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JOSEPHINUM AND THE ANATOMICAL WAX MODEL COLLECTION, MEDICAL UNIVERSITY OF WIEN

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SUMMARY

The collection of anatomical wax models housed at Wien Medical University's Josephinum is one of the greatest achievements initiated by Emperor Joseph II and – reflecting the reformist and revolutionary zeal of the 18th century period in which it was crafted – a remarkable benchmark of Enlightenment in Austria, spanning the divide between art and science. Originally purchased principally for teaching purposes, these artificial yet astonishingly lifelike bodies and body parts have provoked mixed reactions through the centuries, but the value of the collection with its over thousand anatomical wax models remains untouched.

Joseph II - Interests and Influences

Thoroughly educated in natural sciences and with an extraordinary interest in medicine from childhood onwards, Joseph II developed a great sympathy and passion for the philanthropic and scientific developments that marked Enlightenment culture. Indeed, reforms undertaken during his reign (from 1765[1] till his death in 1790) have earned him recognition as one of history's greatest monarchs committing to Enlightenment. Among these reforms were endeavours to modernize and improve the education system, along with which the establishment of the eponymous Josephinum, with its direct relation to reconstruction and reorientation of the medical education, can be classified[2].

Key words: Josephinum – Anatomical wax models - Wien University

Joseph II was a forward-thinking man. However, many of the most groundbreaking developments during his reign began life as the ideas of his enlightened advisers. With regards to medical matters, Giovanni Alessandro Brambilla (1728–1800), the Emperor's closest and most trusted adviser played a key role in the change and development of medical facilities and the new education system for medicine.

Brambilla was an outstanding military surgeon of Italian origin who had good connections to many medical institutions in Italy. As personal physician to the Emperor, he consulted and accompanied Joseph II on all his travel from 1763[3]. During the course of this foreign travel, Joseph II became acquainted with innovations in political, scientific, and educational matters, particularly those in the field

Fig. 1. *Portrait of Joseph II (1741-1790), etching from Hubert, undated*
Fig. 2. *Portrait of Giovanni Alessadro Brambilla (1728-1800), etching from Jakob Adam, 1784*

of medicine. In 1769, while in Italy for the first time, the Emperor visited Bologna and its medical school, where he admired the anatomical wax models created by the skilful hands of anatomists and modellers Ercole Lelli, Anna Morandi Manzolini, and her husband Giovanni Manzolini. It was this visit that likely inspired the idea to establish an anatomical model collection in Vienna[4].

Josephinum – Foundation and Context

In light of his experiences during his national and international travels, the Emperor and his advisers became intent on reforming the domestic healthcare system from the ground up. This resulted first in the establishment of the "Allgemeines Krankenhaus" (General Hospital) in 1784. Built on the estate of the 17th century "Großarmen- und Invalidenhaus" (Poor- and Invalid house), this was to become the city's biggest public hospital in Vienna, with around 100 different wards and 2000 beds. In the same year, the so-called "Narrenturm" (Fools' Tower), a panopticon-style building for the treatment of mentally ill patients, was also opened. The foundation of a military hospital for the care and treatment of soldiers followed in 1785, wherein two special birthing facilities for soldiers' women were also integrated. And, on the same date, the new, centralized medico-surgical military school celebrated its opening. Alessandro Brambilla was entrusted the highest position as first director of this school, now commonly known as the Josephinum[5].

Along with this new medical institution, Brambilla ushered in a revamped approach to medical education. This distinguished itself from previous methods through additional training for army and country doctors, as well as extended education for surgeons, who, at that time, belonged to the barbers' guild and were therefore considered to be craftsmen rather than doctors. The aim here was to raise the status of the occupation of surgeon to that of a professional medic – as such, to that of gentlemen with academic backgrounds[6].

The school was equipped to the most modern of standards and, one year after founding, was promoted to a higher rank and renamed the "Josephinischen medicinisch-chirurgischen Akademie". (Joseph's medical-surgical academy)[7]

In terms of layout, the academy's ground floor included storage rooms for drugs, bandaging materials, and surgical instruments. A number of rooms served to accommodate the dissector, the concierge and the military surgeons. A central, circular room was the lecturing hall. Two further rooms were used for the cleaning of pathological preparations, and the two remaining rooms housed the academy's archives. The building's first floor featured an extensive library of 10,000 volumes, a room for the arranging of preparations for the anatomy hall, and rooms with pathological preparations, enamel paintings depicting eye diseases, and medical instruments. In the middle was the amphitheatre with an anatomy table. It was the north-west wing of the first floor that was chosen to house the academy's most valuable objects: the anatomical wax models. These were displayed through six different rooms. The second floor, besides having apartments for the professors, also had two more rooms with wax models depicting embryology and obstetric embodiments[8].

Anatomical Wax Model Collection – Origin and Establishment

As already mentioned, while on his first trip to Italy in 1769, Joseph II was impressed by Lelli's and Morandi's wax models housed at the University of Bologna. In 1780 he travelled to Italy again and, while visiting his brother Peter Leopold in Florence, was shown the new collection of anatomical wax models at the Imperial Regio Museo di Fisica e Storia Naturale, commonly known as "La Specola". The Emperor's admiration for this collection is said to have been at least as strong as that which he felt in Bologna[9].

This anatomical wax collection was established in 1775 at the initiative of Peter Leopold, with much recognition going to the devot-

ed work of the project's organiser and the museum's first director, Felice Fontana[10]. Fontana supervised a group of sculptors and anatomists, who worked in a studio situated on La Specola's ground floor. Among this group were some of the most prominent modellers and anatomists of the time, such as Giuseppe Ferrini, Antonio Matteucci and Clemente Susini.

In order to ensure precise depictions of the human body, the anatomists dissected cadavers and studied them minutely, each sculpture mirroring their findings. According to lists of corpses that were transported from the hospital Santa Maria Nuova to the studios of La Specola, the dissection of over 200 bodies was needed in order to produce just one whole-body model[11].

The modelling proceeded as follows: sculptors recreated each organ, bone or body part in cheap wax or clay, from which a gypsum negative was made. They then poured high quality bees-wax[12] into these negatives in thin layers. The mould was then improved and refined. Blood and lymph vessels were modelled separately, and then added to the surface. For bigger parts or for whole-body models, a metal structure was used as a skeleton and the wax layers were a pplied around it. Glass eyes and human hair were added to the head models to enhance their verisimilitude.

Joseph II's idea to purchase wax models from La Specola and build a collection for his new medico-surgical academy was not instantly welcomed by the Grand Duke or by Fontana, as he feared this would cause delays in the completion of his own collection. However, the Emperor was persistent, an agreement was made, and in 1781 the models destined for Vienna were officially ordered[13]. Felice Fontana was personally responsible for supervising the artistic and technical accuracy of the objects, while Clemente Susini, a future director of La Specola, also worked on the sculptures while training 16 external modellers. A fortunate coincidence for the future importance of the Vienna collection was the engagement of anatomist Paolo Mascagni

at La Specola at the same time as work on Joseph II's project was beginning. His main area of research was the lymphatic system – an aspect of physiology still new to 18th century anatomists. His depictions of the lymphatic vessels on numerous models destined for Vienna lent the collection a unique pioneering quality.
The entire collection was completed in five years and transported to Vienna by 1786. At that time it contained 1192 wax models in original wooden showcases[14].

The Anatomical Wax Models in Vienna – Usage and Criticism

Reform to the medical education system and the resultant search for optimal teaching methods and materials were the principal motivations behind the purchase of the Josephinum's anatomical wax collection. Anatomy as a science acquired entirely new dimensions thanks to the teaching program at Joseph's medico-surgical academy, only gaining its central place in medical education during the 18th century after languishing as an underestimated area of study. Brambilla personally elaborated the whole educational concept, including teaching instructions for the professors. Anatomy was now to be considered the essence foundation of a successful career for aspiring surgeons. Each student was obliged to absolve a dedicated anatomy course, which included a profound explanation of the physiology of the human body. The course consisted of seven thematic areas dedicated to different parts of the body: bones, ligaments, muscles, organs, as well as vascular-, neurological- and endocrine system-anatomy[15]. This division was mirrored in the composition and content of the wax models.
The classes at the academy were very much related to practise. Dissections were carried out in strictly defined steps: first to show the relationship between particular organs or body parts to their neighbouring organs and to the body as a whole, and then to gradually reveal the body's different layers and individual physiology. Again,

the depiction and composition of the anatomical wax models match in many ways the different steps students undertook while dissecting. The models were never intended to act as a substitute dissection; as mentioned, practice was considered to be of immense importance for the students, and cutting flesh with precision should become their routine. The models were in fact used as a complement to dissection, to recapitulate and further study what had been seen in the amphitheatre. It was only when there was a lack of corpses or when the summer heat intensified decay that the wax models were used as replacements.

The didactic purpose of the objects becomes clearer still when one considers how each model was also illustrated in a tempera-coloured drawing, which was displayed above the model. The drawings' details were marked and numbered, referencing texts situated in drawers integrated below the models' showcases. These texts were written in both German and Italian, and contain detailed descriptions of most of the elements illustrated on the drawing or depicted on the model.

Artistically speaking, the high aesthetics of the objects were as important as their didactic message. Precious nut wood with rosewood veneer and gilded borders, as well as blown glass, were used for the showcases. The models are surrounded by historic silk drapery or laid on mattresses covered with purple silk, and each of the whole body models shows a different movement - poses that capture the classical ideals of the renaissance[16]. Nevertheless, every aspect of the models and their presentation had a practical use. The showcases are very intelligently built: their use is simple and pragmatic and allows the best view onto the models. The display cases for the upright, whole-body models also contained mechanisms enabling the models to be rotated about their axis, thus enabling the observer to view the models from a variety of differing perspectives. Also, the poses struck by the whole body models allow optimal angles to see certain areas of the body, such as the armpit or the interdependence

between the spine and the muscles, which a standard pose would obscure. Furthermore, the models' lifelike colours, which dead bodies lack but which play important role for surgical interventions[17], gave the wax objects a certain comparative advantage over real corpses. However, despite the accuracy and practicalities of the collection, the Josephinum's anatomical wax models did not gain instant recognition from all.

Some in the middle classes and some contemporary medics voiced sharp criticism of the collection, medical reforms, and the academy, the roots of this possible lying in the unfavourable political situation at the time of the objects introduction to their Viennese audience.

The middle classes largely supported and approved of Joseph II's reforms at the onset of the program. However, some of the changes, especially in religious matters, met with public resistance and were therefore withdrawn by the emperor under pressure. Many among the middle classes perceived this as an act of weakness, and labelled Joseph II as fearful and inconsistent in his politics. Furthermore, the bourgeoisie was becoming ever more disillusioned with the possibility of 'enlightening' the general public; doubts began to surface as to whether public education could really aid intellectual development, making the purchase of such an expensive collection that would make little difference in general understanding of science and nature was considered unnecessary.

The anatomical wax models did raise significant public interest. This was however interpreted as an interest in the sensational aspect of the exhibits, a search for entertainment rather than knowledge; the collection was compared to the wax cabinets or travelling shows which were entertaining the Viennese public at the end of eighteenth and beginning of the nineteenth centuries[18].

As the principal purpose of the models was to serve as teaching materials for anatomy classes, these criticisms could, to a certain extent, be pushed to one side. However, even among the medical

community it was difficult to find recognition. Although admitting their scientific accuracy, many contemporary physicians looked at the objects with dismissive eyes, associating them with expensive toys for the lower classes, classifying them as useless in the context of a medical institution. The background for this contempt could again be seen as political. Initially, the professors of the universities' medical faculties agreed with Joseph II on the importance of the public health service. However, as he centralized the healthcare system and its administration was adopted by the state, medical faculties lost powers that had previously rested in their hands. When the emperor then sought to make savings through cuts in the number of employees and changes to the degree programme, he faced resistance from the faculties[19]. This time, however, Joseph II didn't want to surrender his plans, and so in order to fulfil them he founded the medico-surgical Joseph's Academy. Not only the emphasis, but also the preference here was the surgery. This became even more obvious after Brambillas' speech with the provocative title "Von dem Vorteil und dem Nutzen der Chirurgie", which aroused criticism and hostility by the physicians, who were afraid of loosing their authority.

Josephinum and the anatomical wax model collection in the present

The medico-surgical Joseph's Academy was active for 129 years, with only two breaks in between (in 1820 and 1848). The last students were affiliated in 1869, and the academy closed in 1874. After its closure, the building was used to give courses in military medicine, and between 1900 and 1918 a higher-education school for such was situated here. Until the integration of the collection into the Institute for History of Medicine of Vienna University in 1927, the anatomical wax models suffered neglect, and parts of its original configuration have been lost[20].

Luckily, the majority of the collection endured until the present day. Of the 1192 original models, 995 have withstood the turbulence of

history. Today, these are displayed in six rooms on the west side of the first floor. Three of these are open to the public, while the remaining three – containing obstetric models of pathological birth conditions – can be visited with a guided tour.

The collection reveals social and cultural phenomena of the Enlightenment era, such as differences in how genders were perceived: This is evidenced by comparing the depictions of male and female bodies. Female anatomical models were used to show internal organs, their faces and limbs shown mostly with their skin. Their expressions radiate calm, and give the impression of sleep rather than death, as the whole body lies on a mattress in a state of apparent relaxation. The male bodies, in contrast, are shown skinned, their muscles and vessel systems clear to see while they pose in active motion[21].

Displayed in their original historic environment, the Josephinum can be described as a synthesis of art and science that gives one the feeling of being transferred back in time. The collection in many ways reflects the developmental state of late 18th century medicine, with all its achievements, novelties and deficits. The use of precious materials such as bees-wax, silk, rosewood, and gilded details, as well as the style of the interiors they have been implemented in, speak on the one hand to the importance and devotion given to the study of anatomy, and on the other to the aesthetic values of that particular period of history.

Nowadays, the collection attracts a wide range of visitors from different age-groups, representing a variety of interests and educational backgrounds, from primary school pupils being introduced to the insights of the human body for the first time, to medical professionals with many years of experience. The objects' didactic nature in combination with their aesthetic poses means they are often integrated into the anatomy classes of visual art students.

In today's era of rapid technological and medico-scientific development, there is no doubt that the Josephinum collection stands as

a witness to historical progress. However, with its anatomical accuracy, didactic efficiency, and the virtuous artistic performances that went into the models' production, it competes to this day with modern teaching apparatus, while continuing to challenge contemporary artists.

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