

## Scientific museums and its scientific heritage role in developing cultural and Artistic Awareness

### Case study: Dr. Naguib Mahfouz - Ob/Gyn Teratology and Pathology Museum

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#### Abstract

Studies related to history of sciences, museums and heritage sites have not yet been properly studied in Egypt, despite their great importance in preserving heritage and creating bonds of understanding and awareness between science and community, as well as creating interrelationship between society and its scientific outputs, which are represented by scientific museums and institutes and researches. This type of studies is very important, and requires scientific experienced professionals in each of the relevant science as well as civilizational and historical field of studies in addition to museum studies.

The importance of creating this awareness of scientific museums role and activating it for the dissemination of knowledge and awareness, is not limited to scientists and specialists. In this sense comes the importance of this research paper which falls under the theme of "Identity, heritage and culture towards a new direction" Within the seventh topic of the conference, which means to know the achievements of knowledge and scientific outcomes and its role in the development of civilized societies"Scientific museums are playing an essential role in the interaction between science and art.

Through a unique model of one of the scientific museums in Egypt, the Museum of Genomic and Oncology, at the Department of Obstetrics and Gynecology in Qasr Al Eini hospital in Cairo. Its story began nearly 90 years ago, when the famous gynecologist Naguib Pasha Mahfouz collected 1300 rare and mysterious cases of obstetrics and gynecology, and decided to include them in other collections, the museum was founded and opened in 1929, to be a reference for students and researchers. It is the largest and the first medical museum of its kind in the Middle East. There are only two museums in the world similar to our museum, one in England and the other in the Netherlands. They include rare samples in different specialties, not just gynecology. Such museums help researchers in communicating with the surrounding environment and society and is closely related to them as its role is not limited to serve researchers and specialists only.

#### Keywords:

Medical museums, scientific heritage, Science communication, Gynecology, Deformations

## Introduction

It became necessary to pay attention to the Egyptian museums and develop them to keep pace with the world museums, and it became necessary to give such museums a great importance, so that we get to have a knowledge base that can become a major reference for workers and those who are interested in the museum sector. Museums are the window that opens secrets of history and achievements of Egyptian civilization through its ages. A museum is a place not only for the display and storage of exhibits, but its main function is to present ideas and other contexts of the museum during the exhibition. Giving interest in Egyptian museums have become an urgent necessity for the authorities at least in the last two years as they had no clear policy in establishing museums. In the sense that they do not have clear answers to questions such as: When do we think about building a new museum? What is the purpose of this museum in particular? Where it should be built? What is the expected cost? Where are these huge expenditures and what are the target groups? <sup>(1)</sup>

The Egyptian Authority has decided to establish two large museums in the Greater Cairo during the nineties of the last century, namely the Museum of Egyptian Civilization in Al Fustat and the Great Egyptian Museum in Giza, but the projects were not systematically presented to answer any of the previous queries. , the result is both museums so far were not completed, despite the huge funds spent on them, in addition to the many pieces of antiquities and important collections that were exhibited in the Egyptian Museum in Tahrir square were transferred to the composers before the scenario of the presentation of either of them was decided. It is important that the authorities operating in the field of heritage in general and museums in particular have a clear vision of the museum collections and what their purpose is. It is necessary to have a clear plan with organized items to review the importance of the museum and its role and to highlight the value of exhibits of this museum, especially the ones of heritage elements.

In the last 30 years, informal or lifelong science education has grown in terms of research, activity, training, learning landscape and international spread to become significant features of science. <sup>(2)</sup> From Australia to Saudi Arabia, informal science education (ISE) institutions such as science centers, museums, aquaria, and zoos offer opportunities for their visitors to learn about science, understand it, and question it outside school and university curricula and long after they graduate. <sup>(3)</sup> In societies where science plays important personal, social, and political roles, ISE offers valuable experiences for people, among other things, that may affect the science “pipeline,” public scientific literacy, and public debates about science. <sup>(4)</sup> But how accessible are the opportunities that ISE provides? <sup>(5)</sup>

This research paper is focusing on the potential role of medical museums in community and public engagement with health and medicine, based on the role of the Medical museum at the Cairo University, faculty of medicine “Kasr Al-Aini hospital”. The Museum of Genomic and Oncology, at the Department of Obstetrics and Gynecology in Kasr Al Aini hospital in Cairo. Its story began nearly 90 years ago, when the famous gynecologist Najib Pasha Mahfouz (fig1, fig 2) collected 1300 rare and mysterious cases of obstetrics and gynecology, and decided to include them in other collections, the museum was founded and opened in 1929 (fig3, fig 4), to be a

reference for students and researchers. It is the largest and the first medical museum of its kind in the Middle East. It contains different rare medical samples, and volumes suitable to be an integrated scientific approach, and unique project from embryos of different births. Rather than asking whether cultural venues such as museums can directly improve the well-being of their visitors, the research is focusing on how museums should communicate about health and medicine?

### **Research value:**

The main Egyptian museums are characterized by the fact that all their holdings are the result of scientific or non-scientific excavations extracted from the Egyptian lands. This is in contrast to many major international museums, which are filled with many foreign artifacts and acquisitions brought from other different countries. In the classification of museums, it is possible to use many classifications, each of which depends on a specific criterion. The museum's specialization in the types of exhibits within the museums led to the existence of special types. The museum's definition has expanded to include: science centers, nature centers and imaginary museums, museum Collections. Museums are classified into large central museums, including storage, and to display only collections. <sup>(6)</sup> Another way for museums classifications is according to museums collections, they can be categorized into: State-owned museums and public ones. It is also owned by private individuals and institutions, where museums are primarily investment oriented and are not intended to be part of the International Council of Museums ICOM <sup>(7)</sup>. There are museums belonging to government agencies but they are run by an elected or appointed board of trustees, which are not for profit. Museums can also be divided into three main types, such as art museums, museums of history, archeology and heritage, and museums of science and natural history.

The museums of science and natural history in Egypt do not receive the necessary required academic studies and need to provide a lot of serious studies on how to find ways to raise awareness in the Egyptian society about the holdings of these important museums and how to attract community and its various groups for that important type of museums specialized in science and nature, for education and educational process for students, amateurs, visitors of various cultural and educational backgrounds, in addition; that those scientific museums contribute to the development of the personality of young people and increase their association with society and science and motivate them to ambition and love of science and the formation of background patio for certain scientific disciplines that may turn to be their field of specialization in their future.

The study is aiming for shedding light on the status of one of the most important science museums in Egypt, and even in the world, for the uniqueness of its collection and its scientific holdings among the world's scientific museums, with a review of the ways of linking between community and the scientific museum successively.

### **Research Methodology and Theoretical Background:**

The paper describes unique example of samples exhibitions at a Medical museum which attempt to display medicine as culture, and draws out three of the key strategies which it employs. These three key strategies are: (1) If medicine is presented through historically specific material objects? (2) Are these objects used to explore the processes of research and the evolution of practice? (3) If exhibitions are designed to emphasize an implied relationship between the objects' functions and the visitor's own knowledge and benefits?

Museums of science and technology are concerned with the development and application of scientific ideas and instrumentation. Like museums of natural science and natural history, science museums have their origins of [enlightenment](#). Some of them were developed from the collections of learned societies, others from private collections. A later development in science museums involved the applications of science, so that museums began to preserve the material evidence of technological as well as scientific endeavor. Some science and technology museums concentrate on demonstrating science and its applications; in these museums the preservation of process is emphasized over the preservation of objects. Science museums are particularly popular with children as well as adults and often provide opportunities for their visitors to participate through demonstration of models and interactive displays. <sup>(8)</sup> Along with the wider fields of public health promotion and science communication, have gradually shifted their focus further out into the cultural landscape. Determinants of health used to be seen as primarily physiological; then as social, economic and structural; and more recently cultural contexts have entered the stage, creating a "whole-of-society" approach special issue. There are both pragmatic and normative reasons for this, all entangled with changes in communication media that offer ever-expanding opportunities to be confronted with other ways of life, and for citizens to play a role in shaping previously impenetrable institutions and practices.

This research is focusing on introducing the development of science museums interpretations and requirements and how to make these museums more effective in community awareness.

### **The Museum definition and role:**

The museum is a place not only for the display and storage of exhibits, but its main function is to present ideas and other contexts of the museum. During the exhibition, the museum is the institution responsible primarily for both tangible and intangible cultural heritage. It should be addressed at the beginning to confirm the fact that there is no real interest to achieve development and change in museum studies science within the Egyptian academic institutions, although Egypt has about 400 museums in all different disciplines.<sup>(9)</sup> The science of museums is a unique science autonomous "allocated to the foreign universities, independent studies and special sections and programs, as granted in this science master's and doctorate, France has begun to teach this science since 1941.<sup>(10)</sup> The landscape of science learning is broad and ranges from institutions to museums. Within designed science learning environments questions about who participates? How they do so? And why they have traditionally been framed in terms of students within schools and universities?<sup>(11)</sup> Museum. A museum is a non-profit, permanent

institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment.<sup>(12)</sup>

Museums bring the world's treasures to the public. Like many other museums, they collect works of art in order to inspire, uplift, and inform. Museums carefully organize and present these works of art in ways that make them more understandable. Traditionally, gallery presentations have been organized in several ways: by geography, or by medium, or by chronology, or sometimes a combination of those ways. Such categories are useful because they allow the viewer to make important comparisons within a group of closely related works. At the same time, however, those traditional categories can be limiting, because they do not offer an opportunity to make larger comparisons – across different cultures, mediums, or time periods.

This gallery challenges those traditional approaches and offers an alternative option meant to augment other organizational themes in the Museum. Here, works of different places, types, and times across the Museum's collections are gathered into broad themes, emphasizing connections across cultures, which allow us to see the ways in which art reflects our shared humanity.<sup>(13)</sup>

### **Different displaying methods and techniques in Museum:**

Museums are using different methods and techniques for displaying objects through labels, lighting, text panels, graphics, and arrangement.

These frameworks and visual cues communicate a message to visitors about the culture on display. However, they also convey unintentional messages, hiding the transformative process that takes place and engendering certain expectations and assumptions. But how can non-traditional display techniques help museums represent culture more effectively? It is my contention that Connecting Cultures purposely breaks boundaries and subverts expectation to create a bold, non-traditional method of displaying culture that exemplifies how museums can revitalize traditional and foster new ways of seeing.<sup>(14)</sup>

First, it is important to define what constitutes a “traditional” cultural exhibit. Generally speaking, natural history and anthropological museums contextualize objects by displaying them within a clearly defined geographic and temporal context. Objects are arranged in cases or hung on walls so that they are easily viewable, and they are typically ordered by theme, type, or chronology. The exhibit text is written in the authoritative voice of a nameless, faceless curator and often fails to address the multiplicity of meanings of an object that are carried beyond its original context. Issues of how the object was collected and how it entered the museum setting are ignored, erasing a piece of the object's history and the transformative process that has taken place. In this way, museum objects are viewed as dead objects, cut off from the culture that created them and, thus, the only life that is imbued with meaning and importance in the museum setting. Although certainly not every cultural exhibit shares these characteristics, they are foundational elements in many major cultural institutions around the world, and they set the standard for what visitors expect to see in such institutions.<sup>(15)</sup>

**Art museums**, on the other hand, display cultural objects in a way that highlights their aesthetic qualities. During the twentieth century, art museums were developed into sites of aesthetic

contemplation and spiritual communion with the art. This ideal of the aesthetic museum continues to hold in art museums today such as the Tate Gallery in London. Pieces are placed far apart on the wall so that they can be visually isolated and contemplated individually, apart from any wider historical or educational scheme that might undercut the pure, aesthetic beauty and wonder of the object. Information in such museums is provided in anterooms or kiosks at a distance from the art. Everything from the minimal label text to the benches is designed to fade into the background, providing the perfect contemplative setting. In art museums, visitors are used to seeing objects from ancient cultures and complex civilizations displayed alongside European masterworks. Other cultural objects such as those from Africa have made the transition into art museums more recently, increasing in prevalence throughout the 1900s. In this way, art museums like the Brooklyn Museum condition visitors to experience objects of culture from a primarily aesthetic standpoint<sup>(16)</sup>

### **Anthropology and science museums**

However, there is also a history of subverting expectations of the museum setting. Though it is more commonly found in art museums than history or anthropology and science museums, there is a growing trend of exhibits designed to surprise visitors. For example, in recent decades, artists have become interested in staging exhibitions that force visitors to reflect on the nature of museums themselves. One of those is the artist Fred Wilson, who in 1990 staged an exhibit at the highly conservative Maryland Historical Society called Mining the Museum. The opening display featured a silver globe from 1870 next to an empty display case labeled "Plastic display mounts made ca 1960s, maker unknown". Beside that were two sets of pedestals. The first set displayed busts of famous Maryland heroes, and the second set, which was supposed to feature well-known Maryland African Americans, was empty. But perhaps the best remembered display in the exhibition was a case labeled "Metalwork 1793-1880," which juxtaposed a group of lovely silver vessels with a pair of iron slave shackles. In this way, Wilson used the power of the museum context, especially object arrangement and labels, to shatter Western beliefs about museums as bastions of truth and expose the contractedness and biases of knowledge production in the museum<sup>(17)</sup>

Thus, the main goal of the exhibit is to make broad, cross-cultural comparisons that demonstrate how art reflects our shared human experiences. A secondary goal is to introduce visitors of the Brooklyn Museum's diverse collection.<sup>(18)</sup>

After entering the gallery, visitors encounter an open room crowded with objects of all different kinds, styles, cultures, and time periods. However, if one looks closer, it becomes clear that three walls of the gallery are dedicated to three different themes, each with their own introductory text panel: connecting people, connecting places, and connecting things. "Connecting People" centers on how human image has been conceived of and represented across cultures and times, while "Connecting Places" focuses on various impressions and ideas about the world around us. Although technically everything in the exhibit is a "thing," the "Connecting Things" section is devoted specifically to design and cultural significances of everyday, man-made objects. These broad themes relate to the objects along the walls and the

cases that fill the room, though there is no clear path for visitors to follow. Text labels for each object (usually about a paragraph in length) provide contextual information and reinforce and expand on the major themes of the exhibit. Several videos are displayed on small, flat-screen monitors are scattered throughout the exhibit, supplementing the textual information.<sup>(19)</sup>

The center of the room features a circular area around which several cases are arranged. A text panel titled "Connecting Cultures: An Illustration" explains, "When works of art enter a museum, they take on new meanings and can be understood in new ways. In a gallery setting, we can compare objects from different cultures in ways that were not possible before they were gathered together, leading to new insights into what cultures share and what makes them different." The cases in the central area serve to illustrate this point, bringing together objects with similar form, purpose, or value in the cultures they come from.<sup>(20)</sup>

The exhibit design utilizes the height of the space to the fullest extent. Some text labels are almost on the floor, while objects are stacked or hung all the way to the top of the walls. Visitors must constantly look up or turn their head to view the objects, and the sense of being towered-over may be slightly overwhelming to some. Indeed, the exhibit may even be perceived as cluttered due to the lack of space between objects. There is, however, an aesthetic unity throughout the gallery. The white walls covered in large, grey graphics complement the simple, black labels. The black-and-white color scheme also carries over to the cases and pedestals, forming a consistent, unobtrusive backdrop for the artwork. In regard to conservation, many of the objects are not behind glass but have small signs next to them warning visitors not to touch. The most delicate, light-sensitive pieces such as books and textiles are contained in dark cases that can be dimly illuminated by the touch of a button. For two of the taller cases, on the other hand, the objects are bathed in white light, brightly illuminating the items at the top.<sup>(21)</sup>

## Framework

When museum visitors walk through rooms and exhibits in a particular order, they encounter objects in the way the museum's organization dictates. This creates a framework for the visitor's experience and constructs a particular aesthetic and historical narration. Even when visitors choose to not follow the path laid out or only view certain objects, they still must navigate the framework of the space. The way visitors move through museums is similar to worshippers in a medieval cathedral. Pilgrims would move through the cathedral by following a structured narrative such as the life of Christ, stopping at prescribed points to pray and contemplate the message being presented. In the same way, the museum's framework presents a narrative, both within each gallery and throughout the entire museum. Take, for example, the conversion of the Louvre Palace into a national museum. By turning the king's lavish residence into a public space, open to everyone free of charge, the Louvre became a powerful symbol of equality and freedom. The ideology and values of the new republic were reflected through the museum's narrative structure, which reclassified art as the history of Civilization, beginning with Egypt and Greece, then moving into the Italian Renaissance, and ending with the nineteenth century France. The arrangement of art in the Louvre clearly situated these four groupings as the high points of art, including France as the last of the great artistic traditions in the story being represented.

Thus, the museum narrative invoked national pride and presented a particular Eurocentric view of the world. Other museums, including the Metropolitan Museum of Art, were greatly influenced by the Louvre's "ceremonial program," though most have now been rearranged so as not to project the traditional, Western-oriented view of the progression of civilization.<sup>(22)</sup>

## Design

While the framework of the exhibit is a fundamental component of its design, it is also fruitful to examine how more specific aspects of design such as lighting, aesthetics, text, and use of space also affect the message of the exhibition and subvert visitor expectations. These elements are important because they set the objects "in context," providing the viewer with a frame of reference. Indeed, most visitors are unaware of how much their experience of museum objects is "conditioned," subliminally or otherwise, by the way the objects are installed. In *Connecting Cultures*, the placement of objects is highly significant, not just in relation to each other, but in relation to the space itself. Objects cover the walls, rising far above visitors' heads so that they have to look up to see everything. In fact, the space is so crowded full of objects that it may overwhelm some visitors. It is difficult to view one object at a time; a design choice I believe is intentional. The goal of the exhibit, after all, is to make connections among these objects, a concept that is reinforced by not separating them visually.<sup>(23)</sup>

More importantly, the crowded arrangement completely contradicts the typical design of museums, which tend to place objects far apart in order to provide the ideal environment for aesthetic contemplation. Art museums have traditionally been interested in unique objects, distinguished by originality and innovation. Art objects can stand on their own, separated from their cultural context, and still be appreciated as art. This is reflected in the minimalist design of many art exhibits, which display single objects on isolated pedestals, with very little suggestion of cultural meaning or functionality. In contrast, the placement of objects in *Connecting Cultures* more closely resembles "the crowded presentation of the old-fashioned natural history museum [which] grew out of a desire to show many typical examples". Unlike art museums, natural history and anthropology museums collected what was typical of a culture rather than what was unique or aesthetically appealing and exhibited large quantities of similar objects, often arranged typologically. *Connecting Cultures* applies a style of object arrangement typical of a natural history museum to a collection of unique, beautiful objects typical of an art museum.<sup>(24)</sup>

## When establishing scientific museums:

It has to be close to scientific and cultural settings (ex. universities, colleges, schools), So that there is coordination among those scientific institutions, because museums are no less important in their message than any other cultural centers. Although there is objection to the establishment of museums within parks and public parks, but it is now the most popular place to build new museums, where the fire hazard is less, thus providing protection from dust and exhaust. Vehicles and fumes from factories and homes, because all these factors have bad effects on works of art within museums.<sup>(25)</sup>



When constructing museums, the new building will accommodate different collections of monuments, therefore they must be flexible in their design, so it can be expanded in the future to accommodate other groups. Exhibits must be taken into account in the galleries, so that they fit in Forms and colors, in order to provide impressions of decent architecture with content levels, as museum is rich in antiques, jewelry and so on. Selection of suitable places to display old and contemporary paintings should be considered, for visitor to see the difference between the two works. Hence it was necessary to allow urban planning Museums to have freedom and ease of movement when transporting heavy statues, and provide ease and speed if the location of exhibits has changed.<sup>(26)</sup>

When planning museums, it is necessary to consider not only the presentation of their contents, but also that there are socio-economic considerations so that museums are visited by a large number of Public to gain private income to achieve financial status by which it can continue, develop and commensurate with all other activities they have.<sup>(27)</sup> Flexibility must be taken into account when designing museums, not just by focusing on facilities, but Also work to show the aesthetic aspects of the artistic values of historical exhibits.

### **How to set up museums?**

A museum is a scientific and artistic work of a special nature combining many sciences, in addition to creativity and fine and applied arts, a successful museum is based on the use of foundations, correct technical and applied art and presents its work about the rules of science it is specialized in with a psycho-social style, because the first function of the museum organizer is to understand clearly the idea he presents, then translates it into flexible forms that he presents to the public.<sup>(28)</sup>

Determining the purpose of the museum, contemporary museums are of a quality, character and special purpose. The purpose may be to publicize a particular type of museum, or a soft activity or production or the modern methods that it uses in its work, or the new projects that it uses and the importance of its activity in raising the standard of living or consolidating the relationship between the authority community and publicity to urge parents to support and encourage the authority. The most important thing is that museum has one main purpose so that the chance of success is greater. Determine the type of audience that will visit this museum in terms of cultural, social, economic levels, age and gender. As for primary school pupils or Riyadh (kindergarten) children a museum is different from the ones for general public and there a specific museum for university students. Examples of the Natural History Museum with zoos containing a large number of birds Stuffed reptiles and rodents.<sup>(29)</sup>

To study the proposed location of the museum in terms of location for visitors, it should happen soon or it should be easily accessible, so as to facilitate being visited by the largest possible number of the public. In case of the establishment of public museums, a suitable location should be chosen, in terms of having a place next to it. Cars or buses that carry visitors, tourists and those whoever want to avoid traffic disruption.<sup>(30)</sup>

**The development of museum presentation methods :<sup>(31)</sup>**

The development of museums has been accompanied by developments in the presentation of the following stages:

Presentation of the elements accompanied by scientific or educational illustrations such as charts or models of Stereoscopic viewing, which led to the need to re-study the architectural space and clarification.

The difference between what is offered and what is illustrative. It evolves around presenting elements of the surrounding environment as a whole of the image, whether exposed in the light or natural climate or industrial in terms of shape and lighting.

Evolution of the need for the importance of adding elements associated with the artifacts in which the viewer can see, which are difficult for the museum to build, such as scenes of mountains, desert, seas, and maritime or archaeological sites. Those displays are either color slide projectors or projectors within the course of the museum presentation, with consequent considerations of special design in terms of place, shape, lighting or acoustics.

Museums have emerged to attach particular importance to accessing information through experience. Visitors' self-touch (either by touching or by running the displayed tools), special considerations for the method of implementation, materials and maintenance.

Museums displaying antiques or artifacts due to their original considerations such as being rare or so. The presentation is based on scientific or cultural means in science museums, space museums and others.

**General considerations for museum design:**

The flexibility of the museum's interior space allows for horizontal and vertical expansion of all trends, and fits with all types of presentations over time. Flexibility of the museum's human structure to withstand all possible changes. The study of the horizontal projection of the museum in a way that allows the application of known theories of movement for visitors inside museums, which got rid of the movement on the main axis starts from a point known (as the main entrance) and return to the same point without passing through exhibits that has already been passed through. You can get out of this axis and return to it and visit each section separately, if the visitor wishes to extend the visit even for several days.<sup>(32)</sup>

Study the natural lighting method to allow the entry or prevention of natural lighting anywhere in the exhibition according to the requirements of the presentation. Distribution of electrical outlets, air conditioning, communication, drainage and monitoring fixed distances in the ceiling, walls, and floors. Consider the possibility of dismantling and installing units, that network can be diverted according to the requirements or variables needed by the presentation for several years.

**The design should include:**

Contingency insurance and protection plan (fires - natural disasters .....)-Equipment to ensure the safety of visitors and museum administrators.-Devices to control the entry and exit and control

parts of the museum.-Fire alarms and extinguishing devices.-Protecting exhibits from erosion factors that may affect their safety, the most important of which are: <sup>(33)</sup>

- Humidity.
- Direct light, whether from natural or industrial sources.
- Heat and thermal changes.
- Vibrations due to heavy movement or heavy traffic.
- Air pollution and changing its chemical composition
- Lighting

Lighting is divided into: Natural lighting, and Industrial Lighting

-Natural Lighting:

Natural lighting is important in the design of museums and may be characterized by ease, in terms of operation and diversification, “bonus boxes highlight the exhibits' features” but experience proved that this belief is not true and that daylight is the right light inside museums, despite all the different difficulties that obscure light in different periods of time

The building design should take into account the maximum use of natural light, even if it is necessary to sacrifice other structural considerations, it should be noted here that this can illuminate the museum from the ceiling and from the side windows and therefore must take into account the sizes of the exhibits in the design of these windows in accordance with the requirements of lighting inside showroom. Natural lighting inside museums has two types:

- Overhead lighting.
- Side lighting.
- Top lighting:

### **Overhead lighting:**

#### **Advantages:**

It permeates directly into the exhibition halls and is not exposed to any obstacles such as surrounding buildings or the presence of trees that obscure the lighting inside the building. The possibility of controlling the amount of light falling on the paintings and exhibits, it is safe from light reflections and allows good visibility. Providing wall spaces and using them for display purposes. Exploitation of large areas in the building to achieve more halls without having to adhere to the work or openings inside the walls. Facilitate security measures in preserving the museum's contents the presence of windows and openings of walls. <sup>(34)</sup>

#### **Disadvantages:**

The amount of light radiation projected on the exhibits and the irregular lighting. Design disadvantages in excessive heavy roof vents and props mounted on these openings and the resulting dirt pool, in addition to the expected risk of rain, water, humidity, heat, sunlight ..... Etc.

Irregular lighting from the ceiling from one hall to the other; this causes boredom for visitors on their tours inside the galleries

The many technical and structural difficulties that require the establishment of the roof that allows the entry of natural lighting.

The type of lighting and its effect on other benefits.

### **Side Lighting:**

#### **Advantages:**

Good illumination on the side walls and on the exhibits in the middle, the room has angles suitable for the light source. Highlight plastic elements and shadow in the historical paintings and sculpture pieces. Maximize simplicity, economic building design. Use of traditional ceilings, the flat that harmonizes from the surrounding area. Provide good ventilation and proper temperature in the exhibition halls so not to rely on adaptations.<sup>(35)</sup>

The possibility of providing a variety of views for visitors, overlooking the garden or patio indoor display. Get rid of boredom and attract the attention of visitors towards the external display.

#### **Disadvantages:**

The wall in which it is located cannot be used for display purposes. The wall facing is also not fit for display. For exhibits with a glossy or polished surface, they reflect a source of light impeding vision.

### **Industrial Lighting:**

Use when using concentrated lighting. The current trend is to leave regular lighting and prefer a spot-focused light on a range of exhibits, with the aim of attracting visitor interest and creating a changed diversity.<sup>(36)</sup>

### **Measuring the impact of museums on their communities:**

The word (Musée) in French, (Museum) in English and German, (Museo) in Italian and Spanish are all derived from the Greek term (Mouseion) which means "mountain lady" or "mountain woman". It was launched by the Greeks on a temple built on the highest mountain near the Acropolis of Athens.<sup>(37)</sup> The Museum of Alexandria is the oldest museum in the world, where historians said that Ptolemy had founded Alexandria Museum in 290 BC, it was able to attract the most famous writers and scientists of his time, and the idea of establishing the Museum of Alexandria had been established with the foundation of the Library of Alexandria.<sup>(38)</sup> This was followed by the construction of three museums, in Rome in 189 BC to display the Roman spoils which they had captured in their wars, the "Bergham" currently Turkey on almost the same date, and the third in Antioch, the capital of Syria during the Greco-Roman rule.<sup>(39)</sup> The museum has emerged in its modern concept since the 18th century in Europe, where important old buildings such as palaces, churches and cathedrals were used to collect, preserve and display precious possessions. These buildings became the property of the state, not individuals, and became available to all. This period is characterized by the beginning of the systematic classification of exhibits according to the time series. Thus, the idea of building properties for museums, in terms

of collecting and displaying certain effects or collections of the public, does not exceed two centuries in total, as opposed to the idea of acquisition that have been known since ancient times.

<sup>(40)</sup> Europe began to establish museums with its contemporary concept, and spread very quickly, until it became a rumor especially in big countries. <sup>(41)</sup> The most famous and oldest museums in the world according to the originality are:

The Vatican Museum<sup>(42)</sup> in Rome<sup>(43)</sup>, which was established in Italy in 1506, the British Museum<sup>(44)</sup> established in 1751 in London, the Hermitage Museum established in 1852 in Saint Petersburg, Russia, and the Ashmolean Museum, Oxford University, England, which was founded in 1683 and then the Louvre Museum in Paris, 1793, then the Berlin Museum, which was established in 1855 in Germany, followed by the creation of the Museum of Fine Arts in Boston in 1870 (USA) and the Metropolitan Museum of Art, New York, USA in 1870.

### **The Role of Museums:**

A museum is a constantly evolving institution, a cultural educational mechanism for the service of the community, its main task is to preserve and display a collection or collections of exhibits for the purpose of studying and entertainment together.<sup>(45)</sup> Museums are keen to look after the world's cultural property and interpret it to the public. This is not ordinary property; It has a special status in international legislation and there are normally national laws to protect it. It is part of the world's natural and cultural heritage and may be of a tangible or intangible character. Cultural property also often provides the primary evidence in a number of subject disciplines, such as archaeology and natural sciences, and therefore represents an important contribution to knowledge. It is also a significant component in defining cultural identity, nationally and internationally.<sup>(46)</sup>

The National Alliance for Museums, Health and Wellbeing was established in July 2015 in recognition of the increasing contribution that museums and galleries are making to health and wellbeing. The Alliance is a place where information about museums and health can be shared, to improve the existing practice, help build resilience and provide resources and support for those individuals and organizations working in this area of activity, and its mission is to:

- provide leadership and advocacy for the sector's contribution to health and wellbeing;
- identify areas of best practice, and gaps in knowledge and training;
- provide support, guidance and recommendations of best practices, initiating partnership work and health commissioning;
- establish a common language for this interdisciplinary field and highlight what works.<sup>(47)</sup>

The British Museum was established by an act of parliament which stated that the museum was "not only for the inspection and entertainment of the learned and the curious, but for the general use and benefit of the public". It opened in 1759 in Montagu House, Bloomsbury that was specially purchased for that purpose. Public access was free from the outset, although initially it was necessary to apply for a ticket to gain admission. A visitor from France in 1784, observed that the Museum was expressly "for the instruction and gratification of the public". The museum comprised classical antiquities, natural history specimens, manuscripts as well as ethnographic, numismatic and art material. The founding law reflected this encyclopedic thinking of the time

stating "all arts and sciences have a connection with each other". But the natural history collections were moved out to form the Natural History Museum, which opened in 1881.<sup>(48)</sup>

Museums, their missions, their civic, social responsibilities, and their modes of engagement with communities are in a constant process of transformation in response to social and economic imperatives at local, national and global levels. There is a need for museums to stay relevant and be responsive to pressing social and environmental issues such as population and sustainability, social justice and Indigenous rights. Funding bodies and stakeholders now acknowledge that museums and programs need to demonstrate impact and value within their local communities in order to attract further funding and ongoing support. Several models of impact have been developed in Europe and the United States, and a number of benefits are claimed for participation in museum programs and museum visitation. However, these have not been subjected to rigorous testing, particularly in Australia. This paper discusses challenges for such scientific museums in measuring impact and meeting audience needs, drawing on results from two major research projects: Investigating the impact of small museums in their local communities and exhibitions as contested sites and the roles of museums in contemporary society.<sup>(49)</sup>

### **Scientific and Medical Museums history:**

This research paper outlines scientific museums' historical and contemporary approaches to science communication, detailing how they have used exhibits and public programming to balance their twinned missions of scientific research and public education. It describes the history of these institutions, and the various forms of natural history museum, science museum, and science centers they assumed. It explains how and why approaches of exhibition have changed, discussing the rise of hands-on, interactive, and immersive displays, and museums' shifting attitudes toward the visitors in their halls. It also reviews longstanding and current challenges that museums face as they strive to communicate with diverse audiences about scientific process, practice, and discoveries.<sup>(50)</sup>

A range of studies reveals the vital and often unique historical evidences that seemingly mute objects can be made to yield, especially about what people actually did and felt, rather than just what they wrote or said about their experiences.<sup>(51)</sup> Taking a step back from the objects themselves, especially at the places in which most of them are found -namely medical museums. The question then arises of how to deal with the fact that we are always communicating in the context of the lived, local cultures that shape personal experiences of health and medicine. Many traditional health communication media demand the selection of a target group that must be specifically addressed, ideally to influence behavior. Yet it's very hard to "hit the right note" for culturally specific audiences, on both superficial and deep levels. We would like to suggest that attending as well as visiting such museums is better for the receiver's culture. Health communication should also pay attention to the multiplicity in medical culture itself. We do not just want to be sensitive to the social and cultural context with which much history of medicine is concerned; we want to emphasize the specificity of medical cultures themselves, in different

periods, laboratories, hospitals, homes and disciplines. By doing so, we hope to create a public space where the varied and material cultures of medicine can meet lived, local cultures.

As a university medical museum with a broad audience, our museum is shifting the focus away from the specific lived cultures of regular visitors, and work on integrating ideas about medicine as culture into the cultural sector. This statement uses the word “culture” in three ways, which will be briefly unpack before proceeding. First, we refer to museums as part of a broadly defined creative and cultural sector. Second, we refer to the lived, local cultures that museum visitors bring with them – their habits, beliefs and values in relation to health, medicine and the body. Third, in the tradition of science studies, we treat medicine as culture. In other words, we start from the position that the scientific and clinical practices of health and medicine are also cultural, as evidenced by their shared languages, education and institutionalization, practices of looking and categorizing, concepts of knowledge, structures of power and so on...

Health communication always refers to culture, at least implicitly. Health information and research findings never exist in a vacuum; they cannot be fully defined objectively and then transmitted accurately to a blank and deficient public. The medical museum should be considered as one of the places in which this might occur. It is important to acknowledge that only some people can and want to step over our threshold, and as a museum considered to be a part of the faculty of medicine. The collection is focusing on the forms of medicine practiced and researched there.

At the heart of this research lies the conviction, not only that artefacts are significant, but also that their study is greatly enhanced by an understanding of the history of the museums that keep them; indeed, researching the materialistic culture of medicine without an interest in the type of institutions that preserves, it would be to share some of the myopia of ignoring three dimensional evidence altogether. It is the nature and history of medical museums that distinguish their objects from mere collections of generic types and odd examples; they provide the essential context that enables lumps of brute matter -instruments, wax models, pieces of furniture, anatomical specimens and so forth -to come to life as parts of cultural and social history.

Indeed, this insistence on the importance of history of medical museums, in addition to their contents necessitate researching about histories of the buildings they occupy, along with the ways in which their collections were amassed and what has happened to them since they arrived museums. Then museum artefacts which should be capable of revealing much historical insights in their own right.<sup>(52)</sup>

### **Exhibition Methods:**

Material objects always bear markers of culture: their design indicates how they were used, and they often bear the patina of specific use. For example; Medical museum combines a museum with an interdisciplinary research group, to research and practice reciprocally and inform each other; it is continually experimenting methods for exhibiting and understanding cultures of health and medicine in cultural and historical perspectives. That type of work is close to public health researchers, clinicians and biomedical scientists; with scholars from social sciences and

humanities; and with artists and other creative practitioners, all of whom are also part of our audience.

### **Scientific Museum Structure and Operations, Building Design and Function:**

Establishing a new museum or refurbishing an old one is normally a prestigious event with a high public profile. Its design is expected to reflect this, whether involving an existing building that is probably preserved for its own historic or architectural significance or new premises. As a building that houses items of excellence, it is expected to match the quality and distinction that the exhibits bring to it. Today's museum building is multifunctional in character, providing open space to accommodate exhibits and visitors but with high security and stringent environmental controls to protect collections. Less obvious is the storage for reserve collections, laboratory and workshop space for exhibit conservation and preparation, facilities for teaching, studying, and offices.

### **Collection, Acquisition Policies:**

A museum acts as an information Centre for its community. In addition to its displays and exhibitions, its data banks and publications, it has a staff of specialists, who in most cases are available by appointment to provide information on request. Museum publications may be educational or cultural or may be designed for a popular market. They may take the form of periodicals, handbooks, catalogs, research papers, or general guides to aspects of the museum and are an important medium for disseminating information to the lay public and scholars; such information and products are now commonly available via the museum's web site. Many museums also offer an opinion on items brought to them for identification. This can be of value to both the inquirer and the museum because it provides an awareness of local discoveries and holdings that aids the museum's efforts to build up a picture of its area of responsibility. At the same time, it provides an informed opinion as a public service. Museums rarely provide valuations, however, to avoid conflicts of interest, some decline to have any connection with the antiques trade.<sup>(53)</sup>

Relatively few museums have been established with the specific goal of forming a collection; instead, most have been created to receive an existing collection. With the existing collection as its base, the museum then traditionally works to fill in gaps in the collection or extend its activities into other, usually related, fields. For this reason, many museums have heterogeneous collections, at best accumulated under an "encyclopedic" philosophy (which has rarely been successful unless major resources were available to achieve it) and at worst continuing a "cabinet of curiosities" approach (which may amuse and entertain the clientele but does little to engender scholarship or research). Often the collections made depended on the expertise or whim of the curator and were sure to change when that curator was succeeded by someone with different interests. This method has produced some outstanding special collections, but these resulted from circumstance rather than long-term planning. Collections management is the term applied to the various legal, ethical, technical, and practical methods by which museum collections are assembled, organized, researched, interpreted, and preserved. Collections management focuses on the care of collections with concern for their long-term



physical well-being and safety. It is concerned with issues of preservation, use of collections, and record keeping, as well as how the collections support the museum's mission and purpose. The term collections management also is used to describe the specific activities undertaken in the management process. Managing collections effectively is critical for ensuring that the collections support the museum's mission. This also is vital in order to make the most of the always limited resources of time, money, equipment, materials, physical space, and staff. Equally, collections management needs to be based upon clearly defined policy and procedures that guide every-day decision making and activities.<sup>(54)</sup>

Research on museum collections and publication of the findings provides a particular type of access to the collections, and allows museums to address their education and interpretation mission. It makes specialized information available to various interested parties and provides the basis for exhibitions and educational programming. It is very important that all museum research is legal and ethical, in accordance with academic standards, and supports the mission of the museum.

**Field Collecting** When museums undertake field collecting it must be done in accordance with all laws and treaties, and must adhere to accepted academic standards. It also must be considerate of local populations and their needs and wishes.

**In-house Research** by museum staff should relate to the museum's mission and scope. The research should conform to accepted academic standards. Research by museum personnel must take place within the museum. Staff should not be permitted to remove collections objects, even temporarily, from the museum for any purposes. Scholars who visit Museums should have written policies for security access to, and handling of collections by visiting scholars and researchers. Museums should promote in-house use of their collections by visiting scholars and researchers while providing for the security, protection, and safe handling of those collections during the research.

**Destructive Analysis** Sometimes destructive analysis techniques are required to further research investigations. These must be undertaken only after careful consideration. Submission of a research proposal to the museum for evaluation should be required. The museum does not give titles<sup>(55)</sup> Assembling collections is one of the primary functions of a museum, and the objects that comprise the collections become amongst the most important assets of the museum. Preservation, care, and management of the collections to fulfil the public trust are responsibilities of the museum, and thus help to achieve the museum's mission. Good collections management is one of the strategies by which preservation and care is achieved. Adopting and implementing the collections management policies and practice recommended in this chapter will provide a firm foundation for implementing all various other strategies for running a museum.

### **Museums and the History of Medicine, Early-Modern Experimental Museums**

Many of Europe's first museums were, in fact, set up in the apartments and workplaces of medical specialists and doctors. In Italy, then in Northern Europe, and finally in England. Renaissance apothecaries and physicians along with other emergent professionals and that part of the nobility intent on cloaking itself in the pretensions of "virtuosity" gathered and studied "natural" and "artificial" curiosities, many of them were brought back from travels to unfamiliar countries. Being simply not satisfied with hoarding and admiring their treasures, a number of

these early collectors also turned their museums into houses of experience and experimentation. They tasted and tested their specimens, explored the magic of loadstones, assessed the plausibility of theories about fossil origins and, of particular significance here, attempted both to deepen knowledge of *Materia Medica* and to practice medical dissections.<sup>(56)</sup>

### **Museums and medical education:**

The eighteenth century, in particular, witnessed elaboration with some audaciously fanciful developments in the art of their creation. Over a thousand specimens of anatomical and obstetrical wax models cans (fig 5), for example, in the Vienna Institute of "History of Medicine at the Josephinum". Other significant collections exist in Florence, in Dresden at the "Hygiene Museum", and at the Museum of "Morbid Anatomy" of Bologna. At least two examples are also still in the "Anatomy Museum" of Leiden, along with many more prepared by its contemporaries and successors. The most notable exponent of the art in the nineteenth-century in England was "Joseph Towne", whose anatomical and dermatological waxes can be seen in the "Gordon Museum" in Guy's Medical School. Medical wax models continued to be made and used for didactic purposes, augmenting the use of cadavers -well into the twentieth century.<sup>(57)</sup>

With notable exceptions, the use of medical museums for research purposes -for their anatomical, natural historical or pharmaceutical aspects-diminished from its height in the sixteenth and seventeenth centuries. The awe-inspiring range of early-modern museum-based experiments and enquiries was reduced to a more or less monolithic concern with taxonomy. At the same time, medical museums became focused on an educational function. In many eighteenth-century medical schools, collections were increasingly seen as essential elements of the curriculum, and a number of important medical museums owe their foundation to this pedagogical purpose.<sup>(58)</sup>

By the end of the nineteenth century, most learned medical societies had gathered some sort of teaching collection; parts of them approximately a good number have survived till today. Those include: the Gordon Museum, which is still used by "Guy's Medical School" in London; the "Mutter Museum" of the College of Physicians of Philadelphia,<sup>(59)</sup> And the "Warren Anatomical Museum", that was assembled initially by Dr. John Collins Warren between 1850 and 1950 in Harvard Medical School., for the museum has largely been disposed of; even as a teaching forum, this museum had more than its fair share of the marvelous, the wondrous and the ghoulish, and in the modern age of "objective" science, the usefulness and even the propriety of keeping the collection became impossible to defend.<sup>(60)</sup>

### **Documentation of collections**

The importance of the information associated with museum collections requires that this should be documented according to accepted, professional standards. This should include a full identification and description of each item, its associations, provenance, condition, treatment and present location. Such data should be kept in a secure environment and has to be supported with retrieval systems providing access to the information by the museum personnel and other legitimate users. The museum should avoid disclosing sensitive personal or related information

and other confidential matters when collection data become available to the public.<sup>(61)</sup> Information published by museums, by whatever means, should be well-founded, accurate and give responsible consideration to the academic disciplines, societies, or beliefs which are presented. Museum publications should not compromise the standards of the institution. Museums should respect the integrity of the original when replicas, reproductions, or copies of items from the collection are made or used in display. All such copies should be clearly labelled and permanently marked as facsimiles.<sup>(62)</sup>

### **Medical museums and Public Health Education**

During the last century a number of developments within medical museums has been achieved. For much of the first half of the century, they became, in the hands of national states and local governments, widely used as tools for public education in health, sanitation and hygiene. In 1922, for example, Dr. Charles White Bread opened a public health gallery in the "Smithsonian Institution" in Washington DC. Thirty-five years later, a new "Hall of Health" was opened. its most memorable exhibit being the "transparent woman" or "talking lady," as it was known: a female mannequin with internal organs that lit up while being commented upon by prerecorded descriptions. In Britain, the best known example was "Parkes' Museum of Hygiene", founded in 1879, which at the 1950s was still presenting instructional exhibits "in all matters connected with public health."<sup>(63)</sup> Numerous other examples were established by colonizing countries throughout their dominions. They remain popular as educational tools in developing countries.

The other main trend that has, in the twentieth century, led to a virtual explosion in both numbers and types of medical museum has been a self-conscious concern with the history of medicine. Often associated with, and inspired by, the passions of retired medical men, these museums have grown up alongside, but mostly were separate from the development of an academic interest in the history of medicine. Collection of medicine's material culture on a heretofore unimagined scale rapidly becoming larger than many of Europe's national cultural collections. Astoundingly, even this was seen by Welcome as only part of this "Museum of Man."<sup>(64)</sup>

Professional associations have also supported museums. Typical of this genre of medical museum are the "Museum of Pharmaceutical History" in Basel, the German Pharmaceutical Museum in Heidelberg, the Gottingen collection of obstetrical and perinatal artefacts, the British "Dental Association Museum", and, back in Germany, the "Dental History Museum" in Cologne.<sup>(65)</sup>

The cumulative history of some four centuries of medical museums a history which have artificially divided into an early-modern period of museums used for medical research, a later consolidation of their use in medical education, a late-nineteenth-and twentieth-century attempt to use them for public health education, and finally a virtual explosion of self-consciously "historical" medical museums in the past 70 years has produced an extraordinarily diverse legacy of types of institutions in which medically significant collections are now held. Many of the institutions and collections extant today, particularly the older ones, have themselves evolved through a series of stages, each of which has imprinted a new identity of the objects was kept in the collections. An understanding of these successive meanings, where available, that can be

crucial to the study of this material. Though extremely sketchy, even the above outline history indicates the ranges of motivations for founding museums. The importance of this history lies in the potential enrichment it gives to the artefacts that museums contain. For it should prompt students of this material culture to add to their enquiries new questions: when did an object arrive in an institution and how? Why was it brought there in the first place? What use has been made of it since?

### **Historiography in Medical Museums**

In common with many other types of museums, medical history displays have, in the past two to three decades, witnessed a move away from traditional, long timespan, internal histories of the subject to more contextual and interdisciplinary exhibits. In the former, medicine was assumed to be a fairly monolithic intellectual pursuit, with an internal evolution that could be depicted through a mix of objects, illustrations, captions and text panels. In the latter, a different methodology has emerged, in which exhibitions with medical themes are much more broadly interpreted in the context of other subjects and disciplines: most commonly, aspects of cultural and social history, anthropology and archaeology. Two other significant differences also characterize traditional and thematic styles of presentation. First, the former have tended to be set up as "permanent" galleries

The remainder of this paper will look in more detail at the methodological issues surrounding the curatorial challenge of forming and presenting medical history in museums. I will first describe a range of the "traditional" universal survey exhibitions, then I will look at a small selection of thematic exhibitions that have significantly departed from this model and, finally, I will consider the issue of how medical galleries and exhibitions can make conscious use of artefacts as a form of material evidence the very "stuff" of histories they seek to tell.

Medicine touches a special, and especially sensitive part of our psychological make-up. Consequently, as a medical history curator, one tries in vain entirely and unequivocally to separate the "serious" subject of medicine from the "trivial" response to "blood and guts." We feel medical history through its artefacts, not only, like everything else that has a third dimension, because that history tangibly engages other part of our senses. Many curators of medical collections have been tempted to try to avoid, or even willfully to prevent, the visceral responses that some visitors might have to medical historical displays, this sensational aspect of medical history surely provides a key to the special significance of the whole subject. An excessively cautious and fearful approach to such displays thus runs the risk of substituting packages of worthy but uninteresting education for windows on to the real world. It also, incidentally, runs the risk of misrepresenting past periods of scientific investigation.<sup>(66)</sup>

For this reason, exhibitions with a medical history content, no matter what museological context of traditional thousand-year-long survey galleries or temporary thematic exhibitions most probably will contain objects having a potency that inevitably interrupts and rises above the narrative flow of an exhibition. Two examples were taken almost at random from very different types of medical history exhibitions will suffice to make that point. Even though, as just suggested, medical history has privileged access to the core emotions of such objects that touch

these artefacts are inevitably few and far between. For the most parts, both traditional galleries and thematic exhibitions tend to present heavily scripted stories in which objects are mostly used to illustrate, enliven and make palpable a history vouchsafed by textbooks and academic monographs and journals.<sup>(67)</sup>

### **Connection between Museum and Visitors**

It is essential for the museum to be a visitor-orientated museum which is; that the museum has first to be aware of the range of visitors that it currently serves (actual visitors), and who it wishes to attract in the future (potential visitors). If it has a website, it would also have virtual visitors.

Potential visitors are also those who are far less likely to visit museums, for example people with disabilities, families with young children and toddlers, people with low incomes and cultural minority or recent immigrant communities. Many of these people may not have experienced a museum before and so have very little idea of what an attractive and effective museum may offer them. For some there may be barriers. These may be financial, such as unaffordable entrance charges, physical, such as flights of stairs at the entrance and as part of the internal circulation, or social or psychological, such as a reputation that the museum staff do not like visitors with young children. The museum staff need to analyze honestly and consult about actions needed to remove these barriers. Visitor services can enable the museum to gain a positive reputation. Virtual visitors are those who relate to, and use, your museum by visiting your website, through correspondence or by mail order purchases from the shop.<sup>(68)</sup>

Many museums were at first concerned that visitor numbers would drop if they provide Internet access to the services, collections and even the exhibitions, but experience now shows that these fears were unfounded. In fact, the web has been seen to raise people's awareness to museums, encouraging them to make an actual visit. Those planning to visit the museum find an informative website is an excellent way of preparing for the visit in advance.

Every one of us can be categorized by different criteria and fall into different groupings. The groups described below are not the only ones, and of course one individual could fall in to one or more groups at the same time or through their life cycle.

**Individuals:** They tend to visit for a specific reason, probably to see a particular collection or exhibition, or with a research interest at either an academic level or for personal pleasure. As independent learners they want to have detailed information on the items or collections or to get guidance to other sources. They are likely to attend conferences, lecture series and guided tours, provided by the education and curatorial staff. This group may include the retired whose eyesight and hearing may be deteriorating and so would appreciate large printed labels or audio guides. They will like to take time to study displays or paintings and would appreciate portable stools or firm permanent seating at a suitable height in the gallery space.

**Independent adult groups:** These are often adult individuals who form groups for social purposes and some of their time in the museum may be spent in having mutual conversations and relaxing with one another. Museums offer "safe" and aesthetic environments for people to meet and chat.

The museum needs to recognize this social function and provide suitable seating areas, cafes and other meeting points suitable for such smaller groups.

**Family groups:** This group of visitors has a wide range of needs due to the range of ages and interests. Encouraging families; means that the museum is encouraging interest in museum visiting at an early age and creates a pattern of social behavior for life. Family groups often extended to cousins and other relatives and can be major components of the domestic tourist sector. Some, certainly a minority, of museums feel that their collections are not appropriate for young children, but with creative thinking, even complex intellectual topics can be made accessible through special displays, activities or leaflets and quizzes. Family groups include adults who may well return on their own at another time. A successful museum will aim to greet family groups rather than just tolerate them.

**Educational groups:** Depending on the number of groups that visit the museum and the role of the museum's education staff, arrangements may need to be made for the following: spaces for bags and coats; a gathering space that will enable the group to discuss their plans on arrival, a place for eating packed lunches if it has been a long journey, and the provision of clip-boards or notepads for writing on. As many groups may arrive<sup>(69)</sup>.

### **Egyptian scientific museums:**

Natural history museums contain samples of nature, such as plants, animals, or geological strata. The scientific museums are specialized in presenting and interpreting the principles of natural sciences in physics, mathematics, biology, chemistry and using the applications of this science in all fields. The museums which are introducing sciences are among the most modern types of museums. The main aim of these museums is to revive the history of these sciences and track their development over time. Unfortunately, the Arab world did not pay reasonable attention to this type of museums except for some countries during the last few decades. It is also regrettable that Egypt does not have a comprehensive museum of natural history till nowadays. But in Egypt There are a number of quality museums for specific kind of science such as: Museum of Agriculture, the Geological Museum and others. The importance of developing the various types of scientific museums in Egypt is extremely essential to highlight the background of these historical museums and the associated characters who were involved in their foundation and contributed in these museums development, the natural and human heritage and the importance of highlighting the quality of the sources provided by the science documented in the museum group of artifacts and objects ,also the importance of highlighting the scarcity of these groups and what they add in the history of science to the whole world as part of the world scientific heritage. Due to the uniqueness and scarcity of Dr. Naguib Mahfouz as a museum of gynecological and genetic abnormalities among scientific museums not only in Egypt but also in the whole world, it was chosen as an applied example of Egyptian scientific museums in this research paper.

## **Ancient Egyptians and Genetics**

The ancient Egyptian civilization was initiated around 3000 BCE, it was one of the most advanced and productive civilizations throughout ancient history. Evidence of medical organization in ancient Egypt comes from both literature and archeology. The dry climate and religious necessity for preservation of dead bodies as mummies, provided us with a notable indicator of the health status of people during this era.

Ancient Egypt shows some of the earliest evidence for both congenital and acquired diseases. It is a major source of archeological information on achondroplasia and other dwarfing conditions. The skeleton of an adult male of normal stature in a tomb of the first dynasty located in Saqqara (a huge ancient necropolis south of Cairo) in the tomb complex of King Wadj is shown adjacent to that of a male with achondroplasia. It is thought to be around the period of 3100–2800 BCE. The long bones are very short and the fibulae bowed. These changes are mostly attributed to short limb dwarfism, most likely achondroplasia. An interesting example of a skull, suggested the diagnosis of Osteogenesis imperfecta is demonstrated in a “skull of an Egyptian child” of the 22nd dynasty (945–716 BCE) who suffered from osteogenesis imperfecta, now kept at the British Museum, London. Skeletal abnormalities in ancient Egypt including a probable case of Apert syndrome in a child from Nubia, examples of Klippel- Feil syndrome dating back to the Ptolemaic period, two cases with transitional vertebrae from the old kingdom and nine cases of achondroplasia in addition to the two previously reported achondroplasia cases from an Egyptian sample related to Giza Old Kingdom.<sup>(70)</sup>

## **Recent Genetic Facilities in Egypt**

The importance of medical genetics in Egypt started in the Twentieth century in the pediatric departments of Egyptian universities and was well appreciated in the early 1960s at Cairo and Ain Shams Universities. With the increasing control of infant mortality due to diarrhea and infectious diseases, genetic diseases are increasingly becoming a health priority. Then The National Research Centre (NRC) was established in 1967, the medical genetics unit at the “Medical Research Institute” in Alexandria. This was followed by the initiation of medical genetics units in other universities such as El- Mansoura and Alexandria Universities. “Mubarak City of Scientific Research” encompasses centers for frontier sciences including genetic engineering and biotechnology, then the “Human Genetics and Genome Research Division” at the National Research Centre was founded until it became the main unit dealing with genetic diseases in Egypt. Today people from all Egyptian governorates and neighboring Middle East countries seek diagnosis, treatment, and medical advice at that Center. Nowadays, human genetic courses are included in the curriculum of medicine students in most Egyptian universities. In addition; specialized postgraduate degrees in the field of Medical Human Genetics are offered to graduates from Medical schools in Egypt at Ain- Shams and Alexandria Universities. Training programs given by specialized geneticists from different institutions including our division at the NRC are offered to physicians from the” Ministry of Health and Population”.

## **Museums dedicated to niche medicine, pathology, anatomical curiosities and cultural trends keep visitors fascinated and appalled with their educational and grotesque displays.<sup>71</sup>**

Whether it's an oversized parasite, a diseased organ preserved in formaldehyde or a historical look at the outrageous medical practices of yore, there's bound to be an address to discover some sort of unnerving discovery even in less traveled destinations.

### **“Bart's Pathology Museum” England:**

A university collection started in 1879, this exclusive medical oddity exhibit is part of the Queen Mary, University of London. It's open only for special soirees and events that fill up quickly. It's even hosted a pop-up cake shop by “Eat Your Heart Out” bakers. The nearly 5,000 specimens include various objects pulled from human bodies over the last 150 years -- toothbrush in the esophagus, anyone? Also on display: the dissected body parts of assassin John Bellingham among other relics dating to the 1700s.

### **Berlin Museum of Medical History at the Charité, Germany:**

Snippets of Germany's medical history find a home in this restored 19th-century building that houses 1,800 of the 23,000 original specimens that survived World War II bombings. The oldest artifacts include bladder stones from the 1700s. Other curios include a 60-pound mega colon from a patient who died in 1960, an 18th-century birthing chair and various tumors alongside forms of other disease. The museum also traces the darker side of German medicine, including how the National Socialists used science to justify their horrific actions toward race purification. Opened in 2008 in a thriving medical center dating from the 1800s.

### **Choonwondang Museum of Korean Medicine, South Korea:**

This museum details the history of Korean medicine. Items including medical chests and documents are on display, giving insight into the development of Eastern medical practices. The adjoining clinic launched just after the Korean war broke, which was when the Yoon family moved their practice south from North Korea. A main feature of the building is the herbal-production lab with gleaming metal drums shining through the glass walls.

### **Fragonard Museum, France:**

Originally an anatomy collection for veterinary students begun in the 1700s just outside Paris, the curiosities-filled Musée Fragonard that was opened to the public in 1902, then was closed in the 1990s for renovations that lasted until 2008. Skeletons and anatomical displays fill the rooms, but the main event is in the cabinet of unsettling specimens. The skinned bodies flayed by expert 18th-century anatomist Honoré Fragonard. The museum has some of the most renowned yet unsettling specimens in Europe.

Horses, monkeys and even human fetuses are on display, showing all of the gory innards that our skin (fortunately) covers.



**Ibn Sina Academy of Medieval Medicine and Science, India:**

Named after the 10th-century Islamic philosopher and physician, this museum takes a glimpse into medicine across the Middle East and Asia. Its modest but ancient collection includes artifacts from Greco-Arab doctors and medical manuscripts dating to the tenth century. Unani drugs and some dusty-looking tools are on display alongside a large array of busts of some famous scientists, few of them will be familiar. There are also handmade antiquated clay and mud molds showing the GI and respiratory systems.

**Meguro Parasitological Museum, Japan:**

Celebrating its 60th birthday this year, the Meguro Museum started out when Dr. Satoru Kamegai began exhibiting parasites to raise public awareness after World War II. His specimens evolved into one of the most intriguing medical museums in the world, with two floors dedicated entirely to hundreds of skin-crawling (and burrowing) parasites. The museum owns approximately 60,000 specimens. An impossibly long *Diphyllobothrium nihonkaiense*, or tapeworm, is on display. Those who want to keep the experience alive can purchase a T-shirt with the creature printed on it, more or less where it would be living inside of you, feeding parasitically.

**Museum of Human Disease, Australia:**

This educational museum helps you to "know your enemy," presenting more than 2,000 examples of human diseases past and present. Among the samples are a 19th-century tuberculosis lung, an ovarian tumor featuring teeth and hair and brains infected with mad cow disease. Largely geared toward students, welcoming nearly 10,000 a year, the museum is the only one of its kind in Australia open to the public. Opened in 1960, the museum continues to update its collection.

**Museum Vrolik, Netherlands:**

This medical and anatomy museum is just one of many trippy experiences in Amsterdam. The 10,000 oddball items from the Vrolik family's collection dating to the 1700s include one-eyed creatures, preserved conjoined twins and so-called mermaid fetuses. The 16th-century bladder stone the size of a human fist is especially painful to look at, but no more than the pathologically deformed bones or corset livers.

**Paul Stradin's History of Medicine Museum, Latvia:**

Latvia doesn't scream medical tourism, but this museum's hodgepodge of items started by Latvia's greatest surgeon and medical historian is worth a visit. Dr. Paul Stradins started the collection in the 1920s. It includes, among other things, both a two-headed canine and the dog named Chernushka, who was launched into space aboard Sputnik 9, and survived. The museum houses more than 203,000 items, with dioramas including a recreated medieval pharmacy and town that explores healing techniques of the middle Ages.

### **The Maude Abbott Medical Museum Osler Collection, Canada**

A varied collection of about 150 organs dating to the late 19th century is the major draw at this Canadian academic museum. The only problem is that you can't visit it -- yet. The museum is, for the moment, exclusively online, featuring detailed images and information for the collection, but McGill University is making room for a physical exhibition to showcase the extensive array of innards, skeletons, autopsy log books and pathological specimens. Many of the organs come from across North America, but are primarily from local Montreal hospitals.

### **The Ob/Gyn. Teratology and Pathology Museum in Netherland as an international model for Ob/Gyn. Teratology and Pathology Museums:**

#### **The Museum "Vrolik Academic Medical Center" as an applied model for scientific museums:**

This museum was established at the end of the 18th Century. It contains medical collection of pathological specimens, anomalous embryos, odd skulls and bones is used until today by Faculty of Medicine students of the University of Amsterdam. Called after the name of its originators, 18th and 19th century anatomy professors from Amsterdam, Museum Vrolik is today one of the few museums of its kind in the world, it contains possibly the largest collection of human deformities in one place, the University of Amsterdam's anatomical and embryological museum began as the private teratological collection of Gerardus Vrolik (1755-1859) and his son Willem Vrolik (1801-1863). Both were professors of anatomy at the Athenaeum Illustre, the predecessor of the University of Amsterdam. Teratology is the study of deformity, a popular subject for anatomists in the 18th and 19th centuries. Willem wrote extensively on deformities, including cyclopia, the pathogenesis of congenital anomalies, and conjoined twins. His personal collection of specimens was built onto that of his father, resulting in several thousand items that were left behind after his death.

The collection was purchased by the city of Amsterdam in 1869 and eventually found its home at the university. Other anatomical collections have been added to the museum over the years, including a collection of bone pathology, a dental collection, and other teratological specimens. There are also a number of animal specimens in the collection. Not for the faint-hearted, the unique collection contains an extensive range of conserved anatomical specimens, skeletons, skulls, anatomical models and reconstructions. Of huge scientific value is the collection of specimens showing birth defects, including Siamese twins and cyclopean babies.

Since 1994, 150 specimens displaying anatomical oddities or deformations have been on display. The museum started with the private collection of embryos and anatomical abnormalities, put together by the Gerardus Vrolik (1755-1859), one of the most important Dutch scientist of its times, member of notable group of scientists called The Dutch Mathematicians (Hollandse Scheikundigen), professor of anatomy, owner of Drakenburg castle. His son Willem Vrolik (1801-1863), professor of anatomy, physiology and zoology in Amsterdam, a scientist of European reputation, a devoted Christian and a Lutheran deacon, continued the collection. After the death of Willem Vrolik, the collection has been purchased by a group of Dutch citizens and

offered to the municipality of Amsterdam, to be placed in an institution called Athenaeum Illustre, which became later [University of Amsterdam](#).

Today, the Museum Vrolik includes specimens from other collections, added through more than a century of its existence - the last addition of 150 specimens being as recent as in 1994. At present-day Museum Vrolik has not only a historical and didactical importance, but also the development of the molecular research gives the specimens of its collection a noticeable scientific value, no lesser than during the times of its founders. A genuinely medical collection, truly incomparable in its kind. It gives a feeling of old fashioned, even though located in a modern hall, a bit odd and nearly spooky. The Athenaeum Illustre of Amsterdam acquired the original collection in 1865 but it wasn't until 1984 that a selection of exhibits went on show at Museum Vrolik, part of the Amsterdam Medical Center.

The museum has primarily welcomed students and medical specialists over the years, but aims to extend its appeal to a much wider audience following refurbishment and reorganization (completed in 2012), providing a unique experience to all visitors interested in the (abnormal) human body.

### **Case study of the Ob/Gyn. Teratology and Pathology Museum in Egypt:**

The Ob/Gyn. Teratology and Pathology Museum is named after Naguib Pasha Mahfouz as the "Obstetrics & Gynecology Museum" in Kasr Al Aini Medicine School. In 1902, Naguib Pasha Mahfouz was graduated from Medicine School. Due to his hard work and dedication, Naguib Pasha was appointed as the Professor of Obstetrics and Gynecology at Kasr El-Aini Hospital. He was the top doctor in Obstetrics & Gynecology at that time, due to his pioneering work in that field, and he had accordingly received international awards and appreciation certificates for his great efforts in Gynecology. The museum was originally founded in 1928. In just two years, Mahfouz was able to collect around three thousand of the rarest specimens from his operations in obstetrics and gynecology. Moreover, he offered the museum as a gift to Kasr Al-Aini Medicine School. Aside from founding his own museum, Naguib Pasha also provided specimens to museums of universities such as Ain Shams, Alexandria, Assiut, and Khartoum Universities. In 1945, his original Kasr El-Aini museum was described by President of the Royal College of Obstetricians and Gynecologists of England, Sir Eardley Holland as "a wonderful monument to the name of its founder." Ninety years after its launching, the museum is completely renovated, and fully equipped, with modern technology. It currently hosts 1300 (fig 6, 7, 8, 9, 10) of the 3000 specimens, and is designed to be a scientific guide for the rare cases it displays.<sup>(72)</sup> Naguib Pasha's museum may have specimens that cannot be found anywhere else in the world. The renovation was funded by Naguib Mahfouz's family, and supervised by the Kasr El-Aini Hospital. Currently, only 400 specimens are on display, while the rest are being prepared for future display. The museum digital platform & venue will be a forum for scientific exchanges, lectures, research & innovation work in the field of maternal and fetal health. It will be a museum for the future, intensively using technology, the historical past will be a springboard aimed at the betterment of science and health treatment.

### **About the founder medical achievements:**

Dr. Naguib Mahfouz was born in Al Mansoura city in January 1882. He started his elementary education at the American School and then left to attend a public school that qualifies him to attend a medicine school. <sup>(73)</sup> “Mahfouz Pasha was teaching general nursing as well as Obstetricians and Gynecologists in the nursing school for more than thirty years, resulting more than thousand well trained nurses who all had graduated under his supervision, each one of them was working in labor with highest level of training and skill”, Dr. Ibrahim Shawki Pasha, the former Minister of Health, said that Dr. Naguib Mahfouz has authored numerous books and works of great importance for the field of medical sciences, especially in gynecology, obstetrics and nursing, and many of them are still the main used reference till now. Dr. Naguib Mahfouz was also a professor of gynecology and obstetrics for medicine school students and was supervisor of the birth department at Kasr Al-Aini Hospital. He also set up the first clinic to follow up and care for pregnant women in Egypt and also established the first child care center a year later. This work was the reason behind establishing several other child care centers throughout the country. <sup>(74)</sup>

### **The Museum History and Development Stages:**

Naguib Pasha Mahfouz Museum at Kasr Al Aini Medicine School; First inaugurated in 1932, it houses a unique collection of obstetrical and gynecological specimens of outstanding scientific and medical value. These specimens cover a large range of common and rare obstetrical and gynecological conditions. Dr. Naguib Mahfouz had managed to collect almost 1350 of the rarest specimens in obstetrics and gynecology obtained from his operations. That same year, he offered the museum which housed them and which was later named after him in 1932. The museum was totally updated and renovated in 2018, the museum is primarily directed at aiding in the education, training and continuing professional development of doctors, nurses, midwives and other caregivers involved in women’s healthcare and research. The museum will also cater for the needs of lay non-specialized individuals and members of non-governmental organizations concerned with the advancement of women’s health and wellbeing.

The museum digital platform & venue will be a forum for scientific exchanges, lectures, researches & innovation works in the field of maternal and fetal health. By 1928, as a gift to the Kasr Al Aini Medicine School. Naguib Mahfouz Museum of Obstetrics and Gynecology still exists to date at Kasr Al Aini Medicine School. In 1945. In 2017, the Chairman of the department of Ob & Gyn. Professor Mohamed Momtaz, approached the family of Mahfouz Pasha with an offer to renovate the Museum. His grandson, Dr. Naguib Abadir, was willing to fund the updates and convinced the other family members to donate as well. His direction was simple: an updated and dynamic museum that would add to the educational process.

### **Naguib Pasha Mahfouz Award:**

To commemorate Professor Mahfouz, the Department established an annual award for major scientific contributions to the field of Ob/Gyn. whether locally or internationally. The first recipient, who received the award in Cairo in March 2018, was Professor Kyrios Nicolaidis of

King's College in the UK. His contributions to Fetal Medicine are substantial. It is a large medal, fabricated in 950 Silver, with a bust of Professor Mahfouz on the front and weighing a substantial 380gms. It was designed and sculpted by Professor Ahmed El Minawi of Ob/Gyn. department who donated his time and effort. The striking and casting costs were donated by Dr. Sherif Rashed, who is an alumnus of Kasr Al Aini, whose endowment will support the annual award in the years to come. The process of making this precious medal which is shown in the video below. That gift has cemented the name of Mahfouz family at Kasr Al Aini for decades to come and will greatly benefit the educational process as will be seen below.<sup>(75)</sup> (fig 15)

### Specimen Displays

Between the years 1699 to 1763 the Surgeons of Edinburg were determined to create a collection of anatomical specimens pictures and books which was called the "cabinet of curiosities"<sup>(76)</sup>. Early museums mainly consisted of models, artistic sketches and paintings. Between 1789 and 1815 wax models made by the renowned modeler Clemente Susini were and were acclaimed worldwide<sup>(77)</sup>. The museum of anatomical waxes at the University of Cagliari, Sardinia, Italy houses some of the best models prepared by this 18th century modeler who made over 2000 models during his career based on the dissections made by the anatomist Francesco Antonio Boi<sup>(78)</sup>. The famous artist Fabricius had painted over 300 paintings by 1600 and made the "Tabulae Pictae" a famous atlas of anatomy. La Specola Collection in Florence which has the greatest collection of anatomical wax models, was built in the year 1775. The models have been distinguished for their true to life appearance and each piece is a perfect blend of art and science. These models were prepared by the Dutch anatomist, Bernard Siegfried Albinus (1697-1770) and Jan Wanderlaer (1690-1759), the artist and engraver<sup>(79)</sup>. The article "Role of anatomy in our contemporary age and the history of the anatomy museum of Naples by Esposito et al, describes the anatomy museum in Naples as an academic place founded under the guidance of the renowned surgeon and anatomist Marco Aurelio Severino and is one of the ancient museums<sup>(80)</sup>. Professor Mahfouz was keen to save most of the samples of cases that were exposed during surgery, tumors and obstetric operations, and applied the scientific methods in the conservation of these samples, but over the current of time, the methods of presentation of these samples do not match the nature, especially that they were wooden cabinets and shelves exposed to light, and the museum was full of samples and views were traditional and did not allow the students and teachers to see the samples in a scientific and practical proper ways, which necessitated the renovation of the museum according to the latest technologies, regarding both the presentation and the use of containers suitable for it or through replacing the old conservation fluids with modern chemical preservatives and the accompanying cleaning operations of those samples and then re-displaying them again. In addition, the new display system should consider providing wider areas to allow easy access to the samples. The latest methods of linking the samples and displays with mobile technologies and applications were also used. Through which the visitor or the researcher can obtain more information about the exhibits, Specimens which are displayed in this historical place, where using QR code technology to make it available to integrate the past and the future to create a rich learning experience.<sup>(81)</sup> (fig. 13, 14)

## **Instruments**

Collection of antique obstetrical and gynecological instruments previously used at Kasr Al Aini. Spanning from the late nineteenth century to the middle of twentieth century, it has some rare examples including a large variety of pelvimeters and instruments of destruction. (fig.11, 12)

## **Library of Knowledge**

The museum has a unique exceptional library includes real photos of the specimens displayed in the museum, books by the great Dr. Naguib Pasha Mahfouz, along with other proficient scientific content.

## **Discussion and Results:**

### **How can medical museum engage more community members?**

Different kind of exhibition might bring community members through the door, a more thoughtful, issue-based, controversial kind of exhibition. I will not seek to debate this here, only to say that there is a little evidence that this will engage substantial numbers of those who presently do not visit a Medical Museum. Science lectures and talks, art galleries and historical museums mostly attract the ‘converted’. A different kind of exhibition might, nevertheless, provide a more satisfying visitor experience for adults and that would be beneficial. I am wary of those, however, who argue for exhibitions seeking to affect behavioral change regarding the environment, biotechnology, and so on, if they do not seek to be “fun” as well. People come to a science center to have a good time – why would they otherwise spend so much time there?

But how could we modify the offerings of science centers to take these ideas into account? A quick sideways glance at the explosion of publishing in the arena of popular science, books provides some clues as to what intrigues and excites adult readers. In the first place, popular science books have a strong narration. We know that learning takes place when a context is linked to a narration about the life of an individual or the lives of others. Second, the narration is written in relatively simple language, and features individuals in a personal and interesting way. For any individual, there is a natural tendency to seek continuity across their experiences in any aspect of their life by constructing a series of narrations that link these experiences together. Stories from the lives of others, for example from the history of science, can readily engage the attention of an audience.

## **Dialogue and knowledge sharing**

“Dialogue” is the current buzz-word, and is attracting considerable interest. The implications of this new approach to public awareness of science are by far has been reaching many, and may be considered problematic for science centers. Dialogue implies first that it is imperative for scientists to engage the public on equal terms, not as keepers of knowledge on one side, and learners on the other. Second, it is not only public opinion which has a place in this interaction, but public knowledge. Increasingly, indigenous and local knowledge is seen to be important to this process. Respect for such knowledge is critical. With extraordinary speed, the tone of debate in Europe has changed to one of openness and accountability. There is a new emphasis on

strategies such as focus groups, consensus meetings, and so on, to probe public opinions of important current issues. In the area of informal learning, some museums are becoming less focused on transmission of content. Instead, they are setting what might be called “learning agendas”, which recognize and take into account the many different ways in which learning can occur. Yet decisions about the goals of informal learning, for many people whom these areas aim to reach, are no closer to resolution than before. Fundamental to progress, we believe, is a much deeper research agenda to understand how to make the most of occasions where the world of science interacts with the public and to understand the diverse and multicultural groups that constitute our adult populations: how to reach them? How to listen to them? And how to make science accessible to them? Should they desire it? To conduct such research without any idea of the ultimate goals, however, is futile.

## Conclusion

Museums are valued, the impact they have on their local communities and the roles museums play in people's lives. Generally, they show that local communities understand and value the role of museums and that museums benefit the local community, in a reciprocal relationship of mutual benefit. The broader global community also understand and have strong views about the roles of museums, in particularly; places that provide information about issues that might be difficult or controversial.

Museums must inevitably take the dominant role in preserving and illuminating the historical significance of the materialistic culture of medicine. Along with providing encouragement for in-depth "objective" research that are related to other contributions in this volume and their role that I have argued in this paper which has at least two other parts related to it. First, their own institutional histories provide crucial contextual information to supply scholarly pursuit of that nature. Second, by presenting their objects, museums inevitably give them a historiographical role. While most collections of medical objects are still organized according to the conventions of a predetermined history. I have argued that much more is possible to achieve by focusing on types of material that have their own story to tell, and in particularly; by the imaginative use and juxtaposition of this material and the insights it carries within thematic temporary exhibitions. If medical objects are held to have a historical voice, the role of museums is not just to keep them audible but, rather, to make them sing.



The challenge presented by those studies is to use the generated information to convince governments and funding agencies of the role of museums, their worth in the community and the value placed on them by people. How can we do this in ways that are meaningful to funding agencies? Using key economic indicators that go beyond numbers is a start. This could be done through highlighting, for example; the social benefits of museums in areas such as mental health and social wellbeing, demonstrating that museums are an integral part of social capital. Another example; is to clarify the contribution museums make to the monitoring of environmental

indicators, which is becoming critical, given the increased emphasis in the world today on climate change. Finally, museums have opportunities to influence, challenge and sometimes change how visitors think, inspiring them to take action on big issues and be more informed citizens in an increasingly globalized world. If Visitors want this, are museums ready and willing to provide?

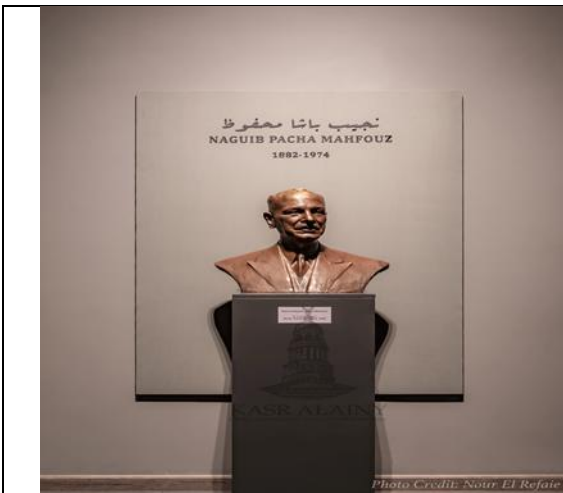
- Museums aren't just for showcasing superficial aspects of culture.
- Museums are a public forum for issues that should challenge society.
- If museums don't do it, who will?

The paper described the unique example “Medical museum” which attempt to display medicine as culture, and draws out three of the key strategies which it employs. The three key strategies are: (1) What if medicine is presented through historically specific material objects? (2) Are these objects used to explore the processes of researching and the evolution of practice? (3) Exhibitions should be designed to emphasize an implied relationship among the objects’ functions and the visitor’s own knowledge, benefits were successfully achieved in the museum after its renovation plan and inauguration last year.

### List of figures

	
<p>(1) Professor Dr. Naguib Mahfouz at the age of nine years old, at the school of Prince Jakan in Mansoura</p>	<p>(2) Commemorative medal, which was prepared by Prof. Dr. Ahmed Al-Manawi, Obstetrics and Gynecology Department, Faculty of Medicine, Al-Qasr Al-Aini, to be used as an annual estimate</p>





(3) Professor Dr. Naguib Mahfouz bust at the entrance of the museum



(4) the entrance of the museum



(5) Gorgeous deformed fetal specimen in both ways, wax and as a drawing [the 'Bologna's Instituto di Anatomia Umana Normale' is a museum housed in Bologna University, that contains a unique

<https://www.imgrumweb.com/hashtag/teratology>



(6) New modern exhibition that shows different ways for the specimens as well as for the tools through glass vitrines and panels



(7) New modern exhibition that shows different ways for the specimens as well as for the tools through glass vitrines and panels



(8) New modern exhibition that shows different ways for the specimens as well as for the tools through glass vitrines and panels



(9) New modern exhibition that shows different ways for showing the specimens



(10) New modern exhibition that shows different ways for the specimens as well as for the tools through glass vitrines and panels



(11)A lacquered brass microscope by J.Thamm A.G Berlin circa 1926.used by professor Mahfouz to examine slides of surgical specimens



(12) A lacquered brass microscope by J.Thamm A.G Berlin circa 1926. Rack and pinion focusing with fine adjustment over a rotating stage and concave mirror also including 2 spare eye pieces marked (4) and(5) and three lacquered brass objectives cases with fitted mahogany case.J.Thamm, Berlin,N.W,Karl Strasse,Berlin, Germany.



(13)Samples of deformed embryos that appear in intracellular folds have been preserved for more than 150 years



(14)Samples of deformed embryos that appear in intracellular folds have been preserved for more than 150 years



(15) An annual award To commemorate Professor Mahfouz, it is a large medal, fabricated in Silver, with a bust of Professor Mahfouz on the front and weighing a substantial 380gms. It was designed and sculpted by Professor Ahmed El Minawi of Ob/Gyn department who donated his time and effort.

## List of References

- Abdel Fattah Ghonaima, Museums, Exhibitions and Palaces, Educational Methods, Cairo, 1998.
- Abdel Halim Nour el-deen, Archeology Museums in Egypt and the Arab World, Cairo, 2009.
- Alaan Douglas, The Museum and its Functions (Guide to Organizing Museums), translated by Mohamed Hassan Abdel Rahman, Cairo, 1993.
- Angela Faga and Luigi Valdatta, "Contribution of the Museum for the History of Pavia University for the Knowledge of Plastic Surgery," in Proceedings of the Fourth Congress of the European Association of Museums of History of Medical Sciences, ed. Museo per la Storia dell'Universita di Pavia (Milan, 1988).
- Audrey B. Davis, "The History of the Health Sciences at the National Museum of American History," Caduceus 4, no. 1, 1988.
- Bamberger Y, Tal T. An experience for the lifelong journey: The long-term effect of a class visits to a science center. Visitor Studies. 2008.
- Bashir Zohdi, Museums, Damascus, 1988.
- Berkeley Ken Arnold, "Cabinets for the Curious: Practicing Science in Early Modern English Museums" Ph.D. diss., Princeton University, 1992.
- Beshir Zohdi, Museums, Damascus, 1988.

- Bray B, France B, Gilbert JK. Identifying the essential elements of effective Science Communication: What do the experts say. International Journal of Science Education, Part B. 2011.
- Brown BA. Discursive identity: Assimilation into the culture of science and its implications for minority students. Journal of Research in Science Teaching. 2004.
- D. V Subbba Reddy, ed., Institute of History of Medicine: Hyderabad Museum Guide, Indian medicine, Secunderabad, c. 1971.
- Dimitrios Konstantios, Nikolas Konstantios and Liana Tsombanoglou, A manual for museum managers. Stage project. 2005. Department of Culture and cultural Heritage General IV- Education, culture and heritage, youth and sport. 2005.
- Dr. Naguib Pasha Mahfouz as we know it, Egypt Press, 1950
- Esposito V and Chiapparo S. Role of anatomy in our contemporary age and the history of the anatomy museum of Naples. Anat Rec. 2006. 289B:92-97.
- Geoffrey Lewis, the Role of Museums and the Professional Code of Ethics, Running a Museum: A Practical Handbook, ICOM, UNESCO, Paris, 2004.
- Georgina Russell, "The Wellcome Historical Medical Museum's Dispersal of Non-Medical Material, 1936-1983," Museums Journal 86.
- Ghislaine Lawrence, "The Ambiguous Artefact: Surgical Instruments and the Surgical Past," in Medical Theory, Surgical Practice: Studies in the History of Surgery, ed. Chtistopher Lawrence (London, 1992).
- Ghislaine Skinner, "Sir Henry Wellcome's Museum for the Science of History," Medical History 30 (1986).
- Gretchen Worden, "Steel Knives and Iron Lungs: Medical Instruments as Medical History," Caduceus 9, no. 2 (1993).
- Gretchen Worden, "The Mutter Museum of the College of Physicians of Philadelphia," in Beyond Ars Medica: Treasures from the Mutter Museum, New York, 1995.
- Guide to London Museums and Galleries, London, 1953.
- [Http://www.ne-mo.org/index.php?id=55](http://www.ne-mo.org/index.php?id=55). accessed 11th may 2019. 13:00 PM.
- <http://obgynmuseum.com/specimen-library/> accessed 2nd May 2019.
- <http://obgynmuseum.com/specimen-library/> accessed 2nd May 2019.
- [https://openi.nlm.nih.gov/detailedresult?img=PMC5241207\\_MGG3-5-8-g005&req=4](https://openi.nlm.nih.gov/detailedresult?img=PMC5241207_MGG3-5-8-g005&req=4), accessed 16th May 2019 PM.
- <https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780190497620.001.0001/oxfordhb-9780190497620-e-23>. accessed 8-6-2019 11:00AM.
- Izzat Kadous, Theology and Museum Art, Alexandria, 2008.
- James Edmonson, the Dimick Museum of Medical History. Caduceus 6, no. 3 (1990).
- James M. Edmonson, "Learning from the Artefact: Surgical Instruments as Resources in the History of Medicine and Medical Technology," Caduceus 9, no. 2 (1993).
- John Pickstone, "Museological Science, The Place of the Analytical, Comparative in Nineteenth-century Science, Technology and Medicine," History of Science 32 (1994).

- Kemp D & Barner S. Surgeons' Hall: A Museum Anthology. Royal College of Surgeons. Edinburgh. 2009.
- Ken Arnold, "Time Heals: Making History in Medical Museums," in Making Histories in Museums, ed. Gaynor Kavanagh, London, 1996.
- Lackoi, K., Patsou, M., and Chatterjee, H.J. et al. (2016) Museums for Health and Wellbeing. A Preliminary Report, National Alliance for Museums, Health and Wellbeing. Available at: <https://museumsandwellbeingalliance.wordpress.com>.
- Lotti S, Altobelli A, Bambi S, Poggesi M. Illustrations of the anatomical wax model collection in the La Specola Zoology Museum, Florence. Arch Nat Hist. 2006; 33(2):232-240.
- Lynda Kelly, Measuring the impact of museums on their communities: The role of the 21st century museum, INTERCOM 2006 Conference Paper.
- Maher A.Eissa and Louay M.Said, "Museum collection and Moving objects: current situation and approach", EDAL IV(2013|2014), Forming Material Egypt, proceeding of the international conference, London, 20-21 May 2013, edited by: Patrizia Piacentini, Christian Orsenigo, and Stephen Quirke:81.
- Maher Issa, Louay Said, Museum Collections and Acquisitions Policy (The Reality of Egyptian Museums), Museum Booklets, Guide Series for Arabic Museums, Museum Booklets, No. 3, ICOM, 2017.
- Maraldi NM, Mazzotti G, Cocco L, Manzoli FA. Anatomical wax work modeling: The history of the Bologna Anatomy Museum. Anat Rec. 2000. 261(1):5-10.
- Martin R. Lipp, Medical Landmarks USA: A Travel Guide (New York, 1991).
- Naguib Mahfouz, Diary of the Life of a Doctor "Dr. Najib Mahfouz Obstetrics and Gynecology professor, Dar Al Maaref, 1st edition, 1963.
- Nicola Ladkin, Collections Management, Running a Museum: A Practical Handbook, ICOM, UNESCO, Paris, 2004.
- Packer J, Ballantyne R. Motivational factors and the visitor experience: A comparison of three sites. Curator: The Museum Journal. 2002.
- Paula Findlen, Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy, 1994.
- Rifaat Musa Mohamed, Introduction to the Art of Museums, Cairo, 2002.
- Riva A. Conti G. Solinas P. Loy F. The evolution of anatomical illustration and wax modelling in Italy from the 16<sup>th</sup> to early 19<sup>th</sup> centuries. J Anat. 2010; 216(2): 209-222.
- Running a Museum: A Practical Handbook, ICOM, UNESCO, Paris, 2004,
- Semper R. Science museums as environments for learning. Physics Today. 1990.
- Sumaya Hassan, Mohamed Abdelkader, Museum Art.
- Thomas Schnalke, Diseases in Wax: The History of the Medical Moulages, Berlin, 1995.
- Ulrich Trohler, "Tracing Emotions, Concepts and Realities in History: The Gottingen Collection of Perinatal Medicine," in Non-Verbal Communication in Science Prior to 1900, ed. Renato G. Mazzolini (Florence, 1993).

- Ulrich Trohler, Marielene Putscher, "Museum des Bundesverbandes der Deutschen Zahnatze," in Proceedings of the Third Congress of the European Association of Museums of History of Medical Sciences, ed. Deutsches Medizinhistorisches Museum Ingolstadt, Ingolstadt, 1986.
- Vicky Woollard, caring for the Visitor, Running a Museum: A Practical Handbook, ICOM, UNESCO, Paris, 2004.
- Victoria Cain , Karen A. Rader, Science Communication and Museums' Changing Roles [The Oxford Handbook of the Science of Science Communication](#), ed, Kathleen Hall Jamieson, Dan M. Kahan, and Dietram A. Scheufele, June 2017.
- William Bennett, "Dr. Warren's Possessions," Harvard Magazine (July/August 1987).
- Yuseir Dabes, Popular Heritage Museums and Tourism Attraction, Egyptian Creativity Forum, (Alexandria), 2004.

- (1) Maher A. Eissa and Louay M. Said, "Museum collection and Moving objects: current situation and approach", EDAL IV(2013|2014), Forming Material Egypt, proceeding of the international conference, London, 20-21 May 2013, edited by: Patrizia Piacentini, Christian Orsenigo, and Stephen Quirke:81.
- (2) Bray B, France B, Gilbert JK. Identifying the essential elements of effective Science Communication: What do the experts say. International Journal of Science Education, Part B. 2011; 2(1):23–41.
- (3) Packer J, Ballantyne R. Motivational factors and the visitor experience: A comparison of three sites. Curator: The Museum Journal. 2002; 45(3):183–198.
- (4) Bamberger Y, Tal T. An experience for the lifelong journey: The long-term effect of a class visits to a science center. Visitor Studies. 2008; 11(2):198–212.
- (5) Semper R. Science museums as environments for learning. Physics Today. 1990; 43(11):50–56.
- (6) Sumaya Hassan, Mohamed Abdelkader, Museum Art, p. 34 .
- (7) Dimitrios Konstantios, Nikolas Konstantios and Liana Tsombanoglou, A manual for museum managers. Stage project. 2005. Department of Culture and cultural Heritage General IV-Education, culture and heritage, youth and sport. 2005, p.3.
- (8) Well-known examples of these are at the [Deutsches Museum](#) in Munich, the [Science Museum](#) in London, and (of a more specialized nature) the [National Air and Space Museum](#) in Washington, D.C. Other specialized institutions include transport museums, such as the National Railway Museum in York, England, or the Swiss Transport Museum on the shores of [Lake Lucerne](#). Of more recent establishment are industrial museums, which often include a large technical component. Museums devoted to modern science, such as the Palace of Discovery in Paris, also provide demonstrations of [scientific theory](#). In India, where museums of science and technology are seen as having an important role in [education](#), the National Council for Science Museums has established a network of such museums across the country. Performing a similar function are science centers where science is demonstrated but where there is not normally a responsibility for collecting and conserving historical apparatus. A pioneer in this field is the [Ontario Science Centre](#) in Toronto. Some science and technology museums, such as the very popular [Museum of Science and Industry](#) in [Chicago](#) or the Technological Museum in Mexico City, are of a more technical nature. These museums are often sponsored directly or indirectly by industries, which occasionally found their own museums in order to preserve their heritage and promote their work. Other museums highlight a specific product resulting from the application of science and technology, such as the American Clock & Watch Museum in Bristol, Connecticut, Lynda Kelly, Measuring the impact of museums on their communities: The role of the 21<sup>st</sup> century museum, INTERCOM 2006 Conference Paper, p.2.
- (9) Yuseir Dabes, Popular Heritage Museums and Tourism Attraction, Egyptian Creativity Forum, (Alexandria), 2004, p. 41
- (<sup>10</sup>) Bashir Zohdi, Museums, Damascus, 1988, p14.
- (11) Brown BA. Discursive identity: Assimilation into the culture of science and its implications for minority students. Journal of Research in Science Teaching. 2004; 41(8):810–834.
- (12) <http://archives.icom.museum/definition.html>, accessed 2 August 2019 2:00 AM.
- (13) SUE ALLEN, Designs for Learning: Studying Science Museum Exhibits That Do More Than Entertain Exploratorium, San Francisco, CA 94123, USA Received 2 October 2003;



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revised 6 April 2004; accepted 7 April 2004 DOI 10.1002/sce.20016 Published online in Wiley Inter Science (www.interscience.wiley.com)

(14) David Luoni ,Exhibition display techniques, issue No#27,2017,NewZeland.p.4,5.

(15) David Luoni ,Exhibition display techniques, issue No#27,2017,NewZeland.p.11,12.

(16) Abdel Fattah Ghonaima, Museums, Exhibitions and Palaces, Educational Methods, Cairo, 1998a.

(17)Yuseir Dabes, Popular Heritage Museums and Tourism Attraction, Egyptian Creativity Forum, (Alexandria), 2004, p. 45

(18)Brown BA. Discursive identity: Assimilation into the culture of science and its implications for minority students. Journal of Research in Science Teaching. 2004; 41(8):810–834.

(18) <http://archives.icom.museum/definition.html>, accessed 2 August 2019 2:00 AM

(19)Yuseir Dabes, Popular Heritage Museums and Tourism Attraction, Egyptian Creativity Forum, (Alexandria), 2004, p. 47

(20)Brown BA. Discursive identity: Assimilation into the culture of science and its implications for minority students. Journal of Research in Science Teaching. 2004; 41(8):810–834.

(20) <http://archives.icom.museum/definition.html>, accessed 2 August 2019 2:00 AM

(21)Sumaya Hassan, Mohamed Abdelkader, Museum Art, p. 34 .

(22)Sumaya Hassan, Mohamed Abdelkader, Museum Art, p. 36 .

(23)Packer J, Ballantyne R. Motivational factors and the visitor experience: A comparison of three sites. Curator: The Museum Journal. 2002; 45(3):183–198

(24)Yuseir Dabes, Popular Heritage Museums and Tourism Attraction, Egyptian Creativity Forum, (Alexandria), 2004, p. 45.

(25)Packer J, Ballantyne R. Motivational factors and the visitor experience: A comparison of three sites. Curator: The Museum Journal. 2002; 45(3):183–198

(26)Brown BA. Discursive identity: Assimilation into the culture of science and its implications for minority students. Journal of Research in Science Teaching. 2004; 41(8):810–834

(27)Abdel Fattah Ghonaima, Museums, Exhibitions and Palaces, Educational Methods, Cairo, 1998a.

(28)Sumaya Hassan, Mohamed Abdelkader, Museum Art, p. 34.

(29)Brown BA. Discursive identity: Assimilation into the culture of science and its implications for minority students. Journal of Research in Science Teaching. 2004; 41(8):810–834.

(29) <http://archives.icom.museum/definition.html>, accessed 2 August 2019 2:00 AM

(30)Geoffrey Lewis, the Role of Museums and the Professional Code of Ethics, Running a Museum: A Practical Handbook, ICOM, UNESCO, Paris, 2004, p.10.

(31)Sumaya Hassan, Mohamed Abdelkader, Museum Art, p. 34.

(32)Geoffrey Lewis, the Role of Museums and the Professional Code of Ethics, Running a Museum: A Practical Handbook, ICOM, UNESCO, Paris, 2004, p.6.

(33)Brown BA. Discursive identity: Assimilation into the culture of science and its implications for minority students. Journal of Research in Science Teaching. 2004; 41(8):810–834

(34)Yuseir Dabes, Popular Heritage Museums and Tourism Attraction, Egyptian Creativity Forum, (Alexandria), 2004, p. 37

- (35) Brown BA. Discursive identity: Assimilation into the culture of science and its implications for minority students. *Journal of Research in Science Teaching*. 2004; 41(8):810–834
- (36) Abdel Fattah Ghonaima, *Museums, Exhibitions and Palaces, Educational Methods*, Cairo, 1998a.
- (37) Rifaat Musa Mohamed, *Introduction to the Art of Museums*, Cairo, 2002, p15.
- (38) Beshir Zohdi, *Museums*, Damascus, 1988, p. 18; Abdel Halim Nouredine, *Archeology Museums in Egypt and the Arab World*, Cairo, 2009, p. 19
- (39) Abdel Halim Nouredine, *Archeology Museums in Egypt and the Arab World*, Cairo, 2009, p. 22.
- (40) Abdel Fattah Ghonaima, *Museums, Exhibitions and Palaces, Educational Methods*, Cairo, 1998a.
- (41) Izzat Kadous, *Theology and Museum Art*, Alexandria, 2008, p. 292.
- (42) In 2006, the Vatican celebrated the 500th anniversary of the museum.
- (43) The number of Italian museums increased to be more than 4700 museum: <http://www.nemo.org/index.php?id=55>. accessed 11th may 2019.13:00 PM.
- (44) This museum was named at the beginning after the king Frederick the second. Maher A.Eissa and Louay M.Said, "Museum collection and Moving objects: current situation and approach", *EDAL IV* (2013|2014), p.15.
- (45) Alaan Douglas, *The Museum and its Functions (Guide to Organizing Museums)*, translated by Mohamed Hassan Abdel Rahman, Cairo, 1993, p11.
- (46) Geoffrey Lewis, *the Role of Museums and the Professional Code of Ethics, Running a Museum: A Practical Handbook*, ICOM, UNESCO, Paris, 2004, p.1.
- (47) Lackoi, K., Patsou, M., and Chatterjee, H.J. et al. (2016) *Museums for Health and Wellbeing. A Preliminary Report*, National Alliance for Museums, Health and Wellbeing. Available at: <https://museumsandwellbeingalliance.wordpress.com>
- (48) Geoffrey Lewis, *the Role of Museums*, p.1.
- (49) For general discussion of this point see, for example, James M. Edmonson, "Learning from the Artefact: Surgical Instruments as Resources in the History of Medicine and Medical Technology," *Caduceus* 9, no. 2 (1993): 87-98; Ghislaine Lawrence, "The Ambiguous Artefact: Surgical Instruments and the Surgical Past," in *Medical Theory, Surgical Practice: Studies in the History of Surgery*, ed. Chtistopher Lawrence (London, 1992), pp. 295-314; and Gretchen Worden, "Steel Knives and Iron Lungs: Medical Instruments as Medical History," *Caduceus* 9, no. 2 (1993): III-18. As surgeons and not historians, Angela Faga and Luigi Valdatta have spoken interestingly of the implicit faith in the significance and pleasure of seeing museum objects that is shared by many non-historians. Angela Faga and Luigi Valdatta, "Contribution of the Museum for the Hisrory of Pavia University for the Knowledge of Plastic Surgery," in *Proceedings of the Fourth Congress of the European Association of Museums of History of A1edical Sciences*, ed. Museo per la Sroria dell' Universita di Pavia (Milan, 1988), p. 53.
- (50) Victoria Cain , Karen A. Rader, *Science Communication and Museums' Changing Roles* [The Oxford Handbook of the Science of Science Communication](https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780190497620.001.0001/oxfordhb-9780190497620-e-23),ed, Kathleen Hall Jamieson, Dan M. Kahan, and Dietram A. Scheufele, June 2017," <https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780190497620.001.0001/oxfordhb-9780190497620-e-23>. accessed 8-6-2019 11:00AM.
- (51) This common enough observation is, for example, made by James Edmonson in his account of the Dimick Museum of Medical History. James Edmonson, "Dr. Dimick's Museum," *Caduceus* 6, no. 3 (1990): I; and by Ulrich Trohler in his "Tracing Emotions,

Concepts and Realities in History: The Gottingen Collection of Perinatal Medicine," in *Non-Verbal Communication in Science Prior to 1900*, ed. Renato G. Mazzolini (Florence, 1993), p. 73.

(52) The Old Operating Theater Museum in Southwark in London provides a particularly strong example of a museum that in effect presents just one large artefact: namely the building, a medical landscape can be traced out on an ordinary map simply by highlighting significant landmarks, and then embellishing it with the theatre of medical history displayed in medical museums. The sites that form such a geographically based history can be as simple and eloquent as the granite gravestone of Mary Mahoney in Boston or as deceptively silent as the Ether Monument, again in Boston, which does not name any of the discoverers of Anaesthesia because who should be credited was the subject of such bitter controversy. Martin R. Lipp, *Medical Landmarks USA: A Travel Guide* (New York, 1991), pp. 71, 104.

(53) *Running a Museum: A Practical Handbook*, ICOM, UNESCO, Paris, 2004,

(54) Geoffrey Lewis, *The Role of Museums*, p.9.

(55) Nicola Ladkin, *Collections Management, Running a Museum: A Practical Handbook*, ICOM, UNESCO, Paris, 2004, p.29, 30.

(56) Paula Findlen, *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy* (Berkeley, 1994); Ken Arnold, "Cabinets for the Curious: Practicing Science in Early Modern English Museums" (Ph.D. diss., Princeton University, 1992).

(57) Thomas Schnalke, *Diseases in Wax: The History of the Medical Moulages* (Berlin, c. 1995).

(58) For accounts of the history of medical museums, see John Pickstone, "Museological Science? The Place of the Analytical, Comparative in Nineteenth-century Science, Technology and Medicine," *History of Science* 32 (1994): 118-21, and Ken Arnold, "Time Heals: Making History in Medical Museums," in *Making Histories in Museums*, ed. Gaynor Kavanagh (London, 1996).

(59) See Gretchen Worden, "The Mutter Museum of the College of Physicians of Philadelphia," in *Beyond Ars Medica: Treasures from the Mutter Museum* (New York, 1995).

(60) Warren's most famous exhibit is the "Crowbar Skull," the preserved head of one Phinias Gage, who in 1848 survived massive head injuries from a iron tamping rod that passed through his forehead, and whose mother was encouraged to contribute her son's skull and the tamping bar to the museum in 1866, some five years after his death. This exhibit survived, but many more did not William Bennett, "Dr. Warren's Possessions," *Harvard Magazine* (July/August 1987): 24-31.

(61) Geoffrey Lewis, *The Role of Museums*, p.9.

(62) Geoffrey Lewis, *The Role of Museums*, p.12.

(63) *Guide to London Museums and Galleries* (London, 1953), p. 10; Audrey B. Davis, "The History of the Health Sciences at the National Museum of American History," *Caduceus* 4, no. 1 (1988): 59-71.

(64) The best account of Henry Wellcome's collecting activities is to be found in Ghislaine Skinner, "Sir Henry Wellcome's Museum for the Science of History," *Medical History* 30 (1986): 383-418. An account of the subsequent history of Wellcome's museum can be found in Georgina Russell, "The Wellcome Historical Medical Museum's Dispersal of Non-Medical Material, 1936-1983," *Museums Journal* 86 (Supplement 1986).

(65) Ulrich Trohler (n. 2 above); Marielene Putscher, "Museum des Bundesverbandes der Deutschen Zahnärzte," in *Proceedings of the Third Congress of the European Association of Museums of History of Medical Sciences*, ed. Deutsches Medizinhistorisches Museum Ingolstadt (Ingolstadt, 1986), p. 246.

- (66) William Bennett (n. II above), p. 31, has described the demise of "a taste for the marvelous" within science museums in his account of the Warren Anatomical Museum in Harvard, Mass.
- (67) The emblematic museum for the illustrative approach may well be the Institute of History of Medicine in Hyderabad, India. For here, large amounts of the material culture to support the story of medical history are not available even in replica, so that the story is instead woven around recent artists' renditions of medical subjects in Indian history. Sample exhibits include "Pictures from Ayurvedic Books" and a "Show-case Showing Replicas of Medical Sciences in the Buddhistic Art." Somewhat refreshingly, the attitude here has not been to worry about the support of material evidence at all, but simply to take a very literal approach to the didactic task of illustrating the history of Indian medicine. D. V Subbba Reddy, ed., Institute of History of Medicine: Hyderabad MIISeum Guide [Indian medicine] (Secunderabad, c. 1971).
- (68) Vicky Woollard, Caring for the Visitor, Running a Museum: A Practical Handbook, ICOM, UNESCO, Paris, 2004, p106.
- (69) Vicky Woollard, Caring for the Visitor, Running a Museum, p111.
- (70) [https://openi.nlm.nih.gov/detailedresult?img=PMC5241207\\_MGG3-5-8-g005&req=4](https://openi.nlm.nih.gov/detailedresult?img=PMC5241207_MGG3-5-8-g005&req=4), accessed 16th May 2019 PM.
- (71) <https://edition.cnn.com/travel/article/world-weirdest-museums/index.html>
- (72) <http://obgynmuseum.com/specimen-library/> accessed 2nd May 2019.
- (73) Dr. Naguib Pasha Mahfouz as we know it, Egypt Press, 1950, p.p6-10.
- (74) Dr. Naguib Pasha Mahfouz as we know it, Egypt Press, 1950, p.3.
- (76) Kemp D & Barner S. Surgeons' Hall: A Museum Anthology. Royal College of Surgeons. Edinburgh. 2009.
- (77) Maraldi NM, Mazzotti G, Cocco L, Manzoli FA. Anatomical wax work modeling: The history of the Bologna Anatomy Museum. Anat Rec. 2000. 261(1):5-10
- (78) Riva A. Conti G. Solinas P. Loy F. The evolution of anatomical illustration and wax modelling in Italy from the 16<sup>th</sup> to early 19<sup>th</sup> centuries. J Anat. 2010; 216(2): 209-222.
- (79) Esposito V and Chiapparato S. Role of anatomy in our contemporary age and the history of the anatomy museum of Naples. Anat Rec. 2006. 289B:92-97.
- (80) Lotti S, Altobelli A, Bambi S, Poggesi M. Illustrations of the anatomical wax model collection in the La Specola Zoology Museum, Florence. Arch Nat Hist. 2006; 33(2):232-240.
- (81) <http://obgynmuseum.com/specimen-library/> accessed 2nd May 2019.