including applying for research grants, direct commissioning and responding to invitations by specific institutions and agencies.

The Research Centre of Museum Studies benefits from its position within the National and Kapodistrian University of Athens by bringing together the members of its research teams from the existing staff of UoA departments, which meet the specific needs and requirements of each project. Unfortunately, the 2009 cuts in the annual funding seriously hindered the process of its development. Perhaps it is important to identify new sources of support as well as people interested in joint research efforts.

Suggestions

The level of underfunding is such that universities do not provide enough resources to help university museums and collections preserve and promote university heritage, according to the changing requirements of society. As a result, a large proportion of material evidence of scientific research and teaching remains unknown or is lost.

However, university museums and collections can improve their status and effectiveness. The first important step is the establishment of a long-term strategy that could be the answer to the problems they are facing. This potential can be achieved through the following tentative steps:

- merge collections;
- invest in personnel training;
- modify the role of the director;

¹¹ Dermitzaki, 'The Museum of the Historical and Ethnological Society of Greece'; Doxanaki, 'The Archaeological Museums of Athens and their Communication with the Public'.

- management with flexibility;
- set up an overall framework of museum policy by the host institution;
- plan for what needs to be done and estimate the resources required;
- promote partnerships arrangements;
- find efficient and selective funding mechanisms.

In addition to the above, UoA should orient itself towards the reinforcement of a Museum Committee, in order for the latter to become fully active, so as to develop its own forward plans, to measure the problems and the effectiveness of the museums.

Finally, UoA should consider the establishment of an independent agent¹² within the academic community, responsible for safeguarding and promoting university museums and collections of all disciplines.

Undoubtedly, strategic investment in university museums offers significant academic and societal benefits: inspiring and teaching students, disseminating their knowledge to a wider audience and promoting involvement with the community, maintaining their professional standards, cultivating international relationships, as well as many opportunities for research impact.¹³

Among other major issues tackled by the Universeum 2015 Conference in Athens was the growing awareness of, and attention to, the cultural role of universities in communities and in society as part of the national and international focus on the universities' so-called third mission. It is clear that emphasis should be placed towards the promotion and safeguarding of the university heritage as part of the cultural mission of European universities. In light of this prospect, the setting up of a Committee within the framework of Universeum Network, responsible for addressing the issues and referring them to the Department of Education and Culture of the European Commission, would be of great benefit. Such an initiative has the advantage of direct correspondence with the Department of Education and Culture of the European Commission, which could be translated not only into financial support of university museums by the EU, but also into setting forth commitments to specific actions for achieving that role for European universities and for making the right decisions for that heritage.

I am confident that during the Conference we have all reached a higher level of understanding and awareness for the very topical issues connected to the present and future of university museums and collections. In addition, one important message of the Conference is that achieving sustainable development for university heritage is a shared mission for all. This in itself would, in my view, constitute a very important outcome.

¹² Of a 'cultural centre' as described by de Clercq, 'Keeping for the Future'.

¹³ See <http://universitymuseumsgroup.org/advocacy/fundraising/>

Figure 1

Interior of the Museum of Paleontology and Geology in 1927,
National and Kapodistrian University of Athens



Source and copyright: National and Kapodistrian University of Athens, Historical Archive. Image taken from the special album entitled 'The University of Athens with its branches', vol. 3, published by National and Kapodistrian University of Athens in 1923.

Figure 2

Exhibits of the Museum of Paleontology and Geology



Source and copyright: National and Kapodistrian University of Athens, Historical Archive. Image taken from the special album entitled 'The University of Athens with its branches', vol. 3, published by National and Kapodistrian University of Athens in 1923.

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BIO

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National Law and Policy Concerning University Museums: The Case of University Museums of the National and Kapodistrian University of Athens, Greece

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The connection between museums and universities stretches back to the origins of both institutions. Primarily, university museums and collections were established to support research and teaching. Today, however, as research and teaching needs are changing, university museums and collections do not play the same role as before. Many have become less relevant to the general academic programme and research, significant material though they may contain.¹ Examining the current situation worldwide, it is evident that many difficulties lie in their path and there are common problems and weaknesses across the sector.²

¹ Many European governments have pressurised universities into reconsidering their priorities in a market-driven academic world by restructuring their curricula, increasing the number of their students, as well as managing their limited resources more effectively. As a result of these pressures—especially on the financial level, since a large number of universities are dependent on the central government for their resources—many university museums and collections have been gradually neglected. Foster, 'A Developing Sense of Crisis'; Boylan, 'European Cooperation in the Protection and Promotion of the University Heritage'.

² A number of articles, books and reports provide a coherent view of the common problems and challenges that university museums are facing. For example, see *Museum International*, 52 (2 and 3), 2000; Kelly, *Managing University Museums*; Bremer and Wegener, *Alligators and Astrolabes*; Lourenço,

One major issue worth mentioning is the fact that in most countries there is no specific legislative framework related to university heritage. The same applies for Greece.

In this paper, we will present a short history of national law and policy concerning university museums, focused on the museums of the National and Kapodistrian University of Athens (UoA). We will also discuss the policy of university museums in the same institution and we will give a general outline concerning their operation, administration and financial structure. The aim of this paper is to provide an insight into their problems concerning policy making. Finally, the discussion includes some potential measures that could be considered with a view to improving the operation of university museums and collections.

Universities in Greece, and specifically the UoA, suffer constant change due to internal and external socio-economic pressures, as well as to reforms in higher education. The effect of all these pressures is poor funding and management, issues related to the operation of its approximately 20 museums and collections.³ Specifically, since 2009 the special grant (to the tune of €5,000) allocated to their operation through the university annual budget was cut. This development was followed by a decrease in staff numbers, as well as a rise in the number of problems connected to the housing and proper care of collections. Apart from severe financial trouble, other challenges university museums in Greece are facing can be summarised as follows: organisational and administrative weaknesses, unclear policy, alienation from the university's long-term strategic planning and, finally, lack of recognition on the part of the wider Greek public.⁴

Despite the fact that UoA Museums share the same problems, there are also significant deviations from the pattern. First of all, museums differ in the particular field of scholarship each one represents.⁵ From an administrative and financial point of view, the dissimilarities are also substantial, as a number of the museums in question belong to a department, others to faculties and others are placed un-

'Are University Museums and Collections Still Meaningful?'; UMAC's Proceedings Sydney & Canberra 2002, 'Distinct Character of University Museums and Collections'; Lourenço, 'Between Two Worlds'.

³ For more information about the history of the UoA museums, see Lavas et. al., *Cultural Management of the University Museums of University of Athens*; Dermitzakis and Triantafyllou, 'The University Museum: Character and Function'; Gavroglou, Karamanolakis and Barkoula, *The University of Athens (1837–1937)*.

⁴ Dermitzaki, 'The Educational Role of University Museums and Collections'.

⁵ The museums of the National and Kapodistrian University of Athens are the following: 1) Museum of Anatomy, 2) Museum of Anthropology, 3) Museum of Archaeology and History of Art, 4) Athens University History Museum, 5) Museum of Biblical and Christian Archaeology, 6) Botanical Garden, 7) Botanical Museum, 8) Criminology Museum, 9) Museum of Dental School, 10) Museum of Education, 11) Museum of George Papanicolaou, 12) Historical Archive, 13) Museum of Mineralogy and Petrology, 14) Moulage Museum of Andreas Syngros Hospital, 15) Museum of Paleontology and Geology, 16) Museum of Pharmacology, 17) Museum of Physical Sciences and Technology, 18) Museum of Zoology, 19) Museum of Hygiene, 20) Folklore Collection.

der the rector. Many (65 per cent) are open to the public, yet others (35 per cent) are closed. Some of the UoA Museums are more dynamic and stable, trying to secure external funding and establish bridges with society (see Table 1). On the other hand, there are museums that are more affected by this 'crisis' since they are threatened with closure and their collections are packed in boxes.⁶ This diversity in the operation of UoA museums shows the absence of a coherent policy and uniform standards. We could argue that many of the challenges mentioned here stem from the current legislative and policy framework.

Examining the history of legislation documents archived in the UoA, we can trace two important landmarks. The first dates back to the temporary Internal Body of the University in 1836,⁷ which acknowledges the need for establishing university collections that would assist in its mission. The second landmark is the ordinances in the Internal Body of 1932, when the first seven university museums were established.⁸

Far more recent is the 1999 Ministerial Decree concerning the operation of UoA museums. This decree provides more details in comparison to the aforementioned University ordinances with regard to the mission and purpose of UoA museums. Key founding principles are a) teaching purposes, b) the support of research activities, c) the encouragement of partnerships, and d) the dissemination of knowledge.⁹ We have to stress that this legislation concerns exclusively the operation of Athens University Museums and, even though in theory it provides them with a sense of purpose and identity, in practice no formal provision is made in order to ensure that these museums may become places dedicated to providing learning and meaningful experiences to a wide range of visitors from different backgrounds, as opposed to university students and schoolchildren.

However, an innovation introduced by UoA authorities during the academic year 1997–98 regarding the way university museums and collections interact with each other was the establishment of a Special Committee titled 'University Museums Committee'. This informal institution¹⁰ had an umbrella structure that

⁶ For example, the Museum of Hygiene and the Museum of Physical Science and Technology anticipate this problem.

⁷ The first temporary Internal Body of the University in 1836 clearly states that, "The University intends to gather all necessary scientific collections and other items that are useful to its function. All public collections, the catalogue of the School of Medicine, and the collections of the Societies of Medicine and Natural History shall be put at the University's disposal. Furthermore, a separate building suitable for this purpose shall be constructed without delay" ('Decree for the Establishment of the University').

⁸ The first seven museums that were established in the National and Kapodistrian University of Athens were the Museum of Anthropology, the Museum of Zoology, the Museum of Mineralogy and Petrology, the Museum of Paleontology and Geology, the Botanical Museum, the Museum of Hygiene, and the Criminology Museum (Act no 5343 of 1932).

⁹ Minister of Education and Religious Affairs.

¹⁰ During that period (1997–98), the Rector of UOA, Konstantinos Demopoulos took the initiative to

was felt to be the solution to the problems of the UoA museums by setting up a long-term communication link between the latter and the University authorities, as well as by offering vision, experiences and recommendations for improving the museums' status. Although the Committee developed actions,¹¹ unfortunately its informal character did not allow it to introduce important changes.

With regard to the overall governmental agenda in Greece concerning university museums and collections, it is interesting to note the absence (until the year 2000) of any legal provision for the operation of museums within higher education institutions at a national level. Furthermore, no formal scheme,¹² similar to the registration scheme for museums introduced in a number of European countries, has been launched by the government or the university itself that would address issues of accountability and evaluation, relevant to the current situation of UoA museums and collections. Therefore, a substantial and coherent body of information concerning the role of museums within the UoA does not exist.

The beginning of the 21st century was marked by a number of developments in the sector of university museums in Greece. First, the Education Act of 2000¹³ included for the first time the term "museum" as a separate unit of the university and equated its operation with that of university laboratories, clinics and libraries. This equation shows that research and teaching in university museums are highly valued by the state, as their operation does not differ from other university structures which focus on those activities.¹⁴ This Act triggered the official establishment of a number of UoA museums deriving from existing collections, which began operating within the earlier-mentioned legal framework.¹⁵ Under the same

create this Committee, which was never officially established.

¹¹ The Committee of UoA Museums organised various conferences on museums and issued a periodical publication titled *The Museum*, the first issue of which was devoted to the university museums of the National and Kapodistrian University of Athens. See *The Museum*, 1, 2003.

¹² Many European countries have enacted special legislation designed to implement a system of museum certification. For example, in the UK a formal scheme concerning the museums is Registration Scheme. Registration is a minimum standards scheme which, through its wide acceptance, provides a recognised national minimum standard for museums, enabling them to demonstrate a shared ethical basis and common framework. On a practical level, the Registration Scheme ensures that registered museums are eligible for grant aid and promotes them to funding agencies as institutions worthy of support. The first piece of legislation in Greece that called for the introduction of a certification system similar to that of the UK for non-state museums was Act no 2557 of 1997; however, its provisions were rather general and vague. After that, it was the Act no 2385 of 2011 that currently regulates in an analytical fashion the specifications that should apply when a public museum is established, as well as the recognition of non-state museums and the criteria to which they should conform. See Museums and Galleries Commission, 'Registration Scheme for Museums and Galleries in the United Kingdom'.

¹³ Act no 2817 of 2000.

¹⁴ However, the Act failed to acknowledge the third mission of university museums, which is to deliver public service in a broader spectrum.

¹⁵ See, for example, the Internal Body of the Museum of Geology and Paleontology which was es-

legal framework, university museums were also established in other Greek academic institutions.¹⁶ Second, the subsequent law for higher education of 2011,¹⁷ which is currently in force, prescribes that the Internal Body of each University now regulates issues of university museums and collections. Finally, another major factor impacting university collections and museums was the creation of the Greek University Museums and Collections (UMAC) Working Group in 2004.

The provisions of the 2011 law for higher education undoubtedly reinforce the self-governing of academic institutions by allowing the latter to regulate the functioning of their collections and museums. That being said, interesting remarks may be made on the draft of the new Body of UoA,¹⁸ since for the first time there is a provision for the creation of a Formal Centralised Structure responsible for the coordination of university museums and reporting directly to the rector. The mission of this Body is to promote the overall recognition of museums; however, it has not yet been applied.

From the issues presented in this paper, it becomes evident that Greece is not well prepared, in terms of legislation, to protect and promote university heritage; as a result, the performance of UoA museums depends to a large extent on the vision and initiatives of individuals.

A review on the developments in the body of laws related to university museums and collections in Greece reveals the following remarks:

- University museums and collections belong to the jurisdiction of the Ministry of Education, where, however, there is no permanent structure devoted to their coordination and supervision. On the other hand, public museums are regulated and funded by the Ministry of Culture. This division shows that university museums oscillate between two realms: the world of museums and the world of academia.
- A review of the introduction and implementation of cultural legislation and policies over time suggests that there is no law enacted by the Greek state that is exclusively dedicated to university heritage.
- Finally, there is no suggestion for the implementation of a common scheme with a view to facilitating specific aspects of administration, management, finance and access to UoA museums and collections. The establishment of the New Body of the UoA intends to deal with core issues, which include most importantly those of monitoring the current situation and promoting common policies and standard procedure within UoA museums, but a final decision still remains to be taken.

established in 2002. Its establishment was based on Act no 2817 of 2000.

¹⁶ See, for example, the Museum of Science and Technology of the University of Patras which was established in 2001, based on Act no 2817 of 2000.

¹⁷ Act no 4009 of 2011.

¹⁸ *Draft of the Body of the National and Kapodistrian University of Athens.*

It is essential for UoA museums to resolve the issues in order to perform their role, both as public and as university institutions. Finding the key to this dual role requires a collaborative effort among the state, the universities and the museum sector for a more effective promotion of university heritage. Primarily, a coherent body of information concerning the current status of university museums is needed in order for long-term strategies to be planned. Second, UoA museums can benefit from a centralised structure responsible for their coordination. This potential will make sure university museums speak in a single voice and will increase the possibility of external funding. The structure will be of public benefit as well, as it can provide information, coordinate bookings and events, and handle public relations, etc.

Finally, at the national governmental level, the state should consider encouraging the establishment of a joint body with a view to facilitate: a) the monitoring of the current situation of university museums and collections in Greece, b) the exchange of information on university heritage, and c) the promotion of common policies and standard procedures.

Table 1
Funding of UoA Museums

Source of Funding	%
Entrance Fees	47
UoA Annual Budget	3
No Funding	46
Other	4

Note: The statistics represent 15 out of 20 UoA museums that answered the specific question, after personal communication with their directors in May 2015.

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The Historical Archive of the National and Kapodistrian University of Athens

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On 3rd May 1837 the first Greek university was inaugurated with a public ceremony in Athens, still a small capital city. Founded only 7 years after the establishment of the Greek state, the University of Athens was the first single institution of higher education in Greece until 1926, when the University of Thessaloniki was established. It was also the first one in the Balkans and the Eastern Mediterranean region.¹

The University of Athens was modelled on German-speaking universities. It was named Ottonian in honour of Otto, son of Ludwig the First, king of Bavaria, who until 1862 was also king of Greece.² In 1862 it was renamed 'The National University' and in 1911 it took its final name, 'National and Kapodistrian University of Athens', to honour Ioannis Kapodistrias, the first governor of the independent state.

The University was housed in the residence of the architects Stamatios Kleanthis and Eduard Schaubert, on the north slope of the Acropolis. In 1842, the administrative services and the Faculties were transferred to what is currently known

¹ For the history of higher education in Greece and the University of Athens, see Papapanos, *Χρονικό - Ιστορία της Ανωτάτης μας Εκπαιδεύσεως* (Historical Chronicle of our Highest Education). See also, Lappas, *Πανεπιστήμιο και φοιτητές στην Ελλάδα κατά τον 19ο αιώνα* (University and Students in Greece During the 19th century) and Gavroglou, Karamanolakis and Barkoula, *Ιστορία του Πανεπιστημίου Αθηνών 1837–1937* (The University of Athens and its History, 1837–1937).

² For an overview of the recent Greek history see, Clogg, *A Concise History of Greece*.

as the ‘main building’ of the University. The building in Panepistimiou Street was designed by Hans Christian Hansen and constructed between 1839 and 1860, with funds provided by various philhellenes and Greeks living abroad.

The University of Athens consisted of four faculties: theology, law, medicine and arts (which included applied sciences and mathematics). In 1904 the faculty of arts was split into two separate faculties: that of arts and that of sciences, the latter consisting of the departments of physics and mathematics and the school of pharmacy.

The University occupied a dominant position in public life. Greek society welcomed it warmly and invested it with great symbolic authority. Early on, public opinion focused its interest on its founding and function, as this was reflected in the columns of the daily and periodical press, in the frequent news reports and articles pertaining to university studies and events taking place within the institution. Newspapers and magazines published rectors’ reports, official speeches and independent lectures, receiving positive and negative comments and generating discussions and even controversies.

The University was founded with three main objectives: a) to educate people who eventually would be employed in the public sector, b) to provide an educational institution for Greeks living beyond the borders of the new state, and c) to secure the important role Greece had to play at the crossroads of European and Eastern culture. The University emphasised the unity of Hellenism in both time and space.

To be more specific, the University took charge of the education of the country’s scientific-educational staff that served in the public administration and the private sector. It provided Greek society with qualified professionals in medicine, in sciences, in law and economics, in archaeology and in education. At the same time, it constituted, at least until the mid-war period, the primary site of generation and dissemination of scientific discourse. It played an important role in defining, constructing and individualising subject curricula and it contributed in the most decisive manner, more than any other educational or research institution, to the formation of academic disciplines in Greece. Through its bodies that were elected by the professors’ body with the consent of the political authorities, the University claimed a place in public life and participated in political and social processes. It is indicative of the reputation of the University that the institution had the privilege of returning a Deputy, elected by the professors, to the Greek Parliament—a privilege it retained from 1844 until 1862.

The symbolic authority bestowed on the University of Athens from the very first years of its operation pertained not only to its educational mission, but also to its usefulness in serving the wider objectives of the Greek Kingdom in the re-

gional geopolitical setting. By serving the Great Idea³—a doctrine denoting the territorial aspirations of the newly formed state—the University largely assumed responsibility for the cultural diffusion of Hellenism, particularly in the areas under Ottoman rule. As its first Rector Constantine Schinas emphasised during the opening ceremony, “the Greek University situated between West and East is destined to receive the seeds of wisdom from the West and having forested them itself through a unique and productive development, to hand them over to neighbouring East, young and fruitful”.⁴

The connection between the Great Idea in its diverse meanings and the cultural propagation of Hellenism primarily in the Ottoman Empire territory lent a special role to the Ottonian University—that of a body commissioned to produce knowledge and develop professional-scientific personnel. Its mission as well as that of university teaching was to go beyond the teaching halls and disseminate its message to the broader area of ‘the Greeks’ East’, beyond the strict state borders. In this context, language, religion and particularly history were the determinatively homogenising elements linking the subjects of the Hellenic kingdom with their ‘irredentist brethren’ in the Ottoman Empire.

The University was considered the key to the revival of ancient civilisation. While the emphasis on classical antiquity was a major feature of the curriculum of the University, in the last quarter of the 19th century there was a wider shift to specialisation and vocational training associated with the expansion of scientific subject matter and an increasing number of students and faculty staff. At the same time, a series of changes took place. The scientific credentials of faculty members were reinforced through their election by their peers in the Schools and the abolition of their appointment by the government. The introduction of the doctoral thesis ensured the renewal of faculty from within the University. Tutorials and laboratory classes were integrated into the curriculum in combination with the creation of university labs, hospitals and museums. Finally, amphitheatre audiences gradually changed from freely attending people eager for knowledge into small groups of students with a view to vocational specialisation.

The connection of the University with science and its practices was reflected in the establishment of annexes, which healed significant shortcomings of the state and actively contributed to the formation of its infrastructure.

Interestingly, in 1842, the Public Library merged with the University’s library and it was housed together with its current collection at the building of Otto’s University, which also housed the Numismatic Museum. Thanks to a continuous supply of bequests and donations—indicating the wide social acceptance of the University as a national cultural institution—it gained remarkable economic power; an important part of the latter was used in order to complete the University

³ See, Skopetea, *Το ‘Πρότυπο Βασίλειο’ και η Μεγάλη Ιδέα* (The ‘Model Kingdom’ and the Great Idea).

⁴ See Dimaras, *Εν Αθήναις τη 3η Μαΐου 1837* (In Athens on May 3, 1837).

building (Anatomy lab, University Club, etc).

The University offered various services, becoming the forerunner of public services, many of which were established in the 20th century during the interwar period and later, such as the National Weather Service, the Seismological Institute, the Chemical State Laboratory. Particularly in the second half of the 19th century, vital functions such as the precise measurement of time, the introduction of standardisation processes for many products, healthcare in hospitals under the supervision of professors of the Medical School expanded the scientific and educational leadership of the institution. Experiments, autopsies, research, laboratory works, bibliographic information, the preparation of individual and collective work were established as essential elements of science education. The main objective was the systematic investigation, recording and categorisation of existing knowledge, but also the creation of new knowledge based on international scientific developments. Furthermore, the final goal was the integration of this production into the international academic community and the recognition of the achievements of Greek scientists. New terms such as 'scientific research', 'study' and less often 'exploration', reflected the processes of generating new knowledge in order to meet social needs.

These functions of the University had a common ground: the enlargement of the area of jurisdiction of science, the foundation of institutions attempting to meet social needs through applied sciences, the implementation of solutions to address various social needs. The many activities of the University's laboratories and other institutions were a conscious effort to establish a culture of precision, which was necessary for the functioning of a modern state. Reliable measurements, the accuracy of time, the safe chemical and medical tests not only ensured scientific ethics, but also legitimised in the society the belief that the 'modern' and 'progressive' way of life could be achieved by the adoption of a culture of precision.

These functions were in a dialogue with the general ideological and political programme of the University. The emphasis on the training of students created Greek scientists on par with Europeans, standardisation rules supported the national industry and agriculture, addressing their needs and thus ensuring better living conditions for the Greeks.

The main goal of the University was what we would call 'national progress'. A progress closely connected with the journey of the Greek nation through time, with its land expansion and its internal development. The main aim was to follow the other European states. In this process, the Europeanisation of the country was of crucial importance, while the University emerged as the main national academic institution. By promoting sciences in Greece, the University was promoting the full integration of the country into the community of the European states. The discourse regarding this integration was based on two foundations: on the one hand, on the fact that the Greek nation-state was the child and the heir of a glo-

rious historical past, with an emphasis on antiquity, which was also the common matrix of the European civilisation. On the other hand, there were the scientific achievements that institutions such as the University could support and promote. The coexistence of these two different approaches was not always harmonious. The relationship between a demand for modernisation, technological and scientific development of the country and the simultaneous articulation of a discourse that insisted on the value of the glorified national past has been a fascinating and vital field for study, and one of our main concerns even today.

Overall, only a few institutions have had the influence that the University of Athens had on the Greek state, on the social organisation, the formation of national ideology and the development of sciences, particularly during the first century of its operation. The University of Athens undertook a number of roles, which have changed over time but have always played a crucial role in the Greek society. Today it is the largest state institution of higher learning in Greece and among the largest universities in Europe.

The Historical Archive of National and Kapodistrian University of Athens

The Archive was founded in 1991 as an administrative and research department of the University. Today it is housed in a building of the interwar period, owned by the University, located in the centre of Athens, at 45 Skoufa Street.

Until 1991, the University Archive had been scattered in many buildings that the University used during its gradual expansion after its founding in 1837. The first task for the new institution was to locate the historical records. Materials from older University Schools, Faculties and Administrative bodies were collected. In this collection, 19th century documents coexisted, lacking any archival coherence, with very recent records. Through exhaustive efforts, the archival series were restored. The archival collections are organised in series of bound volumes and folders with unbound records. The material is organised so that it fulfils two criteria: 1) historical—to keep the structure that the archive had during its formation, 2) practical—to be able to provide reliable answers to research and administrative enquiries.

The Archive of the University of Athens is considered as one of the most complete public archives in Greece. Its multifarious archival collection consists of more than 2,000,000 items. A lot of written evidence from the University's history has been classified. This material constitutes a broad research infrastructure for the study of the history of the University of Athens, but also of Greek history in general. The researcher can find documents on the history of the largest and oldest university in the country, on the educational system and sciences, and on the social, economic, scientific, institutional and cultural history of modern Greece. The archival data is an invaluable source for the composition of doctoral theses as well as research on the history of the Schools, the University and the society in

general. The core archival collections are organised as follows: a) the archives kept by the secretariats of the Faculties (Theology, Law, Medicine, Philosophy, Natural Sciences) and the archives kept by administrative centres (Senate, Protocol, Public Relations, etc.); b) Personal Archives of the teaching staff of the University of Athens; c) photographic, audio and cinematographic material from cultural events organised by the University; d) collection of portraits of University professors. Moreover, it contains archives from institutions founded by the University (hospitals, student club, secondary schools, etc.).

There is also a non-lending specialised library for the research purposes of the Historical Archive. It consists of publications of the University from its foundation until today, scientific works that were submitted to the institution, bibliography on the History of Universities, the History and Sociology of Education, etc.

The Historical Archive collects and classifies archival records for the years 1837 to 1970, digitises the collections and creates digital catalogues. Its main objective is to make this material freely accessible to researchers, readers and the general public. For this purpose, there is a reading room, where one can study the archival and printed collections, and a central hall for seminars and events. Apart from the researchers, the institution accommodates readers interested in obtaining their personal or their ancestors' data from the archive.

One can distinguish three ways in which the Archive operates. The first focuses on continuous and constant concern for saving and safeguarding the archival material, the one that was produced before and is already considered archival, and the material currently produced which will become archival in the future. The preservation of printed material, visual and archival collections is one of the main activities of the Historical Archive. As the University is a living organism and there is a continuous flow and production of new material, the need for recording it is very important. Particular attention is paid to the enrichment of the archive of the University of Athens with new material not incorporated into the collections yet (e.g., personal archives of teaching staff, documentation for the student movement, etc.) in the original or in digital form. For this reason, the Archive collaborates with institutions, where relevant collections exist. In this context, the Archive has also taken the initiative to create a network connecting the Greek University Archives. There have already been two workshops on this subject.

The Historical Archive has also been focusing on the digitisation and electronic management of its massive archival material, aiming to preserve information from the old paper archives, in order to provide historical research with the advantages of technology. Until today the Historical Archive has digitised nearly 750,000 documents. In the context of this project, documents of various kinds and thematology have been digitised: documents, books, pamphlets, manuscripts and photographs, along with a detailed description, organisation and documentation of the material. The digital images of the documents have been processed so that they can be viewed on PC screens and be printed in good quality. The University Com-

puter Centre created an electronic database (the Pergamos Digital Library, <http://pergamos.lib.uoa.gr>), that includes a brief catalogue of the digitised records and an expanded catalogue where the documentation is stored. This information is freely available online.

The institutional function of the Historical Archive is also served by the research and teaching activities. Since its foundation the Historical Archive has initiated activities that promote historical awareness and serve the documentation of the history of universities. These activities have transformed the Historical Archive into a main source of academic reference and have contributed to the creation of an open space for scholarly and public dialogue. In 2014 the Archive published a volume dedicated to the first century of the University of Athens, leveraging the rich documentation provided for this. It has also completed research on the history of Law and Physics Schools, while research on the remaining Schools is ongoing. The institution organises general research programmes on Modern Greek and European history. It also organises postgraduate seminars, it collaborates with European universities and funds related research programmes. Finally, it contributes to the organisation and classification of records from other Greek universities, organisations and corporations.

During the 25 years of its operation, the Archive has accomplished an important and complex task, thanks to the dedication and hard work of the teaching staff who served in its Board and the scientific and administrative personnel. Today in difficult times, with much more limited means than in the past, it continues with two main missions: to preserve a very important archival material and make it available to research.

Figure 1

The main building of the University of Athens (Propylaia) in the interwar period



Figure 2

The building of the Historical Archive



Figure 3

An event at the Historical Archive's seminar hall.



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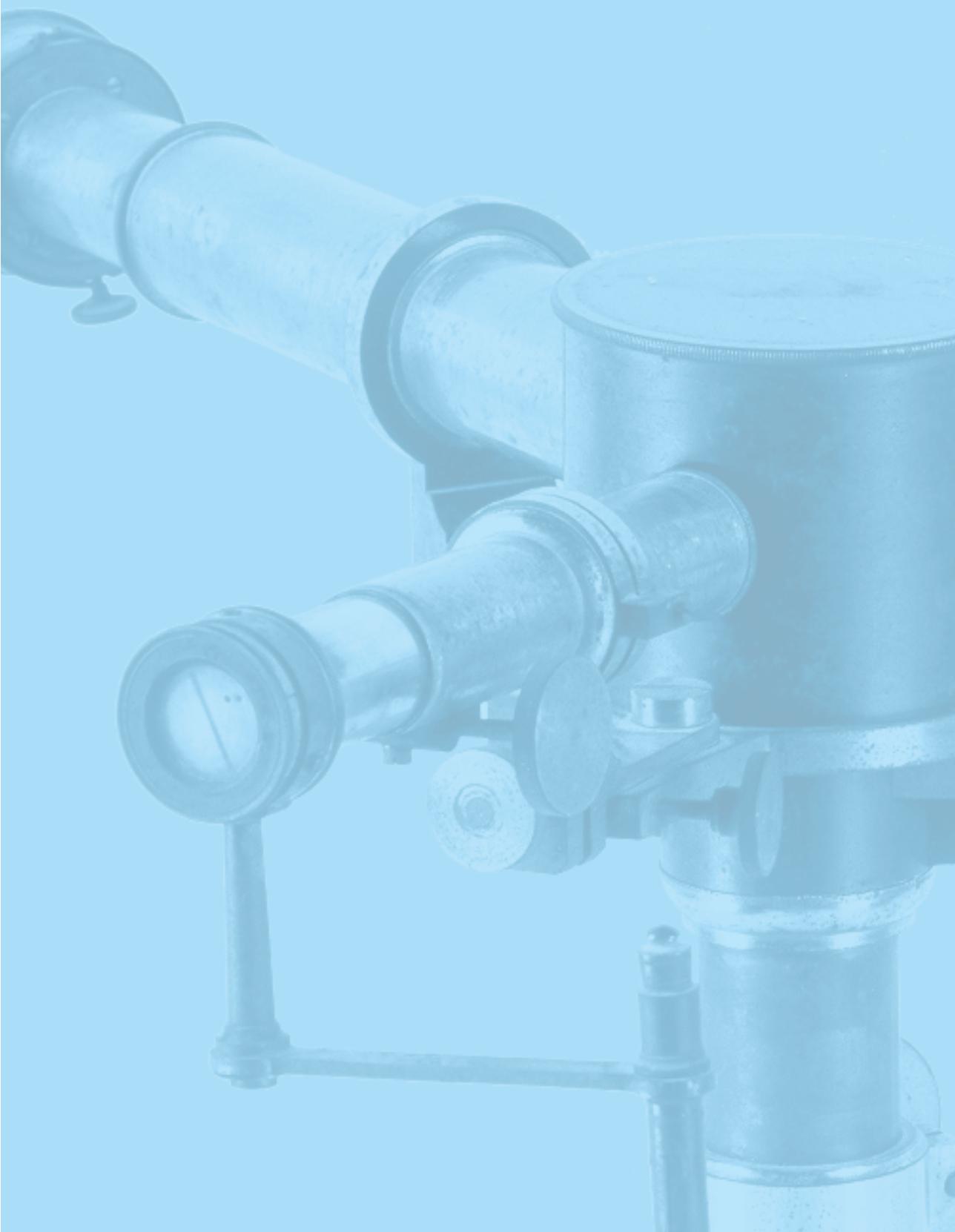
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BIO

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Athens University Museum of Natural Sciences and Technology: The Collections and History of the Building

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Historical Background

The Museum of Natural Sciences and Technology presents a treasured collection of more than 10,000 scientific instruments. To preserve these collections of the Natural Sciences Schools, the Museum's Committee of the National and Kapodistrian University of Athens (NKUA) has regarded these invaluable collections as 'unique' and 'rare'. To preserve and display the collection the University Council approved in June 1996 the foundation of a Museum of Natural Sciences and Technology, the first museum of this kind in Greece. The Museum was hosted under the roof of the Old Chemistry Laboratory of the NKUA located in 104 Solonos Street (Figure 1). The building's foundation ceremony was held on June 1887 and in the foundations a glass cylinder was placed containing a gold Greek coin and a membrane with the writing: "Dedicated to scientific work, which should be further dedicated to the country".¹

¹ Original text: "ἀφιερῶνται τῇ ἐπιστημονικῇ ἐργασίᾳ ἢ δε τῇ πατρίδι"

Figure 1

The Old Chemistry Laboratory in 1917 (1)



The 'Old Chemistry' building was built according to the plans of the German architect Ernst Ziller with the approval of the famous chemist August Wilhelm von Hofmann. This was the first university building in Greece for the natural sciences education. The great amphitheatre of the Museum was considered a miracle of acoustics and contained the technical infrastructure and materials necessary for experimental demonstrations. This amphitheatre was the first to be built in Greece with reinforced concrete. Many great professors of sciences have taught there, such as the man who founded the Chemistry Laboratory Anastasios Christomanos, the great mathematician Konstantinos Karatheodori who was Einstein's scientific collaborator and pioneer in the organisation of the University of Smyrna. Additionally, George Athanasiadis taught there, the man who started the new Physics Laboratory and, after requests to the German government, secured thousands of natural sciences instruments as part of the 'German Restoration Funds' of the First World War. To the list of those that have taught in the Great Ampitheatre it would be worth adding Arnold Johannes Wilhelm Sommerfeld's partner Dimitrios Hondros, as well as Leonidas Zervas and professor Caesar Alexopoulos.

This building, besides its educative role, gave a roof to:

- The National Chemistry laboratory;
- The General Chemistry Laboratory of the State;
- The National Bureau of Standards;
- The Land Surveying Committee;
- The Sea Scaping Company;
- The Physiodiphic Company;
- The Botanic Museum;
- The Hellenic Astronautical Society;
- The research centre of the international programme 'Nestor' that studies neutrinos in the deep-sea area of Pylos;
- The NKUA Museum of Natural Sciences and Technology.

Installations and instruments

The Museum building originally included its own network of permanent installations for converting electricity to direct current and for manufacturing liquid nitrogen. Supplies of water, electricity and gas were provided to the three amphitheatres and to the laboratory benches. This infrastructural support of the Old Chemistry Laboratory building created a perfect functioning set-up for the Museum of Natural Sciences and Technology. Also, very impressive was the installation of a wireless transmitter, which later became the transmitter of the University Radio Station.

The building of the Museum was also an important place for national and democratic struggles. The infrastructure installations of the building and the Museum collections attracted the interest of the famous physicist and Nobel Prize winner Millikan, who expressed his admiration for the equipment and instruments of the Old Chemistry Laboratory.

In the Museum, one can find apparatuses of the National Bureau of Standards, standard measures, the first X-ray generator in Greece dating back to 1897, the secret transmitters that were used during the German Occupation, a Ramsden machine and thousands of other instruments of physics and chemistry, as well as the archive of Konstantinos Karatheodori and instruments from the University of Smyrna.

The exhibition rooms

The collections of scientific instruments of the Museum were exhibited on the four floors of the building. Many of them, especially the very rare objects, were kept in collectible old showcases made from wood and glass. At the basement and the second floor there were very old benches with marbles, where many ex-

periments on physics were demonstrated and some of which provided hands-on experience for the visitors.

On the second and third floor, there were old benches of wood, where experiments of chemistry were demonstrated. On the special benches in the small amphitheatre and in the great amphitheatre, experiments were demonstrated during teaching.

On the second and third floors, very old wooden hoods for chemical experiments have been preserved.

On the roof of the Museum, there are the antennae of the radar and radio station.

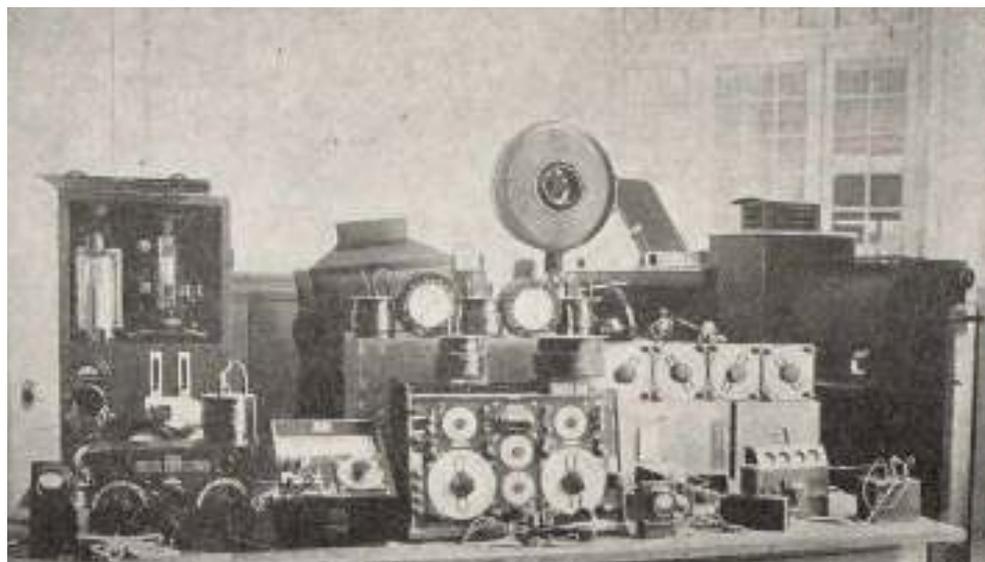
Distribution and description of the collections

At the basement of the Museum were exhibited the following collections of:

- The instruments of the first radio station in Greece that was housed at the Old Chemistry Laboratory building and has a history since 1897. This collection comprises the Siemens radio station, the Telefunken radar, the wireless Marconi, Raytheon, Motorola, Geloso and others, and the generator of the wireless radio of 1919–22, the handmade wireless that operated during the German Occupation and transmitted the message of the Liberation of Greece on 14 October 1944 (Figure 2);

Figure 2

Collection of telegraphy instruments by Telefunken (1)



- Heavy instruments for the study of the elementary particle paths in nuclear physics;
- Dynamometers;
- Electron microscopes, electron lithography and NMR;
- Mass spectrographs and microanalysers;
- X-Ray instruments for research, such as Siemens, Philips, Diano, X-ray examinations, X-ray photography and X-ray irradiation;
- Microtomes, histokinets, cardiographs and the first artificial heart made in Greece (Figure 3);
- Spectrometers, γ -counters, γ -camera and electromagnets;
- Photogrammetric instruments;
- The collection of the old machine shop, the transformers of electric energy and the machine for the production of liquid nitrogen.

Figure 3
First artificial heart made in Greece



Personal photographic collection of Dr Symeonidis

On the first floor, the oldest and rarest instruments and books from the last two centuries were exhibited. The collection includes instruments related to, among others:

- Mechanics;
- Acoustics;
- Electricity;
- Optics, such as the parabolic mirror used for the lighting of the Olympic flame;
- The instruments of the first National Bureau of Standards of Greece;
- The library of the Museum with more than 25,000 books and journals from the last two centuries. We have to emphasise that among these instruments, books and other documents, some of them came from the University of Smyrna;
- In some rooms, the personal furniture of the first professors of the science school were exhibited;
- Instruments for the demonstration experiments performed in the great Museum amphitheatre.

On the second floor were exhibited collections of instruments for experiments on:

- Heat;
- Meteorology;
- Seismology;
- Electronic instruments and their applications;
- Electronic educational circuits;
- Experimental chemistry instrumentation on the original experiment benches;
- Industrial chemistry instruments;
- Logical circuits and calculators;
- Centrifugal machines;
- Glassware and instruments made of glass;
- Cinematography machines and movies;
- Radioactivity counters and radioactive material samples;
- Physical chemistry instruments.

On the third floor were exhibited the collections of:

- Pharmaceutical instruments;
- Instruments for chemical examinations;
- Computers;
- Instruments for physical and chemical applications in medicine;
- Instruments of nuclear technology;
- Separators of amino acids (made by Creg);

- Heaters, ovens and furnaces;
- Chromatographs and
- Balances.

Instruments Manufacturers

German factories have made the greatest number of instruments in this Museum:

- The optical instruments of high precision were manufactured by Hans Heele, Carl Zeiss (Jena), Carl Leiss, R. Fuess, A. Kruss, A. Pfeiffer, and Ascania Werke (Berlin);
- The electrical instruments were manufactured by Siemens and Halske (Berlin), Hartmann and Brown (Frankfurt) and Telefunken;
- The large electric machines came from Allgemeine Electricitäts Gesellschaft (A.E.G.);
- The Linde machine for the production of liquid nitrogen came from the Gesellschaft für Lindes Eismaschinen;
- The educational instruments came from the factories of Max Kohl (Chemnitz), E. Leybold's Nachfolger (Cologne) and A. Pfeiffer;
- The machines of the machine shop came from the factory of Wolf-Jan and Co (Frankfurt), Sagar, Progress, Erichsen and other factories;
- Other manufacturers are Warmbrunn –Quilitz (Berlin), Ph.Pellin (Paris), Pezold, Fritz Köhler (Leipzig), G. Ruhstrat (Göttingen), Fr. Klingelfuss and Co, Alb. Rueprecht and Sohn, E.Ducreter et E.Roger (Paris), W.C. Heraus, Emil Gundelach, Franz Schmidt and Haensch (Berlin), W.M. Gaertner et Co (Chicago), American instruments, Analis, Bausch and Lomb, Bosch, Cambridge Instruments co, Coleman Instruments, Hitachi, Hilger and Watts, Perkin Elmer, Startorius, Varian, Weston USA, Du Mont USA, Unicam Instruments and other.

Donations to the Museum

The Greek Electric Company for Transportation² offered in 1932 the set of transformers at the electric station of the building and the generator and the X-ray tubes made by Siemens. Among the first donors, during the beginning of the first collection of instruments in 1837, were the merchants Buba and Duma from Odessa, the consul of Sweden in Alexandria D' Anastasis, and the consul of Greece in Italy, Pallis. In 1946 the collections of instruments were provided by the Greek Women's University Club, the Hellenic Club of Professional Men from Chica-

² Ηλεκτρική Εταιρεία Μεταφορών

go, Illinois USA, St Nicholas Hellenic Orthodox Church and the Young Ladies Philomusical Society. A bronze plate has been placed on the wall on the first floor with the names of the contributors. In 1897 the Daily Chronicle from London offered the first instrument for radiographs, 2 years after the discovery of X-rays.

Instruments were offered by the Marshall Plan, the UNESCO, the National Hellenic Research Foundation, the National Centre of Physical Research 'Democritus', the General Chemistry Laboratory of the State, the Greek Airways, the School of Electronics 'Kontoravdis'. Chropei, an old pharmaceutical company, offered its old library to the Museum. The mathematician and author E. Spandagos and the first high school of Greece in Nafplio were also donors. These are only some of the donors and benefactors from a long noteworthy catalogue of donations to the Museum from 1838 until now.

Contribution of the Museum collections to education

As our society concentrates more on electronic substitutes for learning experiences, the collections that compose the Museum's heritage acquire a more significant role in the whole educational experience, and particularly constitute a device for aesthetic training. The Museum guided learning through the senses, mainly sight, touch and hearing, and completed it with the help of writing. It communicated with the visitor in an experiential manner, abolishing the borders of language, time and civilisations. With the development of multimedia and computer animation, the presentation of exhibits attracted the interest of the visitor to investigate and learn more about the exhibits and, in general, the spatial area of the Museum. The Museum organised and supported cultural and other social events, planning:

- Lectures for schools, general audience and seminars in the amphitheatre;
- Demonstration and hands-on experiments for the visiting schools;
- More than 50 graduate studies research theses and 400 undergraduate projects;
- Installation of an electronic planetarium with the sun and the sun stigma on a special board at the entrance.

Knowing the historical significance of the building of the Museum, the Ministry of Civilization classified the building itself and all the collections of instruments as historic monuments deserving protection. The Ministry of Environment has also classified the use of this building as a Museum. For the protection and setting up of the Old Chemistry Laboratory as a Museum, the Association of Friends of the Natural Sciences and Technology Museum was founded.

Difficulties

This Museum, trying to rescue and evaluate the collections and the building, faces many difficulties, mainly related to the safety of the collections and the building itself. The last 24 years have been marked by a continuous struggle of the School of Science of the NKUA, the Association of Friends of the Museum, scientific organisations, and all the other institutions of natural sciences, with the co-operation of the Ministry of Civilization and the Ministry of Environment, in order to rescue the building of the Museum and the collections of rare scientific instruments. At the beginning of 2007, restoration work started on the building and all the instruments were transferred to the University campus where the conditions are not safe. As these storage places are not safeguarded, some instruments have been reported missing and even stolen. The only way to protect and save the rest of the collections of the Museum is to transport them back to their physical and historical place, to the building of the Old Chemistry Laboratory in Solonos Street, Athens. To support the continuity of the history, the Ministry of Environment, Physical Planning and Public Works characterised the building, surrounding areas and architectural elements as heritage monument³ to be preserved as is, without adjustments or alterations. The scientific and educational content and the complete collection of exhibits and books of the Old Chemistry Laboratory was also characterised as national heritage⁴ and their preservation and display⁵ inside the Old Chemistry Laboratory building was ordered by the Ministry of Culture. But the long delay of 25 years in the restoration process of the building, as well as the actions of the School of Law to usurp the building, led to partial destruction of the interior and the conversion of approximately half of the building to a library for the School of Law.

The Natural Sciences and Technology Museum, under the roof of the Old Chemistry Laboratory is a well-known landmark of Athens. It is harmonically connected to its scientific history and will continue to be a jewel for the University, a pole of attraction for the city of Athens, as well as a national achievement for Greece.

³ Ministry of Environment, Physical Planning and Public Works, decision nr: 90596/6677/25-10-1994 order of Minister (Φ.Ε.Κ Δ' 1196/17-11-1994)

⁴ Ministry of Culture ΥΠ.ΠΟ/ΔΙΛΑΠ/Γ/54/1330/5-1-1998 order of Minister (Φ.Ε.Κ Β' 47/28-1-1998)

⁵ Ministry of Culture ΥΠ.ΠΟ/ΔΙΛΑΠΟ/Γ/119/1591/5-1-1998

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BIO

Chrysoleon Symeonidis is retired lecturer of Physics in Athens University. He is a Member of the Natural Sciences and Technology Museum's committee; founding member of the Association of Friends of the Natural Sciences and Technology Museum; founding member of the Society of Friends of the Old Chemistry Laboratory building (Natural Sciences and Technology Museum building); and Member of the Committee of Athens University Museums.

The Moulage Museum of ‘Andreas Syggros’ Venereal and Skin Diseases Hospital: A Medico-Cultural Treasure

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Dermatology is based on observation and experience. Currently, technology allows the direct transmission of images and information about skin diseases and dermatologists may gain information and share their experience. However, in the past, paintings, drawings and lithography were the main training tools.

The creation of the first dermatologic moulages is credited to Franz Heinrich Martens (1778–1805), physician and medical illustrator at Jena, Germany, who created about 30 moulages related to venereal diseases.¹ Another important pioneer is Joseph Towne (1806–79), a gifted wax modeller and sculptor, who spent his entire career at Guy’s Hospital in London making casts and models of disease cases as teaching aids for the students. Towne created approximately 560 moulages depicting various skin diseases.² A third physician and wax modeller, Anton Elfinger (1821–64) worked for Ferdinand von Hebra (1816–80), the founder of Vienna School of Dermatology, to cast dermatologic moulages, several of which are still preserved in Vienna.³ These first physician-artists paved the way for the rise of dermato-venereologicmoulage, which was gradually accepted internationally as

¹ Thomas, ‘A Brief History of the Dermatologic Moulage in Europe.’

² Thomas, ‘A Brief History of the Dermatologic Moulage in Europe.’

³ Thomas, ‘A Brief History of the Dermatologic Moulage in Europe.’

a very effective model for teaching medical students until the mid-1960s.⁴

In the second half of the 19th century, thanks to the rising Anatomoclinical School, Paris became the centre of dermato-venereology, developing an important moulding tradition. This tradition started in Hospital Saint Louis, when Professor Charles Lailler (1828–98), head of the new dermatological museum, met the artist Jules Baretta (1834–1923) who was producing papier-maché models of fruits.⁵

Working in Hospital Saint Louis, Baretta created his first moulage in 1865 and by the time he died, he had sculpted about 2,000 wax moulages depicting skin diseases with extraordinary detail. Baretta's astonishing moulages were first presented in 1889, during the 1st International Congress of Dermatology and Syphilology held in Paris. The Congress attendees were impressed by the artistic and scientific impact of the moulage display and, after returning to their countries, they decided to create similar collections in their own departments.⁶

In Athens, the first hospital that specialised in venereal and dermatological disease was established in 1910, as the heritage of a wealthy Greek businessman Andreas Syggros (1830–99), under the supervision of his widow Iphigenia (1842–1921), of the prestigious Mavrokordatos lineage. George Photinos (1876–1958) was appointed the first director and first University Professor for Dermatology and Syphilology. He created a museum of wax models in 1912 aiming at that time to reinforce the education of medical students and dermatologists.⁷

Photinos had been trained in Paris (1902–05), Berlin, London and Vienna. However, his main scientific orientation and inspiration was Paris. He had the dynamic and creative temperament to organise the new hospital in Athens, despite the adverse political situation then reigning in Greece (Greek-Turkish and Balkan Wars).⁸ Photinos was exposed to the moulage technique in Paris. However, Baretta did not reveal the secrets of his technique. Professor George Photinos, in 1907, gave his interpretation of the subject: "Before the mouleurs reach perfection, they have to invest effort and time. They have to learn two things. First, they need to gain at least basic knowledge in dermatology and venereology. Second, they have to invent some kind of method to produce the casts. The consequence was that until recent years no mouleur was willing to share his technique with another for fear of no longer being able to make a living from his art, if someone else learned from him".⁹ In Berlin, at the clinic of Oskar Lassar (1849–1907), Photinos was initiated to the moulage technique by the moulager Heinrich Kasten (1842–1921).¹⁰

⁴ Joshi, 'Moulages in Dermatology-Venereology'.

⁵ Schnalke, *Diseases in Wax*.

⁶ Poulakou-Rebelakou, et al., 'Depiction of Venereal Diseases on Wax Models'.

⁷ Poulakou-Rebelakou, et al., 'Depiction of Venereal Diseases on Wax Models'.

⁸ Worm, Hadjivassilio and, Katsambas, 'The Greek Moulages'.

⁹ Worm, Hadjivassilio and, Katsambas, 'The Greek Moulages'.

¹⁰ Poulakou-Rebelakou, et al., 'Depiction of Venereal Diseases on Wax Models'.

The initial wax models of the Athens' collection is credited to have been made by Professor Photinos himself. Later, the moulages were produced by specially trained craftsmen, such as the painter Constantine Mitropoulos, a graduate of the Athens School of Fine Arts (1892). After him, the art of moulage making passed on to his son George who was, according to the older employees of the hospital, an even greater artist passionate about his job. It is broadly accepted that the Greek moulages are of an artistic quality, easily recognised (Figure 1).¹¹

The mouleur's secret was revealed. The technique consisted of three stages: the formation of the cast of plaster, the pouring of the melted wax into the plaster and the refining of the cold wax model. The creation of the moulage began with the application of wet plaster on the body surface of the patient so that the tiniest details of the skin lesion would be covered. The cast was then coated with oil or soap, so that every pore could be closed and the detachment of the wax could be facilitated. Melted wax at a temperature of around 60°C was poured into the cast. The wax then was cooled and solidified. After the removal of the plaster mould, the model was scraped and the refinement was finalised with the cleaning of the moulage using turpentine. In case of constructing a face, the eyes were made of glass and implanted hair was added. Physician, mouleur and patient were forming a bond as the creation of a wax model demands their close collaboration.¹²

The cultural treasures of the moulages collection of 'Andreas Syggros' hospital consists of 1,660 items depicting a variety of skin diseases. These are exhibited in wooden showcases furnished with crystal doors and divided into two large rooms with 29 and 34 showcases, respectively, and an antechamber containing 12 display cases (Figure 2).¹³ Three items from the Athens' collection representing syphilis have been donated to Paris' Saint Louis museum and 60 items to Paris' Military School Val-de-Grâce at the request of Dr Arnaud, presenting frostbites modelled on the soldiers of the siege of Bizani (Ioannina) during the Balkan Wars (1912–13). Moulages were donated to Professor Photinos by the staff of the Parisian Hôpital du Midi.¹⁴

Today, the Moulage Museum of 'Andreas Syggros' Hospital remains an important cultural treasure. Moulages continue to be used in medical training as several forms of the depicted skin diseases does not exist today, thanks to the development of pharmacology and therapeutics. Moreover, lectures addressed to the public are organised and delivered inside the Museum in an attempt to educate people about and prevent venereal diseases, representing a means by which art can support science.

¹¹ Katsambas, Emmanouil and Petridis, *Museum of Moulages*.

¹² Katsambas, Emmanouil and Petridis, *Museum of Moulages*.

¹³ Katsambas, Emmanouil and Petridis, *Museum of Moulages*.

¹⁴ Poulakou-Rebelakou, et al., 'Depiction of Venereal Diseases on Wax Models'.

Figure 1

A moulage depicting rhinophyma, made by Constantinos Mitropoulos



Source and Copyright: Museum and Library of 'Andreas Syggros' Hospital

Figure 2

Part of the Collection of the Museum of Moulages of 'Andreas Syggros' Hospital



Source and Copyright: Museum and Library of 'Andreas Syggros' Hospital

BIOS

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The Athens University History Museum

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The Athens University History Museum is housed in a historic building (Figure 1) which dates back more than 400 years, and is situated beneath the imposing heights of the Acropolis with a panoramic view of Plaka, the Ancient Agora, the Athens Observatory and the Lycabettus Hill. In the 19th century the building was the home of the renowned Greek architect Stamatios Kleanthis, and from 1837 and for four years, it served as the first home of the National and Kapodistrian University of Athens (NKUA).

Throughout its long life, the building has been used in various ways: as a private home, a high school, a university, infantry barracks, refugee residencies, a grocery store, a small tavern, and finally, as a Museum.

The Museum was inaugurated in May 1987 during the 150th anniversary celebrations of the NKUA. It is one of the few Museums dedicated to the history of a higher education institution internationally, and one of the rare examples where the Museum building is directly associated with the collections on display.

Figure 1
The Museum's building



Photo: K. Xenikakis. © National and Kapodistrian University of Athens – History Museum.

Collections

The collections of the Museum indicate the variety and richness of the NKUA heritage. Apart from representing the history of the University and its Schools, they pinpoint the scientific, cultural and social influence that the institution has had in the development and progress of the country. Since 1987, the Museum constantly enriches its collections through gifts or purchases.

The Museum's main collections are:

- The Book Collection which includes the first Greek academic editions of books on law, medicine, physics, chemistry, astronomy, history, philosophy, archaeology and linguistics, as well as other works by the University's professors, academic yearbooks and old and rare editions, works of the representatives of the Greek Enlightenment;
- The Manuscript Collection which includes hand written books, records, letters and notes;
- The Collection of Scientific Instruments, which were primarily used for teaching demonstrations, mainly in astronomy, medicine, physics, chemistry and pharmacology. The collection constitutes part of the large collection of scientific instruments which the University owns;
- The Old Photographs Collection, which is primarily made up of portraits of professors and photographs of everyday life at the University (anniversary events, photographs of lectures, buildings, etc.);
- The Souvenir Collection, which mainly includes the first Registry of Students (1837–67), the first Protocol, receipts of enrollment, student cards, flags, cups as well as the University's Banner (1887);
- The Collection of Documents such as hand written letters sent to the University on the occasion of various anniversaries of its foundation (75, 100 and 150 years) from universities abroad, Schools of Archaeology, Greek schools, and also from schools in Constantinople, Smyrna, Adrianopolis, etc.;
- The Portrait Collection which constitutes part of the Athens University's portrait collection. These are primarily portraits of professors and benefactors of the University, mainly works by Greek painters; and
- The Seal Collection, which goes back to the Foundation of the University (1837), when it was still called 'Ottonian University' and its symbol was King Otto's emblem.

Exhibition

The Museum's permanent exhibition (Figure 2) is deployed over the first and second floors of the building. The exhibits are organised and presented thematically following mainly the distinctions of the University's first Schools (School of Law, School of Philosophy, School of Medicine and School of Theology) as well as the School of Dentistry.

Figure 2
Part of the Museum's first gallery



© National and Kapodistrian University of Athens – History Museum.

The first room that also acts as anteroom presents the ideology of the University's foundation. In this room landmarks of the institution's many years of life are on display, such as its Banner, the first seals of the Schools and the first Student Registry of the University.

In June 2015, the Museum completed a revised exhibition of the scientific instruments collection. At the moment, the Museum's staff in collaboration with external partners and academics is working on the reorganisation of its remaining permanent exhibition areas following modern and interactive museological approaches.

Learning and Cultural Activities

The Museum offers interactive learning activities and programmes as well as guided tours in Greek, English and French, which are organised daily for students of all educational levels and adults. In accordance with its mission to strengthen the bonds between the University and society, the Museum organises and hosts temporary exhibitions, performances, lectures, and other events that attract diverse visitor groups, such as academics, tourists, families and independent visitors. In the summer months the yard areas, under the rock of the Acropolis, are suitable for holding concerts and theatrical performances (Figure 3).

Figure 3

'Socrates Now' performance with Yannis Simonides in the Museum's courtyard



Digitisation of the collections

Between 2004 and 2006, in the context of the Information Society programme titled 'Digitization and Presentation of the Athens University's History Museum', the Museum was given the opportunity to digitise a large part of its collections and to establish an integral system of managing and promoting the Museum's material. In the context of the above programme's excellence, the Museum collaborated with the University's Historical Archive in the implementation and completion of the research project, 'Establishment of a single web site for the History Museum and Athens University's Historic Archive'. Both aforementioned programmes were carried out in collaboration with the University's Department of Informatics and Telecommunications.

BIOS

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Irini Savvani is Art Historian, Curator. She has an MA in Art History, Université Paris I, Panthéon-Sorbonne. Curator of the Greek representation at the 26th Biennial of Sao Paulo (2004). Research interests include museum as a medium, museum communication, university museums and contemporary art.

Fay Tsitou is Head of Learning, Museum Curator. She has a PhD in Museum Interpretation/communication, RHUL. Best Practice award ICOM-CeCa, Rio 2013. Research interests include art and science learning activities and exhibits, museum theatre, museum interpretation / communication

Eleftheria Kentrou is Art Conservator-Museologist and has collaborated with the Athens University History Museum from 2007 to 2016.

Teaching Mineralogy in the Museum of Mineralogy and Petrology, National and Kapodistrian University of Athens

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History

The original collections of the Museum of Mineralogy and Petrology were created by the Natural History Society in 1835. The University acquired the collections after its foundation in 1837.

In 1979, the collections were transferred to the new university campus. In an effort to repair the 19th century wooden display cases, the collections suffered severe damage (as almost all samples were separated from their labels) and a great number of samples were destroyed.

Between 1997 and 1999, the samples were identified and reclassified, so that the Museum could open again.

The reopening of the Museum

Today the Museum's collections are exhibited in the geology department buildings.

The importance of the collection does not reside solely in the presentation of particularly beautiful samples, but in the abundance and quality of the minerals from 'classical' sites in former states of the Austro-Hungarian Empire, the German

Empire and Tsarist Russia, primarily from sites which have been exhausted and are known only from the literature.

Teaching of mineralogy in the Museum

Teaching of Mineralogy and Petrology in the Museum takes place in a total area of about 1,100 m². The collections are exhibited in three halls, while the fourth one is for audio-visual presentations and lectures.

In the first hall (Figure 1), three built-in display cases, samples and explanatory texts enable the viewer to understand the concepts of minerals, rocks, ores and industrial minerals.

Another case contains reference to the various types of meteorites. Tektites and stone meteorites are displayed as well as an iron meteorite found in Argentina.

On the eastern side of the hall, a new case containing rock samples dredged from a depth of about 3,000 m. in the Mid-Atlantic Ridge are shown.

Finally, a darkened room has been set up to display the luminescence of minerals. This is one of the largest collections in Europe which demonstrates the fluorescence and phosphorescence of minerals by using ultraviolet lamps with different wavelengths.

Figure 1

Display cases of a teaching nature, the colour variety of the minerals and mineral sites in Greece in the first hall



© Director of the Museum, Prof. A. Katerinopoulos.

The second hall (Figure 2) has seven modern crystal cases in which mineral samples of high aesthetic value are displayed, some of which are among the most beautiful of their kind.

Figure 2

Aesthetic mineral collection displayed in seven salient self-luminous show windows in the second hall



© Director of the Museum, Prof. A. Katerinopoulos.

Minerals from the Lavrion mines are displayed in three cases. The broader mining region of Lavreotiki constitutes a natural museum, since more than 13 per cent of all the recognised minerals on earth can be found in it, known world-wide for their variety and beauty.

The great mining boom of Lavrion began in 483 BC, when the rich deposits of silver were discovered in Maronia. The ancient galleries extend over a total length of hundreds of kilometres and were built on six levels. More than 1,000 shafts have been found in the region, some of which are as deep as 119 metres.

Using Lavrion silver, Themistocles was able to build the powerful Athenian fleet, which saved the ancient civilisation at the naval battle of Salamis.

There are also two cases containing samples of metallic and silicate minerals from Greece and abroad. In the last two display cases, there are world-class samples of minerals and gemstones from the former Soviet Union, mainly the Urals.

The Urals region is a vast mineral museum with a multitude of deposits and mineral occurrences. There are more than 800 different types of minerals and more than 12,000 sites with unique samples such as lumps of platinum in its central section alone.

A new case comprises minerals recently discovered in Lavrion due to the collaboration of members of the staff of the Museum of Mineralogy, Athens University and scientists from Russian research centres and universities.

In the third hall (Figure 3), the visitor encounters the heavy wooden display cases of the 19th century. The walls are covered by high upright cases, while inside the hall there are low cases in which the systematic collection is hosted. The decoration of this hall is fully in harmony with the Museum's exhibits, most of which can be dated from the 19th century.

Figure 3

Display windows of the 19th century hosting the systematic collections of rocks and minerals. In the centre, four outstanding self-luminous cases comprising gems and ornaments made of precious stones



© Director of the Museum, Prof. A. Katerinopoulos.

At the entrance of the third hall, there are two impressive samples of rock crystal and amethyst, displayed in special cases.

This hall includes the systematic collection (about 2,500 samples on display, representative of more than 700 types of minerals) and thematic collections of minerals (primarily minerals from known mining centres in Greece such as Lavrion, Chalkidiki, Serifos and Naxos), together with splendid exhibits from abroad, collections of precious stones, petrographic and ores collections, crystallographic collections (wooden and glass replicas of crystals) and a special display about the Santorini volcano.

A special place at the back of the hall is occupied by a case containing radioactive minerals. It provides full protection against radiation and the minerals are observed through a mirror so that the visitor does not have to get too close to the case.

The centre of the third hall is dominated by five display cases containing sculptured creations from minerals and rocks, precious stones, copies of seal stones from different periods and their imprints on pure silver. The fifth case contains a unique 75 cm sample of smoky quartz in the form of a sceptre.

In a high, upright case, 16 of the most important industrial minerals are displayed. Informative texts, as well as indicative products that are manufactured from these minerals, accompany the samples.

The Lecture hall

The Museum also has a hall for lectures, workshop and storage areas, while in a specially laid out area, the Museum's offices and historic archives are located.

Presently the issues expounded during teaching are: the contribution of the Lavrion mines to the history of Athens, modern technology and minerals, volcanoes, radioactive minerals, industrial minerals and precious stones.

A new case presenting the human body and the percentage of the contained major and trace elements in opposition to rocks and minerals hosting in nature the respective elements, implies the inseparable link between the living world, the environment and the world of minerals. In addition to this perspective of public awareness for the environment, the critical issue of water reserves on earth is emphasised and presented through a 3D model of a glacier and its remarkably rapid melting over a hundred years.

The fascinating complexity and plasticity of earth's structure is presented through a show case where rock samples of great scientific interest, dredged from depths of about 3,000 m. in the Mid-Atlantic Ridge, were donated to the Museum collection. A complete dataset of the scientific mission including videos from sampling and informative posters are also displayed.

Organising local and national scientific events (e.g., seminars, touring exhibitions in schools and municipalities) is one of the future goals of the museum.

BIOS

Athanasios Katerinopoulos is professor, director of the Museum of Mineralogy and Petrology, director of the Centre of Museum Studies. Published books: Minerals of the Lavrion mines (1994), The World of Minerals (2007). Awarded by the academy of Athens, the Society of Greek Litterateurs and the Union of Greek Minerals and Fossils Collectors.

Andreas Magganis is professor, director of the section of Mineralogy and Petrology. Research interests include petrology of igneous rocks, ophiolites, volcanism in Greece, low to very low metamorphism of metabasic rocks, metasomatism, chemistry and structure of rock forming and new minerals, applied mineralogy and petrology, archaeometry. Awarded by the Academy of Athens.

Panagiotis Voudouris is associate professor and visiting professor at the Institute of Mineralogy-Petrology, University of Hamburg. Research interests include magmatic-hydrothermal gold mineralisation, ore mineralogy of precious, rare, and critical metals, mineralogy and genesis of gemstones, mineralogy and genesis of alpinotype fissure minerals in metamorphic core complexes, mineralogy in supergene oxidation zones.

Ifigeneia Megremi has a PhD in Geology and is member of the Laboratory Teaching Staff. Research interests include environmental geochemistry, biogeochemistry, mineralogy.

The Botanical Museum of the National and Kapodistrian University of Athens

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Historical background and mission

The Botanical Museum of the National and Kapodistrian University of Athens (NKUA) is among the oldest university museums, holding important scientific collections. The Museum continues to be active and contributes to research, education and cooperation with the scientific community worldwide.

The Botanical Museum became independent from its preceding Physiographic Museum in 1868. The latter housed botanical, zoological and mineralogical collections belonging to the University since 1850. The main task of the Botanical Museum at that time was to accommodate and preserve the dried collections, consisting mainly of vascular plants (ferns, gymnosperms and angiosperms) that originated in Greece and abroad. The older plant collections date back to 1844 but specimens collected earlier may also exist. When referring to the Botanical Museum Herbarium, the international abbreviation of ATHU is used.¹

Nowadays, the Botanical Museum is installed in a specially designated area of the Faculty of Biology. ATHU houses a large collection of plants, apparently the largest in Greece, and is being continuously enriched with new acquisitions.

¹ The New York Botanic Garden is responsible for maintaining a global directory of public herbaria and associated staff known as *Index Herbariorum*; see Thiers, *Index Herbariorum*.

The total number of specimens is largely unknown since no indexing is available. About 117,000 plant vouchers are reported for ATHU according to Index Herbariorum. This number needs to be treated with caution and not accepted before a thorough recording of ATHU specimens is achieved. Among the most important historical collections kept in ATHU are the following: i) The whole herbarium of Theodoros Orphanides, Professor of Botany at NKUA and important plant collector. His collections span between 1845 and 1880 and number 45,000 plant specimens or more. ii) Part of the collections that were gathered by Theodor von Heldreich, a German botanist who collected extensively in Greece and Asia Minor. His main specimen set, accumulated approximately between 1840 and 1900, is in Geneva. iii) Part of Basilios Tuntas' collections, made approximately between 1895 and 1913.

ATHU is one of the most important Greek herbaria, useful to Greek and foreign researchers alike. Within Greece, it is unique for the following reasons: i) it is undoubtedly the most significant historical herbarium, housing collections covering a long time period; ii) it holds plant specimens from all over the world; some were obtained through exchanges made by von Heldreich and Orphanides with botanists of their time, some are recent acquisitions; iii) it is rich in "typi" (holotypes, isotypes and lectotypes), i.e., those original botanical specimens which new plant names are based on (Figure 1); iv) it is enriched with recent plant specimens, particularly during the last decade (Figure 2). Recent acquisitions are also supported by database registration and indexing.

Apart from its obvious importance to plant taxonomists and phytogeographers specialising in Greece, the NKUA Botanical Museum collections are of primary importance to many other scientists dealing with issues of botany, biogeography, ecology, conservation biology and environment protection. Given the current crisis of biodiversity due to human activities and subsequent climate change, loss of organisms is an important subject of discussion, legislation and funding at the national, European Union, or international level. Herbaria and botanical museums may have an important role in investigating, understanding and halting biodiversity loss.² In order to assist researchers, the Botanical Museum responds to national and international requests by sending botanical specimens on loan to various recognised institutions, by providing high resolution photographs of plant specimens and by supplying certified plant tissue for DNA extraction and usage in molecular or genetic investigations. Its contribution is often acknowledged, as for instance in two recent scientific works—the phylogeny of *Asperula* sect. *Cynanchicae* (Rubiaceae), a PhD thesis by Roberta Gargiulo (Napoli) and the

² Several published articles stress the importance of botanical museums and herbaria to plant diversity. See, for example, Krishtalka and Humphrey, 'Can Natural History Museums Capture the Future?'; Graham et al., 'New Developments'; Miller et al., 'Evaluating the Conservation Mission'; Lavoie, 'Biological Collections in an Ever Changing World'.

Atlas of the Aegean Flora by Arne Strid (Englera, volume 33).

In November 1997, the permanent exhibition on the 'Attic Landscape and Environment' moved in the premises of the Botanical Museum (Figure 3). The exhibition focuses on a variety of natural and human environmental aspects of Attica. Since 1998, the exhibition was open to public schools and grouped visitors. Systematically organised tours offer acquaintance with the subjects of the exhibition to groups of pupils or visitors.

Difficulties and prospects

Currently, the Botanical Museum has no staff apart from its elected Director. Moreover, it does not get any regular funds from the University budget; a minimum but regular maintenance credit was ceased several years ago.

While there is suitable space available to host and exhibit collections, staff shortage, lack of equipment and especially the complete lack of financial resources have not allowed any systematic maintenance efforts, recovery and enhancement of collections. Members of the Ecology and Systematics Department offer their knowledge and time to support the Botanical Museum on a voluntary basis, especially with respect to communication and cooperation with scientists in Greece and abroad. Nevertheless, deep-rooted problems and persisting difficulties currently put the activities of the Botanical Museum and the plant collections themselves under threat. More precisely: i) plant collections are insufficiently curated and usually do not recover after damage; ii) insect or fungus attacks are difficult to prevent or control; iii) the Botanical Museum does not accept individual visitors, including scientists who wish to work on its acquisitions; iv) no archiving of the botanical material, particularly the old, historic and invaluable collections is possible; v) participation in projects, together with other botanical museums, is hampered or becomes complicated; vi) plans to offer environmental education to pupils, students or other groups face many difficulties.

In spite of the many problems, the Botanical Museum Director and several staff members of the Ecology and Systematics Department try hard to respond to all national and international enquiries and correspondence, protect its collections from risks to the best of their abilities and enrich the specimens with new material from all over Greece on a regular basis. Furthermore, they plan to "open channels" of communication with the society through the development of environmental education programmes. If conditions permit, the Botanical Museum aims to prepare special publications that relate to plant diversity and biodiversity conservation in Greece.

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Figure 1

A herbarium sheet (three plants) of *Poa timoleontis* Heldr. ex Boiss. collected by Th. Orphanides on Mt. Parnitha in 1852. The sheet is kept in ATHU and designated as Type Specimen by J. R. Edmondson in 1978.



Figure 2

A recent plant collection of *Centaurea lactiflora* Halácsy from the area of Koniskos village in Thessaly. The plant is rare and listed as priority species on Annex II of the Habitats Directive (EU) and under Appendix I of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention).



Figure 3

Part of the “Attic Landscape and Environment” permanent exhibition hosted in the Botanical Museum. The exhibition focuses on a variety of environmental aspects of Attica.



BIOS

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The Botanical Garden of the National and Kapodistrian University of Athens

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The Botanical Garden of the National and Kapodistrian University of Athens is an institution with a long history, devoted to the cultivation and maintenance of plant species from Greece and different countries. It aims at promoting research, education, cooperation with other institutions in its scientific field and serving the public. However, it is currently much neglected and cannot achieve its mission.

Historical background and mission

The Botanical Garden was founded in 1835 and located in a 12-hectare area of the Chaseki estate along the Iera Odos, i.e., the ancient “Holy Way” that still connects Athens with Elefsis. It started as an arboretum in 1836 and turned into a Botanical Garden in 1838. Its reorganisation was primarily achieved after 1851, when Theodor von Heldreich was appointed Curator and Theodoros Orphanides Professor of Botany at the National University of Athens. At that time, the Botanical Garden was enriched with some 2,500 plants mainly through seed exchange with gardens from various countries all over the world. Two small greenhouses (known as ‘thermastiria’ at that time) together with a central pool for the needs of aquatic plants and a seedbed were constructed in the Garden. The Botanical Garden was recognised as a scientific branch of the University of Athens in 1867.

Between 1888 and 1915, a large part of the Botanical Garden was transferred to the Agricultural University of Athens to accommodate its facilities. It was then restricted to around 2.5 hectare. Another size reduction took place the following years that left only around 0.7 hectare for the Botanical Garden. This 0.7-hectare area at the intersection of Iera Odos with Spyrou Patsi streets constitutes today the historical Botanical Garden of the National and Kapodistrian University of Athens.

Despite its small size, the Botanical Garden continued being active for many decades, particularly between 1965 and 1982. A curator was appointed (until 1972), together with two to four gardeners. The associate members of the Systematic Botany Laboratory of the University also worked in close cooperation with the Garden. An annual list of seeds in exchange (Index Seminum) was published and sent to many botanical gardens around the world. The cultivated plants in the Botanical Garden reached high levels: more than 1,000 taxa were catalogued as present, with the largest number reached in 1971 when 1,350 taxa were maintained in the Garden. After 1982 the seed list ceased to be issued due to lack of personnel and funds. The list was re-issued in 1994 and interrupted again in 2015, when the last appointed gardener retired.

By definition, the Botanical Garden of the National and Kapodistrian University of Athens shares the same role and perspectives with many other botanical gardens around the world. It is, therefore, much more than a resting park or a simple recreation garden. A botanical garden serves as a place where documented collections of living plants are maintained for the needs of scientific research, conservation and education.¹ Plants associated with particular scientific fields (e.g., medicine, history, pharmacy, economy) may be the focus of specialised botanical gardens. The modern role of a botanical garden, as recognised today, is wider and crucial² and may include aspects of plant conservation, study of invasive species, climate change experiments, introduction of new crops, public awareness, etc.

Taking into consideration the small size of the Botanical Garden of the National and Kapodistrian, its long history, its location in the centre of the city but also the current shortage in personnel and funds, the following mission can be attributed to the Garden without altering its status as a genuine botanical garden: the Botanical Garden should therefore be a place where i) plant diversity in both form and use is cultivated and displayed; ii) historical, pharmaceutical, economic or local plants (e.g., regional endemics) are maintained and conservation priorities are recognised; iii) student or visitor education is promoted; and iv) calmness and tranquility is offered.

¹ Wyse Jackson, 'Experimentation on a Large Scale'.

² See, for instance, Miller et al., 'Evaluating the Conservation Mission'; Donaldson, 'Botanic Gardens Science for Conservation and Global Change'; Primack and Miller-Rushing, 'The Role of Botanical Gardens in Climate Change Research'; Hockenberry Meyer et al., 'Public Gardens'; Heywood, 'Role of Botanic Gardens'.

Difficulties and prospects

Currently, the Botanical Garden has no staff apart from its elected Director. Its last gardener retired in September 2015 and was not replaced. Furthermore, the Botanical Garden does not get any regular funds from the University budget; a minimum but regular maintenance credit received earlier was ceased several years ago.

Due to lack of funds and staff, most of the 200 or so plant species cultivated in the Botanical Garden during recent years suffer or have already disappeared. Large plants of historical importance, some a hundred years old or older, like a few cypress trees (*Cupressus sempervirens*), Canary palms (*Phoenix canariensis*; most trees recently destroyed by the *Rhynchophorus ferrugineus* beetle) and Washingtonia palms (*Washingtonia filifera*, Figure 1) remain neglected since September 2015. The two old greenhouses (one at the margin of the Botanical Garden) are being ruined and urgently need restoration. A large, central pool built in the 19th century dried up many years ago and no water plant cultivation is possible. A smaller pod near the entrance of the Botanical Garden was still in use at the end of September 2015 (Figure 2) but has not received any horticultural care since then. An old pergola-covered patio is derelict and difficult to spot today due to weeds.

At present, the Botanical Garden of the National and Kapodistrian University of Athens looks like a much neglected or even abandoned place (Figure 3). It can by no means achieve its mission. The lack of skilled personnel is largely responsible for its current condition but the situation is clearly reversible. New staff (preferably a gardener and a botanist) should be appointed to the Garden, even under contract, and work on its reorganisation. The small house within the Garden can be used as a residence for the personnel. If a functioning garden is achieved, then it can cooperate with similar institutions, participate in projects and attract visitors and funding. In the long run, it can be a self-sustaining institution and transformed into an active section of the National and Kapodistrian University of Athens, thus accomplishing its mission.

Figure 1

A few tall, more than a century old *Washingtonia filifera* trees (Palmae) of historic importance still survive in the Botanic Garden of Athens University. The tree is of American origin and commonly cultivated as ornamental.



Figure 2

A small artificial pond with water lilies (*Nymphaea* sp.) is surrounded by ivy (*Hedera helix*) and umbrella-sedges (*Cyperus* sp.). A large pond of the 19th century in the centre of the Garden is not in use due to waterproofing failure.

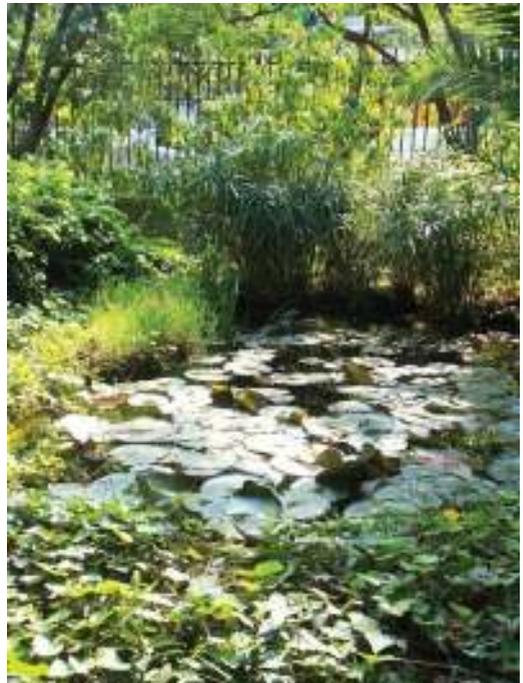


Figure 3

The old, 19th century conservatory and its outbuilding are being ruined. The conservatory, known as 'thermastirion', was constructed between 1850 and 1880 and urgently needs restoration.



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The Zoological Museum of the National and Kapodistrian University of Athens

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Introduction

The Zoological Museum of the National and Kapodistrian University of Athens was established in 1911. It is the oldest and richest of its kind in Greece. In the beginning, it was part of a larger Physiographic Museum that was established in 1858 in the central building of the University, in the centre of Athens. Later on, the botanical, paleontological, mineralogical and anthropological collections were separated in the respective museums. Today, the Zoological Museum is part of the Department of Biology in the Faculty of Sciences.

Until the end of the 19th century, the Museum staff and their collaborators were involved with the establishment, the study and the exhibition of the collections, putting in practice the two-fold objective of the Museum which is the provision of knowledge and the recreation of the public, especially the young people. The Zoological Museum was an attraction for numerous visitors and an important provider of general knowledge in the newly established Greek state and its developing capital. Greek and foreign researchers of Greek fauna, amateur collectors, wildlife hunters and many more deposited their finds in the Museum and assisted in its enrichment.¹

Today, the basic aims of the Museum are the safeguarding of the natural heritage of Greece, the sensitisation and raising of public awareness, research, training of students and staff and consulting.

¹ Krüper, 'Das naturhistorisches Museum'; Legakis, 'The Zoological Museum of the University of Athens. 1'.

The collections

The collections of the Museum are the oldest of their kind in Greece. They include specimens from the beginning of the 19th century, from areas where these animals do not live anymore today such as a lynx from Mount Parnitha near Athens, a red deer from Attica and a lammergeier from Mount Parnassos. They also include very rare species such as the kakapo parrot from New Zealand whose numbers in the wild are very few.

A part of the collections is exhibited in an area covering approximately 2,200 m². It contains representatives from all the animal groups as well as anthropological material. The remainder are housed in store rooms with proper conditions.

The collections include:

- Anthropological Department: A large number of anthropological findings, especially skulls, some of which have paleopathological symptoms. The section includes human bones from excavations and skull models of the ancestors of modern man.
- Department of mammals: Approximately 500 small and large mammals from Greece, the rest of Europe and from all the other continents, either stuffed or as skeletons. It includes a variety of most of the mammalian orders. In separate large showcases, several impressive animals are shown, such as a large moose from Canada, a group of large felines from Africa and one giraffe.
- Department of birds: A rich collection of 3,000 birds from all over the world in which all the species that live in Greece are included, shown according to their habitats. It also includes a collection of eggs and nests.² Some species from Greece that have become or are in danger of becoming extinct are presented separately, together with a presentation of large non-flying birds such as ostriches.
- Department of amphibians and reptiles: The section of amphibians and reptiles includes 500 specimens including all the Greek species and many from other parts of the world. Some large reptiles such as crocodiles, pythons and sea turtles are presented separately.
- Department of marine vertebrates: It includes marine vertebrates from Greece and the rest of the world. It also includes bones and whole skeletons of marine mammals such as whales and dolphins and marine and freshwater fish. Most interesting are a giant white shark and the skeleton of a minke whale.
- Department of insects: It contains very large collections of insects, including more than 10,000 specimens especially from Greece, some of which are pests and some which are useful for man. Among the other terrestrial arthropods,

²Papastefanou, Shogolev and Legakis, 'The Avian Collection'.

the collections include an important collection of Greek spiders by Prof. Charilaos Hatzisarantos and a collection of Greek ticks by Prof. Georgios Pantazis.³

- Department of molluscs: The collection includes a large number of terrestrial molluscs from Greece and abroad.
- Department of marine invertebrates: The collection includes a significant number of specimens from groups such as sponges, corals, crustaceans, marine molluscs and echinoderms from various parts of the world.

The Dimitrios Papalios collection is exhibited in a separate section of the museum. It includes animals from many parts of the world. In the dioramas, we can see scenes from the African savanna, the Arctic region, ostriches in African grasslands and the habitat of the American bison.

Some threatened animals are presented separately. Among them we can see the Mediterranean monk seal, the loggerhead turtle, the brown bear and some threatened birds.

Research

The Museum serves the research interests of around 10 members of the teaching staff of the Department of Biology and a number of postgraduate students. Two technicians are also employed. The research interests of the members of staff cover a wide range of Zoology such as Paleoanthropology, Paleopathology, Ecology, Systematics, Biogeography, Conservation Biology on molluscs, annelids, crustaceans, insects, fish, amphibians, reptiles, birds and mammals.

Most of the projects are aimed at the study of the ecology and biodiversity of various animal groups including monitoring and management.

In order to safeguard the natural heritage of Greece, the Museum has developed databases and archives of literature on the fauna of Greece, with special emphasis on the threatened and rare species.

The Zoological Museum acts as a centre for the collection of ringing data for Greece. The rings that are used by ringing groups (Hellenic Ornithological Society, Greek Bird Ringing Center) bear the name of the Museum that is responsible for the dissemination of these data.

Education and Training

One of the aims of the Museum is the training of university students in invertebrate, vertebrate and systematic Zoology, Parasitology, Faunistics and Anthropology. It also provides training for high school teachers and Technological Education

³ Legakis, 'The Zoological Museum of the University of Athens. 2,' 'The Zoological Museum of the University of Athens. 3.' And 'The Zoological Museum of the University of Athens. 4.'

students who are involved with the preservation of organic material. Finally, the Museum provides specific environmental education projects for school children.

Publications

The first publication of the Zoological Museum appeared in 1935. This publication, titled *Acta Instituti et Musei Zoologici Universitatis Atheniensis*, was the first attempt in scientific publications for Zoology in Greece. Unfortunately, in 1940, the journal ceased being published due to the war. In the nine issues that appeared, 17 scientific articles were published dealing mainly with Greek fauna.

Five informational leaflets were published with the following topics—two leaflets with general information on the Museum, one on biodiversity, one on invertebrates and one on the reptiles of Greece.

Furthermore, there is a limited number of the following reports: “Study for the Organization, Classification and Utilization of Museum Collections of Natural History” and “List of the Threatened, Protected and Endemic Animal Species of Greece”.

Public awareness

Every year, the Museum is visited by approximately 30,000 people, mostly students of primary and secondary schools. This is the result of an extensive campaign that includes briefing teachers of primary and secondary education, promoting press releases and carrying out interviews and presentations in television. It also collaborates with environmental organisations for the promotion of their work.

Consulting

The Museum is involved as a consultant in various fields that are related to animals, such as the identification of pests, imported animal products, Environmental Impact Assessments that involve animals, the provision of literature on Greek fauna, the organisation of natural history museums, the use of animals in environmental education and the provision of advice to ministries and other public services for the conservation of the fauna of Greece.

Collection management

Several protocols have been set in place in order to manage the collection. They include actions such as registration of incoming and outgoing objects, donations, lending, archives of photographs, etc.

Library

The Museum library contains many old and rare zoological books and journals from all over the world. Moreover it is equipped with modern textbooks, identification keys, journals, etc. An important part of the library includes an extensive collection of literature on Greek fauna, especially threatened, rare and alien species.

Archives of the Fauna of Greece

The Zoological Museum houses the Archives of the Fauna of Greece of the Department of Biology, which includes a great number of articles and other publications related to Greek fauna, as well as the indexed data for the documentation and analysis of animals living in Greece.

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The Criminology Museum at the University of Athens

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The Museum

The Criminology Museum belongs to and functions in the grounds of the Medical School of the National and Kapodistrian University of Athens. It is a unique museum in Greece which illustrates the history of crime by presenting some of the most notorious crimes that took place during the 19th and early 20th centuries in Greece. The Museum was founded in 1932 by Ioannis Georgiadis (1874–1960), Professor of Forensic Medicine and Toxicology, although the gathering of evidence had begun some years ago.¹

The Museum is a non-profit institution that provides a valuable source of teaching reference for medical, law and police academy students, while also acting as a dynamic study and teaching space. In addition, the Museum's collections present a rich source of data for researchers in forensic medicine and toxicology, forensic anthropology and other forensic sciences, and areas of sociology that focuses on the study of crimes and their causes, effects and social impact.

Although the Museum is not normally open to the general public, tours of the Museum are available for the earlier-mentioned student groups and researchers. Among the future goals of the Museum are to increase physical and online access to the collections, extend and broaden the Museum's audience, and support its aims for collections care and research.

¹ Karamanou and Stefanidou, 'The Greek Bandit Fotios Giagoulas'

Collections

The Museum houses 1,500 exhibited objects of significant historic value related to the history and practice of forensic sciences in Greece. The Museum's exhibited objects are mainly arranged in three sub-collections.

Forensic medicine collections

Human remains collection

The Museum houses a collection of mummified and skeletal human remains, and also a number of formalin-preserved specimens obtained after medico-legal and pathological autopsy or surgery. Mummified human remains include a naturally preserved unidentified body recovered from a cavern in Attica, and the embalmed severed heads of famous Greek bandits of the early 20th century. The beginning of the 20th century was a time of terror for the Greek countryside, which was ravaged by gangs of bandits who routinely resorted to livestock theft, robberies, or kidnappings for ransom.² They were notorious for their atrocities and feared both by peasants and the authorities who proved, in many situations, unable to catch them. When killed by the gendarmerie their heads were cut off and exhibited in public places. Among the most famous embalmed heads on display is the head of the legendary Greek bandit Fotios Giagoulas, also known as the 'mountain king', who was killed in the area of Mt Olympus in 1925. The Museum also possesses a collection of 19th century dry-prepared specimens of tattooed human skin acquired from autopsies (Figure 1). Forensically, tattoos may be useful in assisting with body identification. Aspects of a decedent's history may be deduced from certain tattoos such as the five dots tattoo in ex-prisoners, and syringes or marijuana leaves in drug addicts.³ The osteological collection consists of partial human and some animal skeletal remains that were submitted to the affiliated Department of Forensic Medicine and Toxicology for examination. In addition, the collection of formalin-preserved specimens of internal organs and other body parts demonstrates both pathological conditions and traumatic pathology.

Collection of nooses and ligatures

This collection includes self-made nooses used in suicidal hangings and constricting bands removed at autopsy from victims of ligature strangulation (homicides). The materials used range from ropes, ties, belts and shoelaces, to electrical and telephone cords.

² Tzanakaris, *The Best Lads are Killed by the Hand of their Comrades*.

³ Byard, 'Tattoos: Forensic Considerations'.

Collection of wax models

This collection includes coloured wax models that were crafted 50 years ago presenting with every detail wounds and injuries concerning all kinds of violent death, i.e., homicide, suicide and accident cases. These models were used for educational purposes.

Collection of medico-legal documents

This includes police documents, pictures of criminals and crimes that have left an indelible mark on Greek society, crime scene sketches, photographs taken at the autopsy of violent deaths, and anthropometry cards based on Bertillon's system of criminal identification.⁴ Also on display are a number of x-rays of conjoined twins and some unusual findings in the field of clinical forensic medicine.

Figure 1
Tattooed human skin removed at autopsy



© Criminology Museum, National and Kapodistrian University of Athens

Toxicology collections

Collection of drugs of abuse

This particular collection includes a number of different street samples of drugs of abuse and relative paraphernalia, confiscated from drug addicts. The collection also has on display hand-made hookahs made by inmates in prisons and wooden pipes made for smoking hashish (Figure 2). Hashish smoking was introduced in mainland Greece around 1885 by the prisoners of Smyrna, Mysiri and Prusa as the

⁴ Bell, *Encyclopedia of Forensic Science*.

“weed of the poor”⁵. In addition, there is a collection of substances derived from poisoning cases and chemical reagents used in the Department’s old toxicology lab.

Collection of mushroom models

This includes a collection of plastic models of poisonous and edible mushroom used for educational purposes.

Figure 2
Hand-made hookah made from
coconut shell

© Criminology Museum, National
and Kapodistrian University of Athens



Criminological collections

Reconstructed guillotine

The Museum possesses the only guillotine ever used in Greece for carrying out judicial executions (Figure 3). Guillotine is an apparatus designed for carrying out executions by beheading, best known for its use in France during the French Revolution (1789–99). In Greece, the choice of the guillotine as a means of exe-

⁵ Stefanis, Ballas and Madianou, ‘Sociocultural and Epidemiological Aspects of Hashish Use in Greece’.

cution was introduced by Ludwig I of Bavaria, father of King Otto of Greece.⁶ The displayed guillotine operated at Palamidi fortress in the town of Nafplio. In 1862, the people of Athens attempted to burn the guillotine during the popular revolt against King Otto. However, it was repaired and moved around the countryside for carrying out executions until around 1930.

Collection of sharp-edged or pointed weapons

This includes a number of knives and swords dating back from the early 18th century up to the period of 1950. There is also a collection of bayonets, cavalry sabers and fencing swords which belonged to Professor I. Georgiadis who was a Balkan Games (1896) winner in fencing. In addition, the collection has various weapons recovered from crime scenes. Some of them are improvised prison weapons made from sharpened metals, known in prison as 'shanks' and bound with strips of fabric to form a handle.

Collection of firearms and ammunition

There is a collection of old muzzle-loading firearms which date back to the late 18th or early 19th century and modern breech-loading firearms. The collection of muzzleloaders includes smoothbore percussion rifles and single or double-barrelled pistols. The collection of modern firearms dates to the 20th century and contains different types of small arms with a rifled barrel such as rifles, submachine guns and handguns. Also on display is a reference collection of unspent cartridges of rifle, shotgun and handgun, and a collection of discharged bullets recovered at the autopsy of gunshot victims by Professor I. Georgiadis in the period 1925–39.

Collection of military equipment

This includes helmets, explosives, grenades, mortar ammunition and other military artefacts, used in military conflicts, mainly during the Second World War.

Witchcraft object collection

This includes objects recovered from sites where witchcraft rituals were performed. The collection contains different kinds of amulets or talismans such as pentacles and skeleton keys used in magical evocation.

Counterfeit banknotes collection

This includes banknotes of the early 20th century from Greece and other European countries.

⁶ Maravelias et al., 'Documentation and Digitalization of the Museum of Criminology of the University of Athens'.

Figure 3
Reconstructed guillotine



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National and Kapodistrian University of Athens

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The Anatomical Museum of the Department of Anatomy of School of Medicine of National and Kapodistrian University of Athens

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An anatomical museum is an important teaching resource to a Medical School, like its library. A museum, in its ideal form, is more than simply a storehouse, classroom or library. It is also a laboratory, a site of medical research and experimentation for both students and researchers. Medical museums were founded in almost all medical schools and many hospitals in the 19th century, and remained an integral part of the medical education until the middle of the 20th century. Today most anatomical museums have become obsolete or extinct.

The present paper summarises all the efforts of the professors of anatomy to collect dry and cadaveric specimens to enrich the anatomical museum of the National and Kapodistrian University of Athens. It also provides all the details related to the exhibited specimens and their educational significance.

In the 18th century, the first museums in Departments of anatomy were set up with their first anatomical collections. In Greece, the great benefactor George Sinas offered to the School of Medicine of National and Kapodistrian University of Athens, in 1840, a skeleton and several dry adult skulls, while George Manousis donated an optical microscope. King Otto donated the famous anatomical charts of Weber and Mascagni.

The Anatomical Museum of the Medical School of National and Kapodistrian University of Athens was founded in 1877 by Professor Damianos Georgiou (Dras-

kas), of Macedonian origin, in a small old building which had a room for just two anatomical tables. The images of cadavers stacked on the floor due to the lack of space are quite characteristic, as well as the unpleasant odour that was emanating due to poor taxidermy of the dead bodies.¹ Georgiou established the Anatomical Fund and collected various surgical tools and anatomical charts from abroad. The rarity of cadaveric material led Georgiou to manufacture dry preparations. The vascular system was injected with a coloured mixture of wax, animal fat and plant resins. The body was dehydrated by immersion in alcohol, vessels were painted and finally the body was varnished. In the academic year 1872–73, Georgiou received from Paris some anatomical models made by Louis Auzoux. In 1883 (Figure 1), the University purchased the famous collection of Konstantinos Valsamakis, Professor of the Ionian Academy, from his niece Penelope Valsamaki for 7,500 drachmae. Valsamakis' rare collection of anatomical wooden models of bones and wax casts workings was made by the anatomist Felice Fontana (1730–1805) from Florence. The contents of Valsamakis' collection were classified into three groups (Figure 2):

1. Miniature wooden statues depicting human muscles
2. Wooden sculptures of bones, skulls of adults and juveniles, vertebrae and spinal cords
3. Wax, plaster and flax casts and some coloured models.

A particularly interesting artefact is a wax model of the female urogenital system depicting the retroperitoneal and inner and outer reproductive organs, with a section of a pregnant uterus by an unknown artist. We do not know the exact number of models and casts purchased. However, there are pieces of bones and muscles made from beech-wood, four wax casts, three gypsum ones and some coloured ones over which there is uncertainty whether they belong to Valsamakis collection. Other wax casts, made by the Italian painter Ercole Lelli and his students Giovanni Manzolini and Anna Morandi (1716–74) are known for their artistry and detailed and precise anatomical depictions (Figure 3).

The next professor in charge, Loukas Papaioannou (1831–90), was a charismatic anatomist who implemented a technique with antiseptic injections and the injection of dyes into the vessels for the study of angiology. From September 1883 until April 1884, 72 cadavers were collected for teaching purposes. In 1884–85 there was daily practise in the Anatomy lab and the number of cadavers reached 110. There were 426 students attending the courses, 202 of which practised on cadavers. In 1886, a new regulation required six years of study in the medical school. In the same year, 436 students attended the Anatomy courses, paying an annual fee of 40 drachmae. That year, cadavers were provided by the Municipal Hospital,

¹ Anonymous, 'Biographies'.

the Hospital of Piraeus and Hospital Evaggelismos, but these were not enough. Thus, anatomy was taught using dry and soft anatomic preparations from Germany and France. In 1887, Papaioannou prepared an embryological collection. He was such a talented anatomist that the French Professor of Surgery Rene Le Fort taught using his anatomical preparations.

Rigas Nikolaidis (1856–1928) was appointed Professor of Descriptive Anatomy in 1893. He collaborated with his assistant Karzis to make dry specimens of the muscles, vessels and nerves of the upper and lower limbs and the head and neck area. He also made exceptional dry specimens of the orbital cavity and specimens of the trigeminal and facial nerves. Nikolaidis enriched the Anatomical Museum with anatomical maps (depicting the origin and insertion of the muscles and the course of the nerves), a complete embryological collection and some important anatomical variations, such as the anomaly of the right subclavian artery, the abnormality of the maxillary artery and anomalies of the latissimus dorsi and biceps brachii muscles (Figure 4).

Georgios Sclavounos (1868–1954) was appointed Professor and Director of the Department of Anatomy in 1899–1900. Sklavounos taught anatomy as it was taught in the rest of Europe and particularly in Germany. With supervisory tools, numerous cadavers, preparations, casts, images and a projector, he always captured the interest of students having the valuable gift of being able to draw on the board along with teaching. He preserved cadavers after the embalming process of the aorta, by using newer antiseptic compounds. Sclavounos used the Teichmann vascular dye injection to investigate the detailed course and relations of the vessels, a knowledge fundamental for surgery. Moreover, Sclavounos used the pyrography technique for the description of muscles adhesion, including bone combustion with thermal cautery at the adhesion points of the muscles.

Professor Epaminondas Katritsis classified the collected material of the Anatomical Museum and Professor Vlachos, in 1989, enriched the museum with brain and spinal cord preparations. In 1992 Professor Nikolaos Papadopoulos (1992–2004) organized in a new fashion all the collected material. Through his actions the Museum was modernised and renovated (Figure 5). The corner of the famous author, the academician Antonis Samarakis, was created after the donation of his body to the Department of Anatomy. It was said that “Antonis offered and continued the race for hope and dream”. The Professor of Urology Aristides Giannopoulos donated a rare collection with kidneys and bladder stones.

In 2010, the current Professor of the Department of Anatomy, Panayiotis Skandalakis, renovated the whole laboratory and the Anatomical Museum. He renovated with the assistance of the Associate Professor Dimitrios Lappas part of the museum dedicated to the famous pathologist Doctor George Papanikolaou (Dr Pap, inventor of the Pap test for cervical cancer screening). A special collection from his life in Cornell University (Anatomy Lab) in America is housed in 50m²,

given by the emeritus Professor of Anatomy Dr Nikolaos Papadopoulos, adjacent to the anatomy amphitheater, dedicated to the famous anatomist George Sklavounos. The current Professor and Director of the Department of Anatomy Dr Panagiotis Skandalakis extended Papanikolaou's Museum and made it part of the Anatomical Museum of the Department of Anatomy. Spyros Marketos, Professor of History of Medicine and the Associate Professor of Anatomy Dimitrios Lappas sponsored the Museum and classified its collections in sections. In the Museum area are exhibited rare photographs from Dr Pap's life, his awards, the plan of the last Greek banknote and his portraits. The central focus of the exhibition includes his microscopes, photographs, letters and other documents about his scientific work. Discussions and presentations related to the research on and modern methods for the prevention and diagnosis of female cancers also exist.

The Anatomical Museum includes a rich collection of dry normal bones, abnormal bones (dysplastic, osteoporotic, partially or completely ossified in the ligamentous part), dry bones with abnormalities (wormian bones, ossified ligaments, additional and emissary foramina), preserved human specimens embalmed in concentrated formaldehyde (37–40%) or glutaraldehyde, as well as phenol and preserved animal specimens in a distinct section dedicated to comparative anatomy. Wax, wood and plaster models also exist. Exhibited are 200 dry normal and abnormal Caucasian skulls and 10 dry normal skulls of animals. A great part of the Anatomical Museum includes brain slices and brain and spinal cord sections adequate for the meticulous study of the central nervous system. Exceptional specimens are the skeletons of a giant, an achondroplastic dwarf, a skeleton with severe scoliosis and another one with multiple exostoses. Preserved specimens (embalmed in alcohol and formaldehyde solution), dried specimens and specimens injected with wax or other substances are adequate for demonstration of the venous, arterial and lymphatic system. Moreover, the Museum houses a rare teratologic collection with abnormal fetuses with clefts, cardiac malformations and other severe structural abnormalities (Figure 6). In another corner of the Anatomical Museum there is a rich collection of old surgical instruments, microtomes and several microscopes. Also exhibited are specimens of different parts of the human body (ear, nose, tongue, larynx, pharynx, heart, lungs, female and male reproductive organs).

In conclusion, the anatomical collection comprises more than 800 specimens. Around 60 of them show congenital anomalies of human and animal fetuses. The Museum opened its doors to the public at the end of December 2017. There is every reason to believe that the latest reform of the Museum's collections will be productive and contribute to the best medical education possible. This is not only a national but also an international goal.

Legends of Figures

Figure 1
Louis Auzoux specimens



Figure 2
Konstantinos Valsamakis collection (photos of the record of the laboratory)



Figure 3

Wax casts and models made by Felice Fontana



Figure 4

The Anatomical Museum of the Department of Anatomy of National and Kapodistrian University of Athens, as it was founded in 1902 (Koumaris, 1939)



Figure 5.

The current view (2010) of the Anatomical Museum of the Department of Anatomy
(photos of the record of the laboratory of Anatomy)



Figure 6.

Teratologic collection with abnormal fetuses with spina bifida and microencephalia



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BIOS

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Museum of Pharmacology: Aims and Perspectives. An Interactive Museum of the Laboratory of Pharmacology

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The Museum of Pharmacology, established on 8 September 2003 by Associate Professor Jannis Papadopoulos, is housed at the Department of Pharmacology at the Medical School of the National and Kapodistrian University of Athens (NKUA). With a very small grant but a lot of hard work and enthusiasm, Professor Papadopoulos set up this Museum of Pharmacology. A collection of old research instruments (e.g., centrifuges, balances, etc.), most of them of the early 19th century, and a large collection of plants from the period of Professor of Pharmacology G. Ioakeimoglou (1928–63) are exhibited.

Aims

The Museum of Pharmacology is a non-profit institution serving society. Its aim is to support the academic and pre- and postgraduate training of the Medical School of Athens, to upgrade scientific research and to enhance the diffusion of new knowledge in both University and society. In order to fulfil its aims, the Museum organises educational and scientific exhibitions of research equipment (i.e., pipettes, scales, centrifuges, Bunsen burners, hot plates, water baths, etc.) biochemicals, books and any other item related to pharmacological research materials. It promotes activities

aimed in the maintenance and repairing of its material. Guided visits sustain the educational purpose of the Medical and other Schools or Departments. Furthermore lectures, exhibitions, and other educational and scientific activities for high school students aim to enhance the diffusion of knowledge arising from the Museum's exhibits and to point out the science of medical pharmacology

The Museum is mainly funded by the NKUA but private pharmaceutical companies have contributed as well. Donations and sponsorships are welcome.

Perspectives

The Museum of Pharmacology effortlessly encourages postgraduate research and learning on relative topics; it provides knowledge and innovative ideas on the evolution of laboratory technology and informs younger students on pharmacological research topics and philosophy of science

The organisation of the Museum's collection was based on an interaction between science and society, and not just a static exhibition of old instruments of the laboratory of pharmacology.

To make this concept clearer, here are some examples. The Museum:

- Is a stimulus for the visitor who gets informed about the science of pharmacology and also about the interaction of pharmacology and society? The old and newer more artistic advertisements concerning medication show that the main idea remains the promotion of a medication; thus, the patient gets attracted by the picture and the benefits of the medication without taking into account possible hazards as well;
- Connects public health problems and their consequences (i.e., alcohol consumption, smoking, drugs, etc.) with pharmacology (alcohol, tobacco, heroin are pharmacological substances). For this reason, posters referring to health problems and tables of statistics on deaths from drugs, etc., are exhibited.
- Shows the relevance of the meaning of the word 'old equipment'. The atomic absorption spectrophotometer for the determination of metals (e.g., bone calcium) that had been used at the laboratory of pharmacology two decades ago became a museum piece since it was replaced by a more modern and more expensive one; the old model is still used at the High Technical School of Athens. One could assume that very often 'evolution' serves commercial profit.
- Shows the velocity by which a new instrument becomes old. The brand new IBM typewriter became a museum piece after 2 years since it was replaced by a computer.
- Shows the effects of technical evolution on research. Small changes from one generation of balances to the next rendered any newer model of balance easier to use, leading to less time for experimental procedures and consequently

more productive work. However, it is possible that evolution could also atrophy of our capabilities.

Future goals

Although the Museum of Pharmacology is the only one of this kind in Greece, it is not well known. Thus, one of the first goals is to increase visibility. Furthermore, since the limited space where it is housed does not permit the exhibition of all the items that now remain stored, a future goal is for the Museum to be housed with other medical museums in a bigger building that is more accessible to the public.

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Figure 1

Several parts of plants (radix, seed, etc.) used for the preparation of drugs are exhibited in the showcases



Figure 2
Several types
of older models of centrifuges



Figure 4

Several models of older balances that have been used in the laboratory of Pharmacology and now are part of the Museum collection



BIOS

Charis Liapi is Associate Professor in the Department of Pharmacology at the Medical School of the National and Kapodistrian University of Athens, an endocrinologist and pharmacologist. She is member of several national committees for drug approval and expert of the EMA expert database. Her research interests are mainly in nutritional pharmacology and neuropharmacology.

Jannis Papadopoulos is an orthopaedist. He completed his medical studies in Germany. An Associate Professor of Pharmacology, he retired in 2005 after

having served the University for 23 years. He is the founder of the Museum of Pharmacology and the author of many books. His main interests are pharmacology and social pharmacology.

Haris Carageorgiou is a microbiologist. She graduated from the Medical School of the National and Kapodistrian University of Athens and completed postgraduate training in the UK in Clinical Pharmacology. She is an Associate Professor of Pharmacology. Her main scientific interests of research are the study of drug action on cholinergic system enzymes in isolated organ preparations or animals and environmental pharmacology. She is the author of many articles and three books on the aforementioned fields.

Nikolaos Sitaras graduated from the Medical School of the National and Kapodistrian University of Athens. He is currently Professor of Clinical Pharmacology and Head of the Department of Pharmacology of the Medical School of Athens.



Museum of Dentistry

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The establishment of a Museum of Dentistry at the Dental School of the National and Kapodistrian University of Athens (NKUA) has been a constant request for many years. The first step was made in 2012, thanks to the initiative of the President of the Dental School of Athens Professor Georgios Vougiouklakis who organised a research team. The aim was the creation of an organisation that would manage the reception, storage, maintenance, recording, documentation, research, interpretation and, most important of all, the exhibition and the promotion of dentistry and the dental profession from ancient times until today to the public.

Museum collections and exhibits

The main exhibition area of the Museum is located on the first floor of the new building of the Dental School in Goudi (Figure 1). The two halls house a remarkable collection which includes a significant number of exhibits. The Museum's objects are exhibited both in the main area of the Museum, and in special display cases in order to meet the demands of modern museological exhibition and Museum function spaces.

Figure 1
Collection at the main exhibition area



© Photo by M. Sakelliou

On the first-floor exhibition area in the new building, the collection consists of scientific dental instruments dating back to the beginning of the 20th century. Examples are surgical instruments such as dental forceps and levers. There are also operative dentistry devices like amalgam dispensers, dental drills and various types of dental headpieces. The first air driven contra-angle hand piece unit that was used at the Operative Dentistry Department is exhibited there. Moreover, tools and devices of prosthetic dentistry are displayed—porcelain teeth, impression trays, a vulcanising device for the manufacturing of dentures and others (Figure 2). A rare dental unit with an even more rare dental office light is part of the collection of dental units.

Figure 2
Dental tools and devices



© Photo by M. Sakelliou

One of the most striking exhibits is the portable wooden cabinet with materials and tools for exercising the dental art. It contains a significant number of glass vials with pharmaceutical preparations for dental use, a great collection of hand tools for placing materials, endodontics tools, needles, syringes, intact local anesthetic vials, etc.

We are deeply convinced that a very important part of the history of dentistry is the story of the people who tried to explore, understand and apply the principles of dentistry. A dialectic relationship between yesterday and today can be achieved by museum islets where the exhibits are in plain sight for both students and patients on a daily basis. For this purpose, old dental units, dental appliances and tools were selected and are displayed in properly designed areas of the dental school building complex (Figure 3).

Figure 3
Old dental unit



© Photo by M. Sakelliou

The Dental School's Historical Archive

The Dental Department Museum incorporates the historical archive of the Athens Dental School (Figure 3) and supports the research of the archive. The rare archival footage tracks the evolution of the 'Οδοντοϊατρικόν Σχολεῖον' (Dental School) from the very early steps of establishment in 1916 until the early 1980s.

The documents illustrate the way in which the first University Dental educational institution was formed, as well as the changes over the years. In that way, the critical historical period, during which the earlier dentistry has been constituted in Greece, is revealed. At the same time, unknown aspects of NKUA academic activity are illuminated.

The Digital Museum

The Dental Department Museum utilised the advantages of modern Internet and multimedia technology and developed a Digital Museum (www.museum.dent.uoa.gr). The purpose was not only to present the exhibits, but also to feature the history of dental education and practice in Greece over time.

In the digital crossroads of contemporary technology and dental history, personal exploration is allowed based on digital storytelling. Thus, the website visitor can wander around and study the entire dental legislation since the establishment of the modern Greek state until the present.

One of the most ambitious programmes running at the moment is the creation of an open, freely accessible online library for the specialist, the student, the scholar, in fact, everyone. Rich material about the Museum and dentistry will be offered in electronic form. The Museum has undertaken the digitisation of all English dental books which are copyright free.

The website also presents the teaching staff, wishing to thank all those who contributed to the upgrading of dental education in our area. The presentation is not a cold, sterile and long list of names, but shows the evolution of the overall staff per academic year as it is recorded in the university yearbooks. Thus, the reader can follow the course of subjects and faculty over time. In addition, a special section is devoted to all doctorates of the Dental School of Athens. Currently, an effort is in progress to record all the graduates from the first one who graduated in 1916 to the present day.

Research, Education and Awards

The Museum of Dentistry, like any university museum, supports a remarkable number of research projects. A monograph on 'Dentistry in the Ancient Greek World' is the result of one of these programmes. Another study, which concerns the role of the 'Iatro-synedrion' (medical council) in supporting the dental profession and promoting dental education in Greece, is already at the final stages of writing.

At the same time, the Museum contributes to the teaching of the undergraduate course on the history of dentistry through its rich collection. Innovative educational programmes have been designed for school children, both for primary and secondary education. The programmes designed and realised by the Museum of Dentistry have begun to bear fruit and are well-appreciated. The staff of the Museum won the first prize for the best poster presentation at the 40th National Medical Conference held in Athens (14–17 May 2014) by showcasing an educational programme designed and implemented for elementary students.

BIOS

Margarita Sakelliou (M.Sc. in health informatics) is technical collections staff member, responsible for day-to-day management of the collections, registration of exhibits, as well as managing the museum database and digital assets. Her main research interest is museum informatics, especially in the fields of digital museum and digital curation.

Georgios Vougiouklakis is the Scientific Director of the Museum. Besides his research interest in the field of operative dentistry, he also focuses on the historical development of operative dentistry, history of dentistry in modern Greece and history of western dental education in the 19th and 20th centuries.

Dimitrios Koutroumpas (PhD in History of Medicine) is post-doctoral researcher in the history of dentistry, with a focus on ancient Greco-Roman dentistry. He is also interested in historical research in university historical archives of the 19th and 20th centuries (documentation, analysis, digitisation and presentation) as, for example, the archives of Athens Dental and Medical School.

Museum of Archaeology and History of Art (Department of History and Archaeology, National and Kapodistrian University of Athens)

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The Museum of Archaeology and History of Art was founded during the interwar period. Eminent professors of Greek Archaeology contributed to the establishment and constant enrichment of the Museum's collections. Christos Tsountas and Panagiotis Kavvadias brought the first assortments of ceramic sherds to the School of Philosophy. Subsequently, two groups of vases were donated by the Heraklion Archaeological Museum (Crete) and by the National Archaeological Museum of Athens following initiatives of Spyridon Marinatos. The concept of the Museum as 'a precious educational tool' was thanks to the Professor of Classical Archaeology Georgios Oikonomos. In 1938, he coordinated the donation of 32 casts of seminal ancient Greek sculptures found in museums outside Greece. In 1941 he also achieved the recognition of the Museum as a separate annex to the School of Philosophy. During the following years, and until 1988, the enrichment of the Museum's collections continued at a slower pace. A milestone in the Museum's development was the acquisition of casts of sculptures of the Mausoleum at Halicarnassus from the British Museum in 1977.¹

Until 1988, the collections were kept in small rooms at the Law School build-

¹ For a short history of the establishment of the Museum's collections until 1980, see Κόκκου-Βυριδή, 'Συλλογή αγγείων του Πανεπιστημίου Αθηνών'.

ing in central Athens and were accessible mainly to students. In 1988, the collections were transferred to the new building of the School of Philosophy at the University Campus in Zografou, Athens, where they are exhibited in two large halls (Figures 1 and 2). A steady increase of exhibits was recorded ever since. Currently the Museum hosts about 9,000 objects, mostly originals, which have been acquired through both private and public donations, and also long-term loans from Ephorates of Antiquities and public museums. They are distributed as follows.

- The **Collection of Prehistoric Archaeology** comprises artefacts dating from the Paleolithic era to the 12th century B.C., originating mainly from mainland Greece, Crete and the Aegean islands. The collection of the Ethiopian Palaeolithic objects is unique in Greece.
- The vases and potsherds of the **Collection of Classical Archaeology** come mainly from Athens and are dated from the 6th century B.C. to the 1st century A.D.
- The **Collection of Ancient Sculpture, Epigraphy and Casts** comprises casts of ancient Greek sculptures that are currently on exhibit in various museums in Greece and abroad. A number of casts are of particular importance because they were constructed on the basis of earlier additions to the original sculptures, such as the sculptures on the west pediment of the temple of Aphaia at Aegina. The collection also provides an educational display of marble working tools relevant to the craft of sculpting as well as a pointing machine.
- The core of the **Collection of Byzantine Painting** consists of copies of wall paintings and mosaics decorating important Byzantine churches in Greece. These 20th century copies, made in situ by well-known modern Greek painters, not only reproduce scenes from these monuments, they are also works of neo-Hellenic art in themselves. The collection includes facsimile reprints of famous illuminated manuscripts, the Vienna Dioscorides (Vindob. med. gr. 1) and the Vatican Menologion (Vat. gr. 1613), and a case showing the technique of icon painting.
- The **Collection of Byzantine and Post-Byzantine Ceramics** comprises some vases and numerous sherds organised into four educational sections: art of manufacturing, thematic display, chronological development and ornamental brickwork used in masonry. The collection was enriched in 2012 with 17 vases and other ceramic objects originating from Delphi of the Early Christian/Proto-Byzantine period.
- The **Trans-Mediterranean and Diachronic Collection of Pottery** includes a significant selection of Cypriot vessels, a small collection of pottery from Mesopotamia, and several series of pottery of various periods from the Mediterranean basin and beyond. The collection serves as an important educational means for the study of pottery in terms of regional influence on techniques and materials.
- The **Collection of Environmental Archaeology** comprises rocks, fossils, animal

and plant remains. Some shell and bone artefacts that have been manufactured experimentally by students are also exhibited. The collection also includes human skeletal remains, useful for the training of students of archaeology.

- The **Collection of Rocks, Minerals and Ancient Technology** consists of samples from a wide spectrum of stones and minerals that have been widely used in ancient Greek architecture, sculpture and the minor arts. The collection has been organised in such a way as to enable both students and visitors to familiarise themselves with the various raw materials used in ancient technology.
- The **Collection of Contemporary Art** includes paintings, watercolours, engravings and prints of the works of Greek painters and sculptors. The exhibits cover a wide spectrum of themes and art forms.
- The **Collection of Ethiopian Popular Art** includes items of popular Ethiopian art from the 20th century.
- The **Collection of Excavation Research**, under preparation, includes a characteristic diachronic collection of sherds recovered from the excavation conducted by our Department at Diogeneion, east of Roman Agora in Athens.

Figure 1

Museum of Archaeology and History of Art



Photo by Nina Baka

© Museum of Archaeology and History of Art

Figure 2

Museum of Archaeology and History of Art, Casts



Photo by Nina Baka

© Museum of Archaeology and History of Art

In general, the educational collections of the Museum comprise remarkable sets of objects which reflect not only the research interests of professors of archaeology at the University of Athens, but also the history and significance of the oldest academic institution in our country.

An open air Archaeological Park was inaugurated in 2004, displaying finds unearthed following excavations at Syntagma Square, during the construction of the Athens Metropolitan Railway (Figure 3).

Figure 3

Archaeological Park



Photo by Nina Baka

© Museum of Archaeology and History of Art

In 2010 a fully equipped Conservation Laboratory was established within the Museum. Subsequently, the Hellenic Ministry of Culture granted permission to the directors of the University excavations to have their archaeological finds transferred to the Museum for a limited period of time, for reasons of conservation. This further enhanced the opportunity for students to study originals from various places and dates.²

Since its beginnings, the main character of the Museum has remained mostly educational. Its collections facilitate the theoretical and practical training of students, as these allow close observation of the objects themselves besides offering the opportunity to address issues such as conservation, documentation and interpretation, management and exhibition of archaeological objects and contemporary works of art. Courses, interactive workshops and tutorials take place on a regular basis in the Museum, which also encourages the study of its objects by scholars or students.³ Furthermore, the Museum always seeks to expand its circle of visitors. For this purpose it organises various educational programmes for school pupils as well as lectures for a wider public, and regularly participates in international cultural heritage celebrations and anniversaries (e.g., European Heritage Days, International Museum Day and European University Heritage Day).

The Museum of Archaeology and History of Art anticipates the expansion of its role and importance among other Greek university museums through the completion of its collections, their display and the constant renewal of its information material which will improve the educational and cultural experience of its visitors including university students, school pupils who participate in organised educational programmes, and the larger public.

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² For the transformation of the Museum into a place of archaeological practice and research. see, Sfyroera, Papadatos and Roggenbucke, 'Practising Archaeology in the Museum'.

³ The study of some of the Museum's exhibits has led to publications accessible on the Museum's site (<http://www.uoa.gr/to-panepistimio/moyseia/arxaiologias-kai-istorias-ths-texnhs.html>)

BIOS

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The Museum of Education

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Introduction

The Museum of Education was founded in 1993 at the Faculty of Philosophy. It is one of the 14 museums of the National and Kapodistrian University of Athens. The core mission of the Museum is to preserve, document and care for a large number of exhibits portraying the history of Greek education in the 19th and 20th centuries. More specifically, the Museum aims to preserve the cultural inheritance related to education; provide material for research and study of the history of education, pedagogy and schooling in Greece both at the undergraduate and postgraduate levels from antiquity to the present; train graduates in the fields of museum education and documentation and conservation of material that exists in schools and which is otherwise lost; and stimulate the interest of the educational community and other groups towards related subjects.

The Museum has hosted a permanent exhibition titled 'Images of Modern Greek Education' since 2004. It has been running indoor educational programmes for schools, families and the elderly since 2014. Programmes are designed to accommodate the needs and the interests of various audiences, and make learning about educational history enjoyable and intellectually stimulating. They are based on an interactive methodology: visitors perform a series of actions during the guided visit with the help of the Museum educators, a process that demands a deeper involvement.

Visitors and especially students of all ages get to know aspects of Greek education and school life in the 19th and 20th centuries by actively engaging with the Museum exhibits, and by participating in cooperative and interactive activities such as puppet theatre, storytelling, dramatisation, etc. These activities not only facilitate the fulfilment of the Museum's educational goals but they also improve the students' intellectual and communication skills.

The 'laterna' of education

A laterna is a Greek variant of a barrel piano. It is a mobile interactive exhibit which lets the students of primary and secondary schools discover on their own the pieces that complete the puzzle of the history of education in the 19th and 20th centuries. The students are intrigued by automatic mechanisms and are brought to discover information, images and oral testimonies about the history of education and pedagogy in Greece from antiquity until modern days. A digital screen is revealed behind a chalkboard that transfers the students to the environment of the early 20th century system of education through excerpts of classic Greek films and testimonies given by teachers and scholars of the past. At the end of the processing children record videos with their own narrations about their interaction with the laterna; these videos 'travel' to meet the next group of students in the following stop of the laterna.

Educational Programmes

When the bell rings

Three bells ring, three journeys through space and time start. The first ring marks the beginning of the travel that will transport the students to the early 20th century. Angeliki, a doll that embodies the student of the past, comes alive and takes part in the Museum tour making vital comments about the school materials of that time. The second ring brings us back to the present which is presented by a shadow play. In this play a grandmother and her granddaughter are the protagonists talking and comparing their school eras. The third and final ring triggers the students' imagination for the future. They undertake a painting activity where they have to decide and imprint which school material should be preserved for the future.

Mrs C and Mrs F play in the Museum

Two dolls, Mrs C and Mrs F, inspired from the music scale, are in charge of introducing the children to the music class of the past centuries. In this programme, children engage in a music-dance play with interchanging tunes, rhythms and sounds and move their bodies in response to sound stimuli. A low pitch note is translated into a heavy step, a high pitch note into walking on tiptoe. An atmos-

phere of the parades is revived by the use of old music instruments of the Museum such as the tambourine and the trumpet.

One day in the school of 1900

A journey through time and through the adventures of the Greek language in the previous century is presented. The debate about 'Katharevousa' (a compromise between Ancient Greek and the colloquial Greek of the time), the strict discipline and the important role of the teacher are displayed through the equipment and the tools of a class and a paper theatre.

Once upon a time

Classic fairy tales are reanimated and amalgamated with modern fairy tales through the narration of the Museum personnel. The narration is followed by the dramatisation of the tales by the children. In that manner children learn how to comprehend, reflect and engage their body and voice through the text.

The break begins

In this programme students revive a school break of the yesteryears. Students are introduced to the games of the past and afterwards they practise these outdoor games that are no longer played such as the marbles and hopscotch. In this way, they are able to contrast their own modern games with the old ones and detect the differences but also the similarities.

The student of today meets the student of the past

The tour in the Museum is suddenly interrupted and the Museum is transformed into a set of the early 21st century. Aikaterini, a student of today, meets a classmate from 100 years ago and a theatrical play begins. The stories of the girls introduce the children to the differences between past and modern pedagogical models. Furthermore, through the narrations students have the opportunity to question and reflect on whether the educational system has changed through these centuries.

The 'Tree of Life' Narrative approach

An additional programme is applied in collaboration with the Professors of the Faculty of Psychology, P. Isari, A. Galika and A. Gomez. Designed to encourage exchange between different generations of teachers, 'the tree of life' metaphor is used to invite teachers to share their educational and work experiences and development. Stories from primary, secondary and higher education teachers are recorded and displayed within the context of the Museum. Students and young professionals in education have an opportunity to enrich their knowledge and practices and to learn from the detailed narratives of experienced teachers.

The educational activities of the Museum of Education are expanded through the collaboration with the Museum of Folklore and Christian Art in Andros Island. In addition, a new programme concerning the History of the Educational Reforms in Greece is being currently designed for the visitors of the Secondary Education level.





BIOS

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The Folklore Museum and Archives of the National and Kapodistrian University of Athens: Their Academic and Public Character

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Establishment and History

The quest to combine academic education with professional training and the preparation of students for the world of the market economy forms a major world-wide challenge in today's tertiary sector. This paper demonstrates the multi-faceted character of the Folklore Museum and Archives (FMA) of the Department of Philology, University of Athens, with particular emphasis on their current state and future plans.

The history of the FMA reflects the history of the discipline of folklore (*laografia*) in Greek academic life.¹ Their establishment and functioning are inextricably linked to the theory and practice of folklore in Greece, and to the training of folklorists and of educationists generally concerned with Greek folk culture. They were founded in 1965 when Georgios K. Spyridakis, then Professor of Folklore

¹ Folklore as a discipline was established by Nikolaos Politis, Professor of Greek Archaeology and Mythology, founder of the Hellenic Folklore Society in 1908, of the Society's journal, *Laographia*, in 1909, and of the Folklore Archive in 1918, renamed the Hellenic Folklore Research Centre in 1966. Folklore as a subject was introduced to the University of Athens by Politis, and was first taught as a distinct academic subject in 1947 by Georgios Megas, the first Professor of Folklore.

(1964–72), with the help of his assistant, Maria Milingkou-Markantoni, embarked on the creation of an Archive of Manuscript Collections of Folklore Material attached to the Spoudasterion Laografias (Folklore Study Centre and Specialized Library).² This was formally established in 1972 and remained in the building of the University at 33 Ippokratous street in central Athens till 1987, when it was transferred to the new building of the School of Philosophy, where it is currently housed in two rooms of around 270 m² on the seventh floor (Complex 734).³

Figure 1
View of the FMA folklore manuscript collection



The Folklore Museum and Archives of the Department of Philology, School of Philosophy, National and Kapodistrian University of Athens, were officially instituted upon publication of Greek Government Gazette B' 1923/02.06.2017.

² The late Maria Milingkou-Markantoni, Associate Professor of Folklore, was the leading spirit of the Folklore Collection for many years (1966–2007) and saw to the organisation, maintenance and development of its archives. She is fondly remembered by several generations of students whom she trained and advised in matters of fieldwork and of folklore manuscript creation.

³ The Decree of the establishment of the "Folklore Library with a Folklore Collection containing the existing archives of folklore material, music etc. as well as a Museum collection" was published in the *Government Gazette A'*, 49, 14.04.1972. For information (in Greek), see phil.lib.uoa.gr/bibliothikes-spoydastiria/spoydastirio-laografias/pliinfoories.html.

Student Fieldworkers

The FMA are the largest university folklore archive in Greece and are among the most important folklore archives in the country. Their mission, stated in their Constitution, is "to support educational and research needs relating to the subject of Folklore, and its application to the study of folk culture in Greek society and in the Greek diaspora. They will make accessible material relating to the documentation of folk culture, as well as archival material deriving from their collections and from a continually updated digital data bank."⁴ They possess musical recordings, photographs and microfilms, documents dating from the 18th to the 20th centuries and about 4,000 files of ethnographic and oral folklore material, mostly manuscripts, derived from fieldwork undertaken by students of the Department of Philology. These manuscripts, bound in around 700 volumes and containing over 350,000 pages, contain first-hand information on various aspects of Greek traditional life, such as material culture, religion, rituals and customs of life and annual cycles, oral literature and oral history, and social life, recorded in the idiom used by informants (Figure 1). Most of them were compiled by students who belong to the communities described and they contain information and interpretations available only to locals, so they are especially valuable for the study of Greek folklore and ethnography (Figure 2).⁵

The manuscripts depict life in various areas of Greece and of the Greek-speak-



Figure 2

Folklore fieldwork information recorded by students during the 1970s

⁴Decree for the establishment of Folklore Museum and Archives in the Department of Philology, School of Philosophy, and approval of their internal regulations", Greek Government Gazette B' 1923/ 02.06.2017.

⁵Maria Milingkou-Markantoni mentions the case of Greek-Cypriot students originating from Northern Cyprus who would come to the Folklore Library with members of their families to read the manuscripts and reproduce photos of the villages, houses and people lost to them following Turkey's invasion of the island (Milingkou-Markantoni, 'Georgios K. Spyridakis', pp. 6–7).

ing world over the past 50 years, although the information contained in them goes back long before their time of compilation, as it refers to the communicative memories of informants which stretch back several generations before their own lives. This material was gathered and organised using a standardised questionnaire created by Georgios Spyridakis, a concise guide outlining the areas and subjects on which the student folklorists were to ask questions.⁶ Almost all the manuscripts have been digitised and can be accessed via the University of Athens Digital Library Pergamos (<http://pergamos.lib.uoa.gr/>). Scholars from Greece and abroad often consult the Archives and several master's and doctoral dissertations have already drawn on them. The Archives are continuously updated and diversified in response to current developments in Greek society and culture. Accordingly, the past decade saw the creation of specialised archives containing both autobiographies and life narratives of folk poets, musicians, dancers and singers, and those of migrants, refugees and members of the Greek diaspora.

The FMA contain collections of around 1,100 traditional everyday utensils, items of dress and pieces of jewellery, all donated by students and others over the past 50 years (Figure 3). These have been digitised too and are accessible through Pergamos. However, they require more thorough documentation—this is an area of training that postgraduate students in Folklore Studies receive, thus acquiring useful professional skills within the University. The archive of the 18th to 20th century documents, the microfilm archive containing about 13,700 photographs, and the music archive containing old recordings on magnetic tapes of folk songs and music, folk tale narratives, etc., provide more opportunities for student training in folklore museology and research.

Prospects and Challenges

The FMA are thus multi-dimensional (Figure 3). An academic institution, they offer students acquaintance with traditional and modern ways, ideas and practices of Greek everyday life. Through fieldwork, students discover their own, or others', roots and ways, and become ethnographically and anthropologically sensitive to identity and otherness. This is important, since most of these students

⁶ See Spyridakis, *Odigiai pros Syllogin Laografikis Ylis*. Students have also used other similar questionnaires, such as Megas (*Zitimata Ellinikis Laografias*) and Imellos and Polymerou-Kamilaki (*Paradosiakos Ylikos Vios tou Ellinikou Laou*). In recent years, such collections of folklore material have tended to focus on specific aspects of traditional and contemporary Greek culture, rather than on overall descriptions of life in various villages. Many of them concentrate on interviews and life narratives and stories, thus using questionnaires that the student collectors compile according to their needs, and following the methods employed by oral history. Such corpora of material are now submitted in typed and digital form and often contain audiovisual files. Students are also encouraged to include reflexive diaries recording their fieldwork and interview experiences and problems which, however, are clearly separated from the first-hand interviews and fieldwork material.

become educationists or involved in various cultural industries.

The public role of the FMA reflects a tendency established from the beginning of the discipline of folklore, which works “from the grassroots up.”⁷ Thus folklorists and student fieldworkers draw valuable ethnographic material from various communities and return it to the people by recording, organising, studying and publishing it.⁸ Academic and lay folklorists and creators of folk culture, such as folk poets and musicians, are often invited to the FMA to present their work in seminars, while visiting school groups are introduced to the concept of an archive and the value of traditional objects. This latter function will be enhanced once the Folklore Library has moved to the main University Library, thus freeing space for more educational activities.

The Folklore Collection of the Department of Philology, now established as a Folklore Museum and Archives, face challenges at a time when there are few financial resources to promote their development. Fortunately, human resources are not lacking. Their main strength lies in the academic and administrative staff, undergraduate and postgraduate students who contribute to them in various ways. Their continued maintenance and enrichment through the voluntary work provided by students and staff, the establishment of seminars, the organisation of workshops and other events on themes drawn from their rich archival material, and the creation of a group of Friends of the FMA are some of the activities that will guarantee the continuation of its service to the University and to the wider community.⁹

⁷ On the public character of Greek folklore, especially as manifested through the work of the Hellenic Folklore Research Centre (HFRC) of the Academy of Athens, see Chryssanthopoulou, ‘Folklore Theory’, 106. Most Professors of Folklore in Greece, including the creator of the FMA of the University of Athens, Georgios Spyridakis, had also worked in the HFRC as its researchers and/or directors, thus “grafting” the fieldwork and archiving practices of this Research Centre to their student communities and providing a distinct educational and research tradition in their university departments (Chryssanthopoulou, ‘Folklore Theory’, pp. 113–16).

⁸ This ideology and practice of engagement with the community is clearly expressed in the following statement by Georgios Megas: “And we [folklorists], who do not deal only with theory, but practise our work in folklore out of commitment to the people to whom we belong, continue to set as the ultimate purpose of our discipline the knowledge of folk life and soul ...” (Megas, ‘Theodoros Papadopoullos’, 352–53; Chryssanthopoulou, ‘Folklore Theory’, p. 106). On the public character and orientation of folklore in international scholarship, see also Baron and Spitzer, *Public Folklore*.

⁹ Anastasia Pouliou, then a postgraduate student in Heritage Management (University of Kent/ Athens University of Economics and Business), worked as a volunteer at the FMA and presented an interesting paper titled, ‘Sustainability Analysis for the Folklore Museum and Archives (FMA) of the University of Athens’. In this paper, she has offered a market analysis, suggested marketing and fundraising strategies, and provided a financial model for a sustainable functioning of the FMA. On behalf of the academic and administrative staff of Folklore and of the FMA, I would like to express our sincere and warm thanks to Anastasia Pouliou for her contribution to their progress.

Figure 3
Display of traditional jewelry in the FMA



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Biblical-Archaeological Museum, Theology School, National and Kapodistrian University of Athens

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The Biblical Archaeological Museum of the Theology School in the National and Kapodistrian University of Athens was an idea of the memorable Professor Vasileios Vellas. The Museum started in 1969 and was established in 1982. It is housed in the Theology School of the National and Kapodistrian University of Athens, in the University Campus in Ano Ilisia.

The first collection of the Biblical Archaeological Museum was a collection of copies from different world-famous museums such as the Louvre and the British Museum. These exceptional copies are the Moabite Stela of King Mesha, the Black Obelisk of Salmanassar and the Stela with the Code of Hammurabbi. These three important copies are very useful for understanding the theological traditions, laws and daily way of living in the ancient Near East. They provide the necessary material for teaching Biblical Archaeology and developing knowledge about Biblical Israel. Furthermore, the Museum holds a number of exhibitions such as the Tabernacle of the Congregation (Tent of Meeting), the Temples of Solomon and Herod, the time of Jesus, a geophysical map of the land of Palestine and the attires of a high priest and a priest. The visitor can look at and study the design, the architecture and the function of these places of worship. The high priest and the priest

played the most significant role during worship in Biblical Israel and the visitor can see their clothes and their appearance.

The Biblical Archaeological Museum also holds a number of copies of the archaeological findings from the excavations that the Theology School carried out during 1990–2000 in Israel. These are pottery, coins, tools, bronze weapons, small statues, sacred vessels, lamps, stamps from the 8th century BC and manuscripts.

In recent times, the Museum included to its collection attires of the Knights Templar from the time of the Crusades with all the equipment and the typical clothes of a crusader.

For the past 46 years the Museum is open not only to the students of the Theology Faculty but also to other Faculties and to schools. The section of Hebrew Language and Interpretation of the Old Testament, which is in charge for the Biblical Archaeological Museum, always looks forward to growing its collection and to protect its heritage.

Figure 1
Collections of Vessels



The first two photographs are collections of vessels, which are a classic example of pottery of the Iron Age II-III (10th to 6th century BC)



Figure 2
View of the Museum



The high priest is in the right corner and the priest in the left one. Next to the Priest is the Code of Hammurabi, a copy of the well-preserved Babylonian law code of ancient Mesopotamia, dating back to about 1754 BC. In between, there is the Temple of Herod (20 BC) and in the back of it, the geographical map of Israel

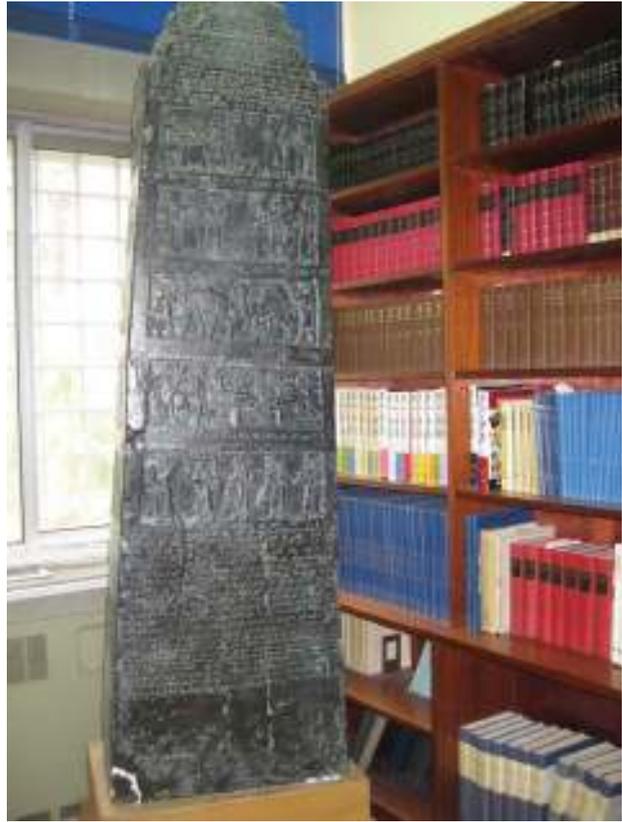


Figure 3

Obelisk of Shalmaneser III

The Black Obelisk of Shalmaneser III is a black limestone Neo-Assyrian bas-relief sculpture from Nimrud (ancient Kalhu), in northern Iraq, commemorating the deeds of King Shalmaneser III (reigned 858–824 BC).

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The Museum of Anthropology of the National and Kapodistrian University of Athens

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The Museum of Anthropology of the Medical School of the National and Kapodistrian University of Athens was founded in 1886, and it is one of the earliest museums in Greece. It holds historical significance for the Medical School of Athens and constitutes a modern facility conducting innovative research and academic functions in the field of Physical Anthropology.

The anthropologist Dr Klon Stefanos (1854-1915) was the founder and first director of the Museum from 1886–1915. Ioannis Koumaris, founder of the Hellenic Anthropological Society and first appointed professor in the chair of Physical Anthropology (1915-1950), has also contributed significantly to the advancement of anthropological education and research in Greece.

The Museum of Anthropology belongs to the Section of Descriptive and Functional Studies and implements both educational and research focused agendas. Its collections are exceptional and some of them quite rare. It is open to the general public and many schools visit yearly.

The museum features a permanent exhibition hall that officially opened its doors in September 1998. The main collection includes skeletal material from all over Greece, and it represents a population range from all the chronological and cultural periods of the ancient Greek world. These collections have been the subject of systematic anthropological studies conducted by important Greek and foreign scientists, who have expressed views concerning the evolution, ethnogenesis and routes of human migration relevant to the Hellenic population.

The paleo-anthropological museum collections comprise several replicas of fossil human remains from all over the world, covering all eras of the five-million-year human evolution and the phylogenetic history of Hominids. The **enigmatic Neanderthals**, hold the center stage while a special section focuses on the pre-historic traces and historical evolution of the population of Greece.

The prehistoric collections refer to various phases of Greek and European Pre-history, including significant original material, which represent the cultural evolution of humans, mainly in the Greek area.

Moreover, among the collections there are three rare Egyptian mummies. After careful anthropological examination from experts, these mummies are of exquisite archaeological, museological, as well as educational and research value.

Last but not least, the museum possesses some very interesting ethnological collections of exhibits, from Africa, Asia and the Americas, such as authentic Samurai costumes of Japanese warriors.

Current research by the Museum of Anthropology involves different sites throughout Greece and has yielded significant paleoanthropological finds as well as cultural artefacts from the Palaeolithic period, shedding light on human evolution in the European continent. Future goals include further analysis on human fossil finds, employing advanced methodological approaches. Skeletal material from the collections of the Museum has been the subject of paleopathological studies broadening our understanding of the history of disease in the Hellenic population and the medical treatments and cultural practices associated with disease.

Figure 1
Skulls from Neolithic sites in Greece.
(Mitilini, Arcadia, Kozani)



Figure2

Total View of Museum of Anthropology, Medical School.



Figure 3

Human Fossils From Apidima Mani, Greece.



BIO

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The collection of the Museum of Palaeontology and Geology stores the largest vertebrate, marine and plant fossil collection of Greece. Its collections cover more than 300 million years of the geological history of the country. It also includes some samples from abroad, micropalaeontological and stratigraphical collections and classic printed reconstructions of palaeoenvironments of the beginning of the 20th century. The collections are constantly being enriched with exhibits coming from research projects, palaeontological excavations and donations. The Museum has an official local department at Vrisa Lesvos Island.

At the exhibition space of the Museum, one may admire some of the most important fossils discovered in Greece, such as the world known fauna of Pikermi with the primitive hipparions and the machairodonts that lived about 7 million years ago, and the famous fossils of *Mesopithecus pentelicus*. It also includes some skeletal reconstructions of endemic mammals, a life size reconstruction of *Testudo schufferi*, the largest Miocene Greek Reptile, a realistic reconstruction of *Elephas tiliensis*, the last European Elephant whose bones have been excavated at Charkadio Cave on the Tilos Island, as well as fossils that have played an important role in the history of evolution of life on earth, in an attempt to travel back in time with fossils as our guide. A significant part of the collection includes fossil bones of the giant *Elephas antiquus* from Isioma Karyon near Megalopolis. The fossil of *Elephas*

antiquus have been attributed to prehistoric giants and the fossils of endemic Mediterranean elephants to Cyclops.

The Museum is open daily to the public in order to disseminate knowledge and inform people about topics that concern the promotion and protection of our palaeontological heritage. It also organises temporary exhibitions and events. Since 2011, it has been organising multiple educational programmes for pupils and students as well as guided tours by its scientific staff. The educational projects are organised in a special room of the Museum and include palaeontological excavations, construction of plaster replicas, educational memory competitions for children, observation of microfossils through binocular microscopes, painting guided by Greek painters. The educational projects come from MSc, PhD students and undergraduate students, and is sustained entirely by the entrance fee since the Museum has no permanent scientific staff. The labs of the Museum are used as a place for practice by the geology students and compilation of palaeontological studies.

The Museum is the oldest and richest in specimens in a Greek centre of palaeontological research. Its collections are visited every year by many foreign researchers, postgraduate and PhD students, while various research projects concerning mainly vertebrate or invertebrate palaeontology have been realised at its labs. The Museum members have supported the creation of exhibitions in other part of Greece, aiming to promote palaeontological treasures for tourists and educational purposes. In addition, in the last years it has organised in Athens and other Greek cities educational projects for teachers and school members in order to give an opportunity to children who live outside Athens to appreciate the scientific use of fossils for understanding geological time, and learn about the changes of palaeogeography and palaeoenvironment that follows climatic and tectonic events or volcanism and earthquakes. Since 2011 the Museum has organised special Sunday events including public speeches by members of the Geological Department, presentation of films, educational programmes. Additionally, during 2016, it opened its first temporary exhibition about the first 3D printed skeleton of *Elephas tiliensis*, based on very long and tedious CT scans, laser scans and allometrical studies completed in collaboration with National Technical University of Athens. The exhibition will travel at the end of 2017 to the Museum of Tilos island.

BIO

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Figure 1
Museum central room



© Prof. George Theodorou

Figure 2
Educational programme for the construction of fossil replicas by Maria Mousi



© Prof. George Theodorou

Figure 3

Megalo Rema Pikermi (Valanaris) classical locality
Excavation by Prof. Georgios Theodorou and student team for the collection of a giant Proboscidean scapula 7,000,000 years old. The fossil accumulation was located by Christos Solomos -Low right (April 2013)



© Nikolaos Tsoukalas and George Theodorou

Figure 4

A state of the art 3D printed reconstruction of the last European elephant, *Elephas tiliensis*



Prof. George Theodorou

