

## ORIGINAL PAPER

# INSIGHT INTO THE HISTORY OF ANATOMOPATHOLOGICAL MUSEUMS – PART 1. FROM CASUAL ASSEMBLAGES TO SCIENTIFIC COLLECTIONS

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We present a short history of anatomopathological museums in Europe. In the first part we provide an insight into the beginnings from the Renaissance until the middle of the 19<sup>th</sup> century. We assess forms of acquisition and exhibition of the specimens concerning the steps of medicine and pathology development. The prototypes were “curiosities of nature” collections starting in the 15<sup>th</sup> century. The next milestone collections focusing on the human body were those of Frederik Ruysch in the Netherlands (17<sup>th</sup> century). In the 18<sup>th</sup> century teachers in surgical and anatomical schools realized the educational power of such collections. Anatomopathology as a separate medical discipline was developing in parallel. At that time museums such as the one established by Honoré Fragonard in Paris, the Hunterian in Glasgow and Narrenturm in Vienna were created. At Polish universities in Cracow and Vilnius, such museums were beginning to emerge at the beginning of the 19<sup>th</sup> century. Anatomopathological collections became more popular, gathering specimens: osteological, dry and mummified, as well as wet – embedded in alcohol, formalin, and mysterious mixtures. They provide a wealth of important data for scientific, medical, historical and even ethical areas, as well as methods and concepts of conservation and even recreation of human body parts.

**Key words:** anatomopathological museums, history of pathology, autopsy, anatomy, Kunstkamera.

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## Introduction

A museum is a building or institution that is dedicated to, houses and cares for a collection of artefacts and other tangible objects of scientific, artistic, or historical importance and makes them available for public viewing through exhibits [1, 2]. Almost every museum has its own area of interest, limited in terms of time, space and theme, including institutions collecting artefacts connected with medicine. One particular

type of such an establishment comprises those gathering exhibits from the anatomical pathology field, starting as small private sets of curiosities as a means of entertainment, through private, municipal and later hospital educational collections, up to large, strictly professional assemblages at the medical universities. They also, as time passed, developed several subdivisions – neuropathological, paleopathological and forensic medicine. These exhibits changed from simple artefacts, stones, fossils and bones, through drawings,

paintings, plaster and wax models, up to body parts and even whole bodies preserved as dry or wet specimens [2, 3, 4]. These collections, being very important in the development of medicine and anatomopathology, focused the point of interest of scientists, physicians, artists, high society, but also idle spectators.

In many cases museum resources were gathered over the years, and some of the old collections are still open to the public.

### The oldest information on anatomopathological collections

The history of pathology museums dates back to the 15<sup>th</sup> century, when “cabinets of curiosities” began to be created (Kunstkammer or Wunderkammer). This kind of encyclopaedic and partly systematic collection was a rare phenomenon. In the Renaissance the idea of gathering items on the microscale (a microcosm) was to reflect the outer world (a macrocosm) – as above so below – and prove the interests and wide knowledge of the owner and/or creator. The first collections of natural history exhibits along with books and paintings slowly specialized. The origins of “cabinets of curiosities” are

associated with artistic collections at the courts in Urbino and Mantua, collections of Emperor Ferdinand I (1503-1564), Ullysee Aldrovandi (1522-1605/1607), the physician Ole Worm (1588-1655), and Ferrante Imperato (1525? – 1615?) [5, 6, 7] (Fig. 1).

Such collections were scattered all over Europe, being the symbol of wealth and demonstration of awareness and knowledge of the complexity of nature. “Cabinets of curiosities” consisted of creations of nature and man (*naturalia et artificialia*). However, among the earliest collections concerning natural history, ethnography, geology, archaeology and art, anatomical artefacts were only occasionally found. It usually collected animal horns, bezoars and bones. But part of the collections related to humans, especially everything of the abnormal and monstrous about him, was not a very rare finding. Such a specially separated room can be found even in the Kunstkamera of Danish kings [5, 6, 7, 8, 9].

From the second half of the 16<sup>th</sup> century a more vivid interest in the interior of the human body could be observed [7, 8, 9]. This should be associated with publishing in 1543, of the first up-to-date work on human anatomy by Andreas Vesalius (1514-1564), and



Fig. 1. Fold-out engraving from Ferrante Imperato’s *Dell’Historia Naturale* (Naples 1599), the earliest illustration of a natural history cabinet

Source: [https://en.wikipedia.org/wiki/Ferrante\\_Imperato#/media/File:RitrattoMuseoFerranteImperato.jpg](https://en.wikipedia.org/wiki/Ferrante_Imperato#/media/File:RitrattoMuseoFerranteImperato.jpg)

the beginning of the Baroque era, when the macabre played an important role, often shown through the prism of the ugliness of the human body [9, 10, 11].

Specimens were needed for educational purposes, especially anatomy lessons, but there was a problem with their acquisition. Usually, the prosector during either a public or private autopsy, after finding something far from the normal appearance of the body parts, was able to separate and dissect it. At that time the next problem was either to find a way to preserve the body parts in the best condition or at least recreate them as closely to reality as possible. The easiest natural specimens to obtain and preserve were the osteological ones and calcified pathological lesions. The osteological exhibits were often displayed as decoration in anatomical theatres (Fig. 2). The wet specimens were usually submerged in an alcoholic preservative in sealed jars or other containers made of glass. Dry preparations were primarily injected with resin or wax and then dried. One should also pay attention to the legal, religious and philosophical issues connected with obtaining human bodies for such practices. Given the above reasons, only in the 17<sup>th</sup> century did larger anatomical collections begin to emerge [7, 8, 10].

### From Frederick Ruysch to Honoré Fragonard

In the 17<sup>th</sup> century the number of autopsies considerably increased. The reasons for that were often

willingness to acquire medical information or purely entertainment in the form of public autopsies [12]. Frederick Ruysch (1638-1731), born in The Hague and educated at the University of Leiden under Franciscus Sylvius, having started with pharmacy, devoted his later years to anatomy. Personally interested and involved in preservation of body parts, he created a mixture which allowed tissues to be kept in perfect condition for a long time. Although it was William Harvey (1578-1657) who developed the method of injecting blood vessels, it was Ruysch who refined it and mastered preserving whole bodies or only their parts. His collections of specimens with changing expositions, open to the public (with some restrictions of humanistic and professional nature) were shown in a specially prepared house on the outskirts of Amsterdam. For Ruysch presentation like this had a didactic purpose, which he inscribed in the Guest Book: "*Vene, vidi et judica nil tuis oculis*" [Come, see and judge, believe only your own eyes]. In his ten-volume book "*Thesaurus anatomicus*", published in the years 1701-1716, with copper engraved plates by C. Huijberts, he presented compositions of typically baroque shapes created from gallstones, preserved blood vessels, and children's skeletons [12, 13, 14] (Fig. 3).

In 1697 and 1717 Ruysch's collection was shown to Peter the Great, who took a course in anatomy. In Russia, the Tsar issued recommendations for performing autopsies, which were previously prohibited. After visiting Amsterdam, he purchased the whole



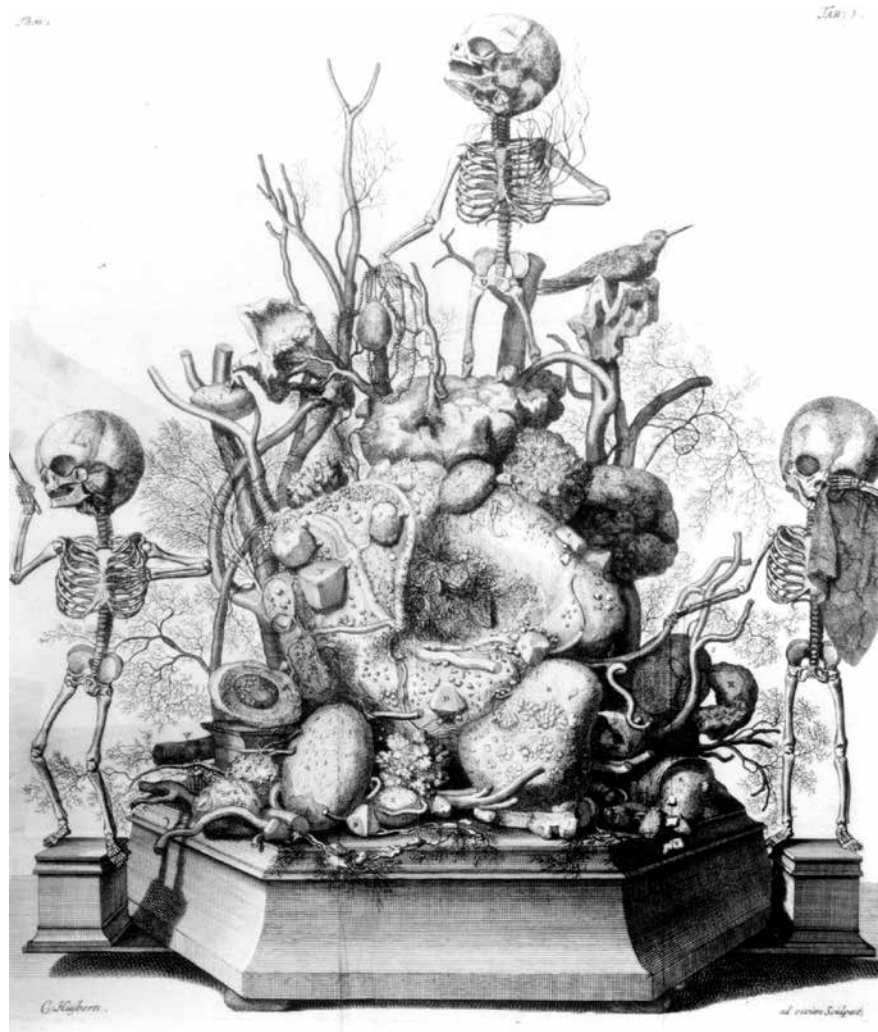
Fig. 2. Theatrum Anatomicum of the Boerhaave Museum in Leiden. Reconstructed and in 2014 brought to life to initiate the visitors into the secrets of science

Source: [www.tinker.nl/en/work/anatomical-theatre](http://www.tinker.nl/en/work/anatomical-theatre). Photography: Mike Bink.

collection, along with the recipe for the preservation fluid, what gave the foundation for *Kunstkamera* (1714) in Saint Petersburg. The Tsar, issuing the decree “On gathering born monsters and unusual finds”, started the Russian anatomical (teratological) collections, but first of all he tried to change the attitude towards autopsy and collecting “curiosities”. He decided that the interesting cases would end up in *Kunstkamera*, in order to carry out detailed research to verify the superstition that deformed fetuses and newborns of humans and animals are the work of the devil. It was also decided that some of the teratological exhibits would be copied in drawings when decorated with high quality clothes. *Kunstkamera* in Saint Petersburg is open until now and still has 937 original exhibits by Ruysch. Having sold the collection, Ruysch began to create a new one, which after his death was acquired by King Augustus the Strong. Little is known about it, because later it was scattered [12, 13, 14, 15, 16, 17, 18].

In the 17<sup>th</sup> century, also the first anatomico-anthropological museums in Paris, Amsterdam, London and Padua were founded. Their significant development occurred in the subsequent century. It should be associated with the Enlightenment approach to scientific issues. Moreover, in the 18<sup>th</sup> century, autopsies became more frequent, though the procedures and interpretation varied in different areas.

One of the most important collections of 18<sup>th</sup> century anatomical specimens was founded by William Hunter (1718-1783), a Scottish anatomist and physician. In 1742 he purchased anatomical specimens from Doctor Douglas, which expanded his own assembly. At his own expense Hunter expanded his house in London, to hold lecture halls and preparation rooms, along with a museum. Its exhibits, on the basis of his last will, were later moved to Glasgow and became the foundation of the first Hunterian Museum (1807). In the 19<sup>th</sup> century it was relocated to a new building [19, 20, 21, 22].



**Fig. 3.** A diorama by Frederik Ruysch (engraved plate by C. Huijberts)  
 Source: F. Ruysch, *Thesaurus anatomicus primus*, Amsterdam 1701.



Fig. 4. Le Cavalier (1766-1771) écorché by Honoré Fragonard

Source: [http://christophelepetit.com/fr/galleries/1derniersreportages/x4enva/photos/\\_D6C3628.jpg](http://christophelepetit.com/fr/galleries/1derniersreportages/x4enva/photos/_D6C3628.jpg). Photography: Christophe Lepetit.

The younger brother, John Hunter (1728-1793), was also a physician, an anatomist who assembled his own collection of about 15,000 specimens, which was bought by the British government in 1799, and given to the Company (later The Royal College) of Surgeons [20, 21, 22, 23].

One of the oldest collections in France is Musée Fragonard d'Alfort in Paris. The history of this museum dates from 1794 when Professor Honoré Fragonard (1732-1799) made his first anatomical and teratological cabinet. He was one of the first to represent the human body in the form of *écorché*, that is skinned, revealing muscles, bones and organs. Such exhibits, about 700 prepared by him (now only 21 of them are available), were not only used for the purposes of research or teaching, but also a theatre. In 1771 he was declared insane and stripped of his positions. To this day his creations, such as The Horseman of the Apocalypse based on Albrecht Dürer's print, elicit extreme emotions [24, 25] (Fig. 4).

### **Anatomopathological collections created at the turn of the nineteenth century**

Up until the 18<sup>th</sup> century coincidence played a large part in the creation of anatomopathological collections. They were assembled somewhat on the margins of the studies on normal anatomy. Only the development of pathology at the end of the 18<sup>th</sup> century led to

the formation of separate collections as a result of direct research. Moreover, in the course of medical studies more emphasis was placed on the practical experiences connected with direct exploration of the human body, either during autopsies or indirectly by studying various specimens. Patho-clinical correlations were sought. Thus, didactics started to play a great part in the creation of medical collections. This is why one can often see a keynote, and the gathered specimens were more systematic and coherent than the earlier ones, which often constituted a gathering of random yet interesting items [8, 12].

In 1795 Professor Gerardus Vrolik (1775-1859) started collecting anatomical and teratological specimens, both osteological and wet ones, in Amsterdam. His work was expanded by his son Willem (1801-1863), and thus contained in total over 5,000 exhibits [26]. It was a private collection assembled on the basis of research on conjoined twins and congenital defects. The collection shows syndromes with multiple congenital anomalies, skeletal dysplasias, sequences, other complex anomalies, closure defects of the neural tube, and conjoined and acardiac twins. Subsequently it was expanded with donations by Hovius' collection of pathological bones and Grevers' dental collection [26, 27]. In 1869, after Willem's death, the collection was bought by the city community and donated to the municipal Athenaeum Illustre, the later University of Amsterdam, where it is



Fig. 5. Vrolik Museum, Amsterdam

Source: <http://we-are-star-stuff.tumblr.com/post/57630251854/pytbox-vrolik-museum-amsterdam>

still open and revitalized as Museum Vrolik (Fig. 5). The original preparations underwent MRI examination with cataloguing.

On the other hand, didactic reasons were the basis for the creation of the Anatomical Museum in Edinburgh. It was established in 1798 by Alexander Monro (1733-1817). At the turn of the 18<sup>th</sup> century, a museum was erected in Edinburgh, which collected books, but also anatomical and pathological exhibits. A century later it was developed to follow the famous Hunterian Museum. Currently the Royal College of Surgeons of Edinburgh houses three museums, including the Surgeons' Hall Pathology Museum featuring pathological anatomy and human disease studies. Collectively they form Scotland's largest and oldest medical museum, open to the public since 1832 [21, 28].

At the turn of the 18<sup>th</sup> and 19<sup>th</sup> century, scientific collections started to arise on German-speaking territories. Such is the ancestry of today's collection of the Institut für Anatomie und Zellbiologie der Martin-Luther-Universität Halle-Wittenberg. Its origins are connected with Johann F. Meckel the Elder (1714-1774) and his son Philipp (1756-1803). The former started to gather specimens in Berlin. His collection included mummified parts of bodies, organs, bones and human skulls. For the purposes of comparative anatomy he also collected zoological specimens. In 1779 Philipp Meckel took over the collection and

moved it to Halle. As he was interested in obstetrics, he enriched the assemblage with specimens of embryo distortion at different stages of its development (finally 3476 pieces). His son, Johann F. Meckel the Younger (1781-1833), expanded the collection to more than 12,000 exhibits. In all probability it was the largest and the most famous anatomical collection in this part of Europe. In 1836 it was purchased by the University of Halle [29, 30, 31, 32].

Equally important was a collection established in Vienna, where in 1796 Emperor Franz I founded the Museum of the Pathologic-Anatomical Institute. It was housed in a former asylum for mental patients in Narrenturm. The founder of the collection was Josef P. Ferro (1753-1809), Viennese city physician, but its establishment was only made possible after Johann P. Frank (1745-1821) arrived in the city. Much of the credit for creating the anatomical collection belongs to Lorenz Biermayer (1778-1843), who from 1813 maintained a catalogue of specimens later continued by his successors, including Karl von Rokitsky (1804-1878), who between 1832 and 1875 was a chairman of the board of the Pathology Institute and a museum. The collection features several types of specimens – macerates (human and animal dry specimens of bones and other body parts with pathological changes), as well as wet ones – cadaveric parts with pathological changes, preserved in jars with formalin [33, 34].

## Past collections of wax models

Parallel to the above direction in pathology museums, recreation of nature with casts or wax developed. Primarily educational anatomic models were made of wood, horns or ivory [8].

The art of ceroplastics was becoming more refined in the 16<sup>th</sup> and 17<sup>th</sup> centuries. It became very useful for educational and scientific purposes. Models of this type had many advantages: they were durable, and devoid of the foul odour of death and atmosphere of the macabre. They were also easy to exhibit, so in the Age of Enlightenment they became a common method of promotion of knowledge on the human body. A great number of them were made with extraordinary precision and sense of aesthetics, placing them among notable works of art (Fig. 6).

Their history begins with the sculptor and anatomist Gaetano Zumbo (1656-1701), who worked in Bologna and made colour wax models for the purposes of studying anatomy. His successor was Ercole Lelli (1702-1766), who for several years cooperated with Giovanni Manzollini (1700-1755). Together they created wax models for the Anatomy Museum of the Academy of Sciences of Bologna Institute. They authored many works about muscles and inner organs by studying real corpses during and after dissections. The majority of them were bought by the Royal Society of London and Pope Benedict XIV. Today they

are exhibited in several institutions in Bologna and abroad [35, 36, 37]. However, the most famous collection of anatomical wax models is in La Specola – Museum of Natural History in Florence. It originated in 1771 as a teaching aid. The models were made by Clemente Sussini (1754-1814) and his assistants. La Specola exhibits were shown to Emperor Joseph II in 1780, and the models were included in the collections for Josephinum (1782) – Military School of Medicine in Vienna [38, 39, 40, 41, 42, 43, 44].

## Beginnings of collections on the territory of Poland

The cabinets of curiosities also functioned on Polish ground. One of them was opened in Toruń in 1594 as the Cabinet of Curiosities at the library of the Academic Gymnasium. In 1613 in Gdansk the first public autopsy in this part of Europe was performed by Oelhavius. It is also confirmed that *theatrum anatomicum* existed in the city at that time, serving autopsies for the students and physicians. In 1724 Johann Kulmus, from Atheneum Gedanense (Gdansk Academic Gymnasium – erected in 1558 with a separate Department of Medicine and Anatomy), performed a famous public autopsy of conjoined twins, which was described and published in detail. These twins were preserved for educational purposes for several years [12, 35, 36] (Fig. 7).



Fig. 6. Wax anatomical model from La Specola Museum in Florence  
Source: [www.emmakisiel.com](http://www.emmakisiel.com). Photography: Emma Kisiel.

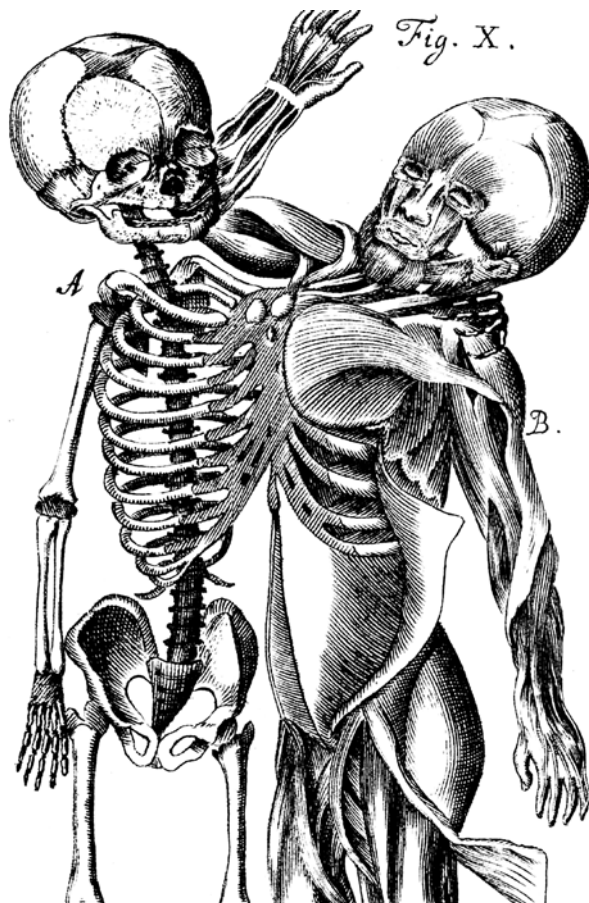


Fig. 7. Conjoined twins dissected by Johan Kulmus.  
 Source: Joannes Adamus Kulmus. *Descriptio anatomico-physiologica al cuius foetus monstrosi (...) Tab III, Fig X. Gedani 1724.*

The oldest and most opulent collections were located in Kraków. The origins of the exposition of the Collegium Medicum at Jagiellonian University are connected with Vienna. The humble beginnings of this largest and oldest institution of this type in Poland were 12 specimens of bones and fetuses, which were brought to Kraków from Vienna in 1803. As early as the first half of the 19<sup>th</sup> century, one of the sections comprised anatomopathological exhibits [37, 45]. Collegium Medicum has also a separate Anatomopathological Museum of Jagiellonian University. The core of the collection, consisting of dry and wet bone specimens, wax models, plaster casts and paper-mâché, as well as graphics and oil paintings, dates from the early 19<sup>th</sup> century and is associated with the internist Maciej J. Brodowicz (1790-1885) and surgeon Ludwik Bierkowski (1801-1860) [37, 45].

Anatomopathological collections were also gathered in Vilnius. The university, with its roots in the second half of the 16<sup>th</sup> century, opened its medical department in 1804. The founder was Johann P. Frank, who came from Vienna and stayed briefly in Vilnius. His legacy was continued by his son Joseph (1771-1842) [46, 47]. Since its inception, the department

had been collecting pathology-related items. They were lost, however, during the retreat of Napoleon's army (starving soldiers of the Grand Army consumed most of the anatomical specimens). In 1815 a new museum was opened in Vilnius, presenting not only zoological and veterinary, but also anatomical collections, which were divided into physiological, osteological, and pathological groups. In 1820, 1833 and 1841 they contained 682, 2 170 and 2 895 specimens, respectively. They included numerous dissected fetuses (often deformed), heads of convicts and suicides, as well as a skeleton arranged in a sitting position, which reportedly could be raised with the help of a hidden mechanism. In 1842, the university and the museum were closed and the majority of the anatomopathological specimens were transferred to the University of Kiev, to the local museum of anatomy [46, 47, 48].

## Summary

The beginning of the 19<sup>th</sup> century was a time of change in the world of medicine. The human body was perceived as a biological mechanism, to which a scientific approach and methods, partly conceived in the Enlightenment era, could be applied. Thus anatomic and anatomopathological collections began to play a major part as scientific and didactic aids in many university centres. The era of collecting just curiosities was finished. However, after the golden age of anatomopathological museums, the fast decrease of their prosperity occurred in the second half of the 20<sup>th</sup> century.

For our contemporaries the oldest collections bear different values. Just as before, we can admire unusual old exhibits sometimes for their beauty, sometimes due to their aesthetic, educational and of course scientific aspects. These collections bring a wealth of important information for scientific and medical fields – types of preserved exhibits, methods of conservation and storage, and paths of medical education as well. We can also perform historical research concerning past museology, the collectors and development of science. They are also extraordinary cultural heritage of past times.

*The authors declare no conflict of interest.*

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