

# University Collections

by Cornelia Weber

European universities house a variety of collections that played, and continue to play, an important role in the development of academic traditions, in the founding and differentiation of individual disciplines, and in the concrete practice of research and teaching. For a long time historians of science have neglected these collections, but in recent years a growing concern with the material dimensions of knowledge cultures (Wissenskulturen) has awakened a greater interest. Yet although increased efforts are being made to identify them, classify their contents and groups of objects, analyse their functions and usages, and to explore the history of individual objects and collections, fundamental research into the full European dimension of collections remains a desideratum. With this background in mind, this article attempts to provide a first historical survey and typology of European collections.

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## Introduction

The 1904 World's Fair (→ [Media Link #ab](#)), *Louisiana Purchase International Exposition* in St. Louis, USA, awarded a gold medal to a lime wood anatomical model used in university teaching. This six-fold magnification of the human skull that can be dismantled into individual sections was one of two identical models created by the woodcarver Albert Bechtel for the Munich anatomist Johannes Rückert (1854–1923) (→ [Media Link #ac](#)).<sup>1</sup> Although the Munich model was destroyed in the Second World War, the Berlin model (→ [Media Link #ad](#)) can still be admired in the foyer of the Anatomical Institute of the Charité where an important collection<sup>2</sup> of anatomical specimens and other demonstration objects is on display. In addition to the various models, one can also see Johann Nathanael Lieberkühn's (1711–1756) (→ [Media Link #ae](#)) "Präparate von menschlichen und thierischen Koerpern" and his injection-prepared specimens of the gastrointestinal tract presented through "Wundergläser" (lit. "miracle glasses", a form of microscope).<sup>3</sup>

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As in this example from Berlin, many universities in Europe also have extraordinary collections. But many of these have been forgotten because they are no longer used in research and teaching. In some places, these valuable resources were collected over a period of several centuries and may consist of fruits of academic research, products of external manufacturers or natural objects. Besides, objects brought back from expeditions (→ [Media Link #af](#)) and excavations which were often looted items found their way into a collection or even became its basis. Accordingly, the contents of collections range from *Alligators and Astrolabes*<sup>4</sup> through *Minerals and Magic Lanterns*<sup>5</sup> to *Totems and Trifles*.<sup>6</sup>

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By June 2012, the *University Museums and Collections Worldwide Database*<sup>7</sup> alone had registered some 1,758 collections and

museums in Europe. A systematic investigation would probably reveal a much higher number, but the data is difficult to obtain because many universities are unable to provide an overview of their holdings. In many cases, only a few employees in departments that have collections are even aware of their existence. This is especially true of the innumerable small collections scattered over individual faculties and departments that make up the vast majority of university collections.

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Nevertheless there are also important university museums whose large collections are known well beyond national borders; for example the Ashmolean Museum at the University of Oxford,<sup>8</sup> officially opened in 1683 and generally considered to be the first public museum;<sup>9</sup> the University of Uppsala's Museum Gustavianum<sup>10</sup> that not only looks after the thermometer of Anders Celsius (1701–1744) (→ Media Link #ag) but also the botanical garden (→ Media Link #ah) of Carl von Linné (1707–1778) (→ Media Link #ai), the Museo di Palazzo Poggi<sup>11</sup> in Bologna in which the natural history collection of Ulisse Aldrovandi (1522–1605) (→ Media Link #aj) is on display; and the Collegium Maius – Muzeum Uniwersytetu Jagiellońskiego<sup>12</sup> – in Kraków. In fact, some university museums have been granted the status of national museums: Among these are the Musée National des Arts et Métiers (CNAM)<sup>13</sup> in Paris, the Museu Nacional de História Natural<sup>14</sup> of the University of Lisbon and the University of Pisa's Museo Nazionale degli Strumenti per il Calcolo.<sup>15</sup>

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## Definition and Characterization

What do we mean when we speak of a "university collection"? Instead of using a binding definition, let us propose one that emerged from a German research project on the subject:

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Als Universitätssammlungen gelten ... alle aktuell oder ehemals zu einer wissenschaftlichen, theologischen und künstlerischen Hochschule gehörenden Sammlungen mit gegenständlichen und audio-visuellen Objekten. Auch Orte, an denen lebende Organismen aufbewahrt werden (z.B. Botanische Gärten oder Aquarien), sowie mit der Universitätsgeschichte verbundene Memorialeinrichtungen, die in Lehre und Forschung genutzt werden und/oder museale Funktionen erfüllen, zählen zum Gegenstandsbereich des Projekts.<sup>16</sup>

The project did not include the classical holdings of libraries and archives. Nevertheless, the range of collections taken into account is extraordinarily broad, extending from classical studies to zoology. Both the traditional academic disciplines and the newer ones, both the large and the small are represented.<sup>17</sup>

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Due to the nature of their origin and use, university collections are generally tied closely to universities since their primary function was to serve the purpose of research and teaching. To this day, collections have preserved entire categories and groups of *naturalia* und *artificialia* that can be found nowhere else. In addition to collections consisting of objects used in teaching and research (→ Media Link #ak), we can also find collections that bear witness to the history of universities.

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## The State of Research

For a long time, the historiography of scientific practice has neglected and even ignored university collections. In particular, the role they played in the formation and differentiation of scientific disciplines has not been investigated adequately to this day.<sup>18</sup> If the history of collections was studied at all in the past, it was treated as a part of the history of institutions, and collections were discussed, for example, within the framework of university chronicles and anniversary publications. These studies, however, focus primarily on the development of local collections and fail to place them in the larger context of the history of science.

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The United Kingdom presents an exception to this rule. Already in the 1980s and early 1990s, the first systematic and detailed surveys of university collections were carried out, and a number of publications appeared with a focus on museological aspects.<sup>19</sup> In the Netherlands, during the 1980s an initiative was launched in order to provide at least an overview of university collections.<sup>20</sup> Italy followed in 1986,<sup>21</sup> and Belgium,<sup>22</sup> Spain<sup>23</sup> and Portugal<sup>24</sup> have also provided directories of their collections.<sup>25</sup> In 2004, Germany has begun to identify and systematically organize university collections, as well as to supply detailed data concerning the holdings, selected groups of objects and their histories in an online information system.<sup>26</sup> Up to now it has been difficult to obtain documen-

tary sources in Eastern Europe; consequently, only a few presentations of the subject have been made.

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Moreover, to this day very little scientific work has been done on the European dimensions of university collections.<sup>27</sup> At present there is not enough material to make an adequate analysis of their history possible. In addition, there is a lack of information on specific questions, for example on the institutionalization of collections according to their underlying concepts, or to networks of exchange and systems of distribution.

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## The Historical Development of European University Collections

The attempt to sketch a comprehensive history of European university collections encounters a considerable number of obstacles. First, the histories of individual collections are rooted deeply in their respective disciplinary contexts; second, collections occasionally developed along idiosyncratic lines that can be reconstructed only in part and with difficulty. Sometimes the nucleus of a collection has to be sought in a small number of objects which were initially brought together without any concept or structure, and which have only in the course of time developed into a real collection. As a rule, such individual histories are strongly influenced by external factors, such as changes in a collection's ownership or in its organizational or logistical structure. For a long time, collections were the private property of professors, and when a professor accepted a post at another university, the collection went with him. Also mergings or new divisions into various sub-collections, the restructuring of departments, institutes and faculties, the relocations accompanying such changes, and the donation of collections to other institutions, or indeed the dissolving of collections, could – and still do – mark stations in the history of collections. For instance, in the Berlin Museum für Naturkunde (The Berlin Museum for Natural History)<sup>28</sup> that was opened in 1889, the natural history collections of the Friedrich Wilhelm University in Berlin, which up to that time had been separate units, became a single institution. In 2009, the museum has joined the Leibniz-Gemeinschaft (Leibniz Association) and thus no longer belongs to the university. The Academic Museum which was established at the University of Göttingen in 1773 was a physical and organizational unit until 1840; thereafter its various parts were given to the respective faculties.<sup>29</sup> It is thus clear that each collection has its particularities that have been shaped by the specific local and institutional settings, not the least of which is the influence exercised by individual personalities.

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A number of older university collections were created in the context of Universalist ideas of science but with increased specialization and diversification were differentiated according to the fields of study. Many independent specialised collections did not develop before the 19th and the early 20th century.

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The first organised collections were connected with the teaching of medicine, namely the *Theatrum anatomicum* and the *Hortus medicus*, or botanical garden, facilities that spread rapidly throughout Europe.<sup>30</sup> Anatomy, the study of the structure of organisms, is believed to have been the first academic discipline that made use of practical demonstrations.<sup>31</sup> Thus the 16th century Flemish physician and anatomist Andreas Vesalius (1515–1564) (→ Media Link #am), who lived in Padua, insisted "dass der Universitätslehrer selbst sezieren und die anatomischen Gegebenheiten an der Leiche demonstrieren sollte".<sup>32</sup> Therefore anatomical dissections and demonstrations were part of the medical course of each winter semester. The *Theatrum anatomicum* (*Amphitheatrum anatomicum*) in Padua (→ Media Link #an), founded in 1594, was the first of its kind.<sup>33</sup> The dissections exhibited there provided specimens that could be used in academic and practical instruction. Thus anatomy, which had traditionally been taught from books, was transformed gradually into an empirical natural science.<sup>34</sup> Later on, medical faculties everywhere created anatomical cabinets, a process that in some countries continued well into the 18th century.<sup>35</sup>

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Botanical gardens are among the oldest facilities of scientific institutions and among the richest in tradition. They were preceded by the monastery and covenant gardens of the Middle Ages in which herbs and medicinal plants were cultivated for practical use. At the time when the first university gardens were established, botany was not yet an independent science. Instead, it was taught by physicians in order to instruct students in the knowledge and use of medicinal plants. For this reason, many university gardens were created initially as a *Hortus medicus* (*Hortus physicus*, *Hortus simplicium*) which could provide demonstration material for medical students. The first *Hortus physicus* was established in Pisa in 1543, followed by the *Hortus medicus Patavinus* (→ Media Link #ao). In Padua, the physician and botanist Francesco Buonafede (1474–1558) introduced the practice of separating lectures (*lectiones*) from demonstrations (*ostensiones*) of medicinal plants (*simplices*). The *Ostensor simplicium* was also the director or prefect of the garden.<sup>36</sup> In the botanical gardens, not only plants were cultivated, dried and mixed for medical purposes (*Materia medica*), but geological specimens thought to have healing powers were also collected. In the 17th and 18th century, European anatomical schools like Leiden and Oxford also collected minerals and fossils "for the light they might shed on comparative

More or less simultaneously with the establishment of botanical gardens, herbaria were also created, i.e., collections of dried or pressed plants. For example, Ulisse Aldrovandi, naturalist and professor *de fossilibus, plantis et animalibus* at the University of Bologna,<sup>38</sup> created his herbarium in 1551.<sup>39</sup> The plant collection that had been established six years earlier at the University of Padua is nowadays recognized as the first institutionalized herbarium.<sup>40</sup>

In the late 16th century, pharmacies and botanical gardens began to provide museums as well.<sup>41</sup> The University of Leiden that was founded in 1575 established two such facilities, one in the *Ambulacrum* of the *Hortus physicus*, one in the *Theatrum anatomicum* (→ Media Link #ap). The catalogue of the *Hortus physicus* shows that, in addition to *naturalia*, a large number of exotic animals and *artificialia* were also collected.<sup>42</sup> But the larger collection was on display in the anatomical theatre, built 1591–1593, in which the professors of medicine, Pieter Paaw (1564–1617) (→ Media Link #aq) and Otto van Heurn (1577–1652) (→ Media Link #ar), created one of Europe's most famous cabinets of curiosities. Except in winter, when the theatre was reserved for public dissections, it was used to exhibit a collection of skeletons.<sup>43</sup> After Paaw's death in 1617, Otto van Heurn assumed responsibility for the facility and began to convert Paaw's *Anatomiekammer* into an encyclopaedic cabinet of curiosities.

A number of academic collections took over the contents of curiosity cabinets, natural science cabinets and art cabinets that had belonged to scholars, scientific societies and local rulers. The cabinet of Frederik III of Denmark (1609–1670) (→ Media Link #as)<sup>44</sup> provided the foundations of the zoological and mineralogical museums that were established at the University of Copenhagen in 1862 and 1879 respectively. The Royal Academy Museum in Germany,<sup>45</sup> founded in Göttingen in 1773, used the natural history collection that the university purchased from Christian Wilhelm Buettner (1716–1801) (→ Media Link #at), a teacher of natural history at the University of Göttingen. And the University of Amsterdam inherited the collection of the Royal Zoological Society, the *Natura Artis Magistra*.<sup>46</sup>

That many older university collections were initially privately owned is due to the fact that professors generally had to acquire, maintain, and care for the equipment they used in teaching and research themselves.<sup>47</sup> This practice changed in the second half of the 18th century, for example at the University of Göttingen which around 1800 was viewed "als Inbegriff einer geglückten Reformuniversität, als die aufgeklärteste, modernste Hochschule des Reichs, wenn nicht gar Europas".<sup>48</sup> Here an academic museum was established to provide the "unentbehrlichsten Hülfsmittel" ("indispensable aids")<sup>49</sup> required for teaching and research. The museum housed natural science collections of botanical, zoological, and earth science objects; it also had collections of coins, art and ethnological items.<sup>50</sup> In addition, in the ensuing period, the university purchased collections that had been assembled by professors at their own expense.

The physics cabinets of the 17th, 18th, and 19th centuries were a special type of collection. One of the oldest facilities of this type is the physics cabinet at Leiden<sup>51</sup> which was established in 1675 and is now part of the Boerhaave Museum,<sup>52</sup> the national museum for the history of science and medicine in Leiden. The University of Leiden was the first to introduce the new experimental method into its curriculum and for this purpose established a special room with equipment, the so-called *Theatrum physicum*. Thereafter, physics courses were no longer taught exclusively by lecture but were enriched with demonstrations. Other universities adopted this practice and created similar cabinets with instrument collections. One of the best preserved cabinets for physics was transferred to the University of Coimbra in 1772 from the *Colégio dos Nobres* in Lisbon, and can still be visited today in the Museu da Física.<sup>53</sup> It houses instruments that were used in experimental physics during the 18th and 19th century. Another famous example is the physics cabinet<sup>54</sup> founded by Alessandro Volta (1745–1827) (→ Media Link #au) in 1778 at the University of Pavia.

Some physics cabinets include special instruments from university observatories for astronomical observation. Before independent university observatories were created, they had been built in the top floors of privately owned buildings and towers. Europe's oldest university observatory is the Sterrewacht in Leiden,<sup>55</sup> built in 1633 as the Observatory of the University of Leiden. In Bologna, at Europe's oldest university, the construction of La Specola was completed in 1726. Today it houses a museum<sup>56</sup> displaying a collection of astronomical instruments.

Since the mid-18th century, collections of models have also played an important role – partly housed in chambers of models made specifically for that purpose. At some universities, they were part of the cabinets for mathematics and physics, for example in Cambridge and Haarlem. In Göttingen and Heidelberg, they were an independent facility available to all professors. In the chamber of models of Göttingen,<sup>57</sup> which was mostly maintained by mathematicians, models and other objects were also collected from the fields of *res militaris*, *architectura*, *machinae*, *res metallica* and *scientifica*. A thorough examination of the history of such university chambers of models remains a desideratum.<sup>58</sup>

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In some disciplines, special teaching collections were created that, in a few fields, are still in use. The early cultural science study-collections that were established everywhere in Europe include numismatic collections and plaster cast collections of ancient sculpture. Probably the earliest numismatic collection used in teaching at a German university was founded at the University of Halle in 1768. Its basis was the collection of ancient coins assembled by Johann Heinrich Schulze (1687–1744) (→ Media Link #av) at the so-called *Numophylacium Schulzianum*. In 1738 Schulze conducted a *collegium* on numismatics using his private collection and thus became the founder of this scholarly discipline.<sup>59</sup> At the University of Göttingen, Christian Gottlob Heyne (1729–1812) (→ Media Link #aw), who is recognized as the founder of archaeology "als eines universitären Lehrfachs",<sup>60</sup> established the first German collection of plaster casts of ancient sculptures in 1767, in order to give the auditors of his lecture course *Die Archäologie oder die Kenntniß der Kunst und der Kunstwerke des Alterthums* "eine Vorstellung von der realen Größe und der plastischen Form dieser Bildwerke".<sup>61</sup>

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In technical and natural science studies, it was primarily during the second half of the 19th century that numerous collections of models, machines and tools; instruments, equipment and apparatus; materials etc. were created. On the one hand, they supported experimental work; on the other hand, they were used for demonstrations during lectures. After the Second World War, the importance of these collections in research and teaching declined visibly – a renewed interest has only come about recently in the wake of current research into the history of science.

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There is also a long tradition of art collections at European universities. Their development differs from that of other collections because they were not connected with the founding of an academic discipline. However, they often contain objects that represent a university's history, for example in the form of portrait galleries of scholars. One of Europe's oldest major academic art collections was established in 1692 at the Academy of Fine Arts in Vienna.<sup>62</sup> In the sense of a visual memory, it reflects more than 300 years of academic life.<sup>63</sup> Many art collections were donated to universities, a common practice in the 18th century. For example, General John Guise (1682–1765) (→ Media Link #ay) bequeathed his *Picture Gallery* with more than 200 paintings and 2,000 graphics to his alma mater, Christ Church College, Oxford.<sup>64</sup>

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## Inventory: Types of Collections

In categorizing university collections, we can identify five different types: research collections, teaching collections, combined teaching and research collections, historical teaching and research collections that are no longer in use, and other collections that were not established primarily for the purposes of teaching or research. In the latter category, we will especially find collections concerned with the history of a university or with bequests. In addition, various universities have special kinds of collections that are academic facilities and cannot be subsumed under the usual museum categories: aquarium / terrarium / zoo, botanical garden / arboretum, geopark / geological garden, herbarium, campus prison, sound archive and observatory.

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Collections for teaching and research can function in very different ways: In general, they constitute the material basis for research and teaching. They may also serve as an archive or laboratory, support teaching within a particular discipline with a constant collection (or with one that is thematically limited or temporary), or provide an historical source for specific scientific investigations. These various forms are not mutually exclusive; on the contrary, the particular use made of a collection always depends on the approaches, research methods and didactic conceptions of each discipline, which may vary over time. In addition, some academic collections are also made available to the general public.

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## Functions

### The Collection as a Primary Material Basis for Research and Teaching

For the establishment of numerous academic disciplines, the creation of a collection was of vital importance because it constituted the discipline's real working basis for research and teaching. On the one hand, the material objects were used as a starting point for scientific work, on the other hand as visual examples in teaching. This is the case for many medical and veterinarian medical fields, but also for all natural history disciplines. In cultural studies, collections have sometimes constituted—and continue to make up—the primary material basis as well. For example, the academic discipline of comparative musicology which was established in Berlin at the beginning of the 20th century had its material basis in a collection of sound recordings (→ Media Link #az) from the Berlin Phonogramm-Archiv, which was created in 1904 and in 1963 became part of the Ethnological Museum's<sup>65</sup> department of ethnomusicology.

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## The Collection as Archive

Even if a scientific collection no longer plays a central role in research and teaching, it may still be valuable as an archive. This is especially true for natural history collections. For example, if a new plant species is discovered, it must be compared to the specimen that was used to describe the original species-type. For this purpose, the relevant existing holdings can be consulted. Earth science collections often contain especially important reference material, the physical evidence of what has been investigated in works of academic qualification and research projects, and which has therefore been described in scholarly publications. Furthermore, geological collections are valuable sources of information for environmental research; for example, core repositories can be used for the reconstruction of climate and ecological conditions.<sup>66</sup> In this regard, even an older medical collection can serve as an archive. For instance, with the aid of DNA testing historical holdings can now be used to investigate historical diseases.<sup>67</sup>

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## The Collection as a Laboratory

Collections can serve as a kind of "laboratory (→ Media Link #b0)" in which objects are observed, compared, and used in experimental investigations. In disciplines such as zoology, botany, geology, mineralogy, palaeontology and archaeology, knowledge can be gained from direct observation and comparing objects. In physics and its derivative sciences, as well as in engineering, knowledge is generated by means of experiments, the material basis of which is constituted by the objects. After the experiment has been completed, such objects are merely of historical interest; therefore, many of these collections are not maintained, whereas collections of the first category usually *are* preserved.

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## The Collection as a Permanent Academic Classroom

In some disciplines, teaching is based not only on written and visual records, but also on collections of *naturalia* and *artificialia*. Therefore, special collections have often been established and study rooms set up with botanical, zoological and earth science collections, especially in natural history faculties. Typical examples are the botanical garden and the herbarium.

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In the field of cultural studies, especially in archaeology, teaching collections constitute one of the foundations of academic instruction, albeit with varying degrees of emphasis. They are especially important in classical and prehistoric archaeology, in Egyptology, in the archaeology of the Middle East and Sudan, and in Christian archaeology. One such collection is maintained by the Tartu Ülikooli Kunstmuuseum (University of Tartu Art Museum), founded in 1803<sup>68</sup> and now preserved in the main building of the University of Tartu in which, next to objects of classical archaeology, modern art works are also exhibited.

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## The Thematic Collection Providing Temporary Teaching Support

In many disciplines, teaching collections were established for specific thematic fields that once were of topical interest and that were only used for a limited period of time. Transitory interest has characterized the history of many model collections, for example in the case of mathematical models. Collections of models were used for teaching primarily in technical subjects, but they also played a significant role in other disciplines, including medicine and biology.<sup>69</sup> The glass models (→ Media Link #b2) of Leopold (1822–1895) (→ Media Link #b3) and Rudolf Blaschka (1857–1939) (→ Media Link #b4), for instance, have become famous and are still found in many zoological collections all over the world.<sup>70</sup>

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## The Historical Collection as a Source for Studies in the History of Science

Universities also own many so-called historical collections that no longer serve their original research or teaching purpose, for example collections of devices and machines, models, and instrument cabinets that were used in teaching physics. Among these is the collection of instruments and devices that Georg Christoph Lichtenberg (1742–1799) (→ Media Link #b5) created in 1783 at the University of Göttingen and financed with private funds.<sup>71</sup> His demonstration objects were the main attraction of his introductory lecture in experimental physics. Such a collection, that documents a field's historical development, is not only significant for the development of an academic discipline's identity, but may also serve as a source for investigations into the history of science and can thus become a subject of research itself.

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## The Collection as a Place for Exhibitions

Often university collections were (and still are) referred to as museums. But in the course of history, this term has been used to describe a variety of things: Among others, a "Sammlung von Kunstwerken, öfters auch von Büchern und Naturproducten", a "Kunst-Kammer", a "Müntz-Cabinet", a "Rarität- und Antiquitäten-Kammer" or an "Ort, wo man zusammen kommt, um sich mit den Wissenschaften und schönen Künsten zu beschäftigen".<sup>72</sup> Thus what used to be described as a "museum" may not always correspond to the current concept as defined by the ICOM.<sup>73</sup> And, in contrast to today's practice, in the past university collections were often open to outsiders. For example, along with many other points of interest, the 1833 *Wegweiser für Fremde und Einheimische durch Berlin und Potsdam* ("Guide to Berlin and Potsdam for Visitors and Residents")<sup>74</sup> points to the University of Berlin's "museums" which tourists could also visit upon presenting an admission ticket or by making a reservation.<sup>75</sup> From today's perspective, this practice raises the question of whether it was the increasingly active and intensive use of collections in teaching and research that led to excluding the general public.

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## Conclusion and Outlook

European universities house an extremely broad range of collections and a unique material culture that played a vital role in the establishment of many scientific disciplines. Indeed, experts themselves are sometimes surprised by the abundance and diversity of university holdings. Even collections that are obviously only of historical interest can acquire new relevance after the introduction of new research methods, approaches or didactic concepts. Therefore, as a matter of principle university collections must be preserved in order to maintain their research potential for future generations, keep the material evidence of the history of science and to retain this part of our cultural heritage.

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Fortunately, in recent years, Europe has witnessed the beginning of more general historical research into collections and their contents. In this context, the trans-regional networks that were developed at the beginning of the 21st century have played an essential part in the field of university collections.<sup>76</sup> They have directed attention not only to the museological aspects of collections, but also to their history. In addition, a newly awakened historical and epistemological interest in the importance of the material culture for scientific practice has produced stimulating studies on selected collection objects and object groups. Up to now, cultural transfer (→ Media Link #b6) in Europe has been visible primarily at the level of objects, for example in teaching models: The wax anatomical models which the Florentine Clemente Susini (1754–1814) (→ Media Link #b7) developed for the museum La Specola have also found their way into many other European collections. For example, when Emperor Joseph II (1741–1790) (→ Media Link #b8) visited the museum in 1780, he ordered a large number of them for the Museum Josephinum<sup>77</sup> in Vienna.<sup>78</sup> Of particular importance in this regard, are, among others, the works of the Frenchman Louis Auzoux (1797–1880) (→ Media Link #b9) whose papier-mâché botanical and zoological models were bestsellers throughout Europe.<sup>79</sup> Mathematical models have also travelled far: Thus we find the models made by the Leipzig publishing house of Martin Schilling widely distributed throughout Germany and other places, including the University of Coimbra where at present an inventory of the models is being taken. If this tendency continues, one will soon be able to write a comprehensive history of university collections in European culture. Such a study could also trace the trans-regional relationships between collections that came about during the early modern period and which have not yet been sufficiently investigated.

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## Appendix

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## Notes

1. ^ Bredekamp, *Theater der Natur und Kunst* 2000–2001, p. 213.
2. ^ [www.universitaetssammlungen.de/sammlung/48](http://www.universitaetssammlungen.de/sammlung/48) [14.05.2012].
3. ^ Bogusch, *Der Weg des Bluts* 2010 ("anatomical specimens of human and animal bodies", transl. by W.P.).
4. ^ Bremer / Wegener, *Alligators and Astrolabes* 2001.
5. ^ South West Museums Council, *Minerals and Magic Lanterns* 1999.
6. ^ Arnold-Forster / Weeks, *Totems and Trifles* 2000.
7. ^ <http://publicus.culture.hu-berlin.de/collections/> [14.05.2012].
8. ^ [www.ashmolean.org/](http://www.ashmolean.org/) [14.05.2012]. Cf. MacGregor, *The Ashmolean* 2001.
9. ^ Pomian, *Der Ursprung des Museums* 1998, p. 66.
10. ^ [www.gustavianum.uu.se/](http://www.gustavianum.uu.se/) [14.05.2012].
11. ^ [www.museopalazzopoggi.unibo.it/](http://www.museopalazzopoggi.unibo.it/) [14.05.2012].
12. ^ [www.maius.uj.edu.pl/index.html](http://www.maius.uj.edu.pl/index.html) [14.05.2012].
13. ^ [www.arts-et-metiers.net](http://www.arts-et-metiers.net) [14.05.2012].
14. ^ [www.natural-europe.eu/en/the-consortium/national-museum-of-natural-history-university-of-lisbon-mnhml-portugal](http://www.natural-europe.eu/en/the-consortium/national-museum-of-natural-history-university-of-lisbon-mnhml-portugal) [14.05.2012].
15. ^ [www.fondazionegalileogalilei.it](http://www.fondazionegalileogalilei.it) [14.05.2012].
16. ^ "The term university collections refers to ... all collections that contain physical and audio-visual objects and which now, or at some time in the past, belonged to a scientific, a theological or an arts university. Also numbered among the project's research objects are places where living organisms have been preserved (e.g., botanical gardens or aquariums) and memorial facilities associated with the history of universities that are used in teaching and research and/or fulfil the task of, or function as, a museum", transl. by W.P. This definition is the result of a project to register university museums and university collections in Germany. Cf. the project's documentation at: <http://www.universitaetssammlungen.de/download/Projekt-dokumentation.pdf> [29.02.2012].
17. ^ Among these are Egyptology, Assyriology, anatomy, anthropology, archaeology, architecture, astronomy, biology, chemistry, ethnology, earth sciences, history, computer science, classical studies, cultural studies, art, mathematics, medicine,

- ecology, physics, pharmacology, physiology, psychology, religious studies, linguistics, engineering studies and theology. The majority of the collections belong to the fields of natural history, natural science and technology.
18. ^ One of the few exceptions is the article by Jochen Brüning that investigates the role of collections in the genesis of natural science studies in Berlin: Brüning, Von Humboldt zu Helmholtz 2010.
  19. ^ For example: Arnold-Forster, The Collections of the University of London 1989; idem, Held in Trust 1994; idem, Beyond the Ark 1999; South West Museums Council, Minerals and Magic Lanterns 1999; Arnold-Forster / Weeks, Totems and Trifles 2000; idem, A Review of Museums and Collections of Higher Education Institutions 2001; Drysdale, A World of Learning 1990; Northern Ireland Museums Council, A Survey of the University Collections 2002; cf. also Merriman, The Current State of Higher Education Museums 2002.
  20. ^ LOCUC, Rapport landelijke inventarisatie universitaire collecties 1985.
  21. ^ Cipriani / Merola / Sentinelli, Un'indagine sui Musei Scientifici ed Orti Botanici Universitari italiani 1986.
  22. ^ Van den Driessche, University and Universality in Belgium 2000.
  23. ^ Such, Asociación de Museos y Colecciones Universitarias Españolas 2003.
  24. ^ Lourenço, Are University Museums and Collections Still Meaningful? 2002.
  25. ^ Newer initiatives present their collections on the Internet: Recently the organisation "University Museums in Scotland" (UMIS) has launched the online database Revealing the Hidden Collections which provides detailed information on collections and their objects. Other European countries have also begun to register university collections electronically; for example, Italy has created a new web portal, POMUI (PORTalMUseumsItalian), and the Netherlands is developing the portal UNICUM (University Collections and University Museums) which is commissioned by the Academic Heritage Foundation (Stichting Academisch Erfgoed – SAE).
  26. ^ [www.universitaetssammlungen.de/](http://www.universitaetssammlungen.de/) [14.05.2012].
  27. ^ An exception is Marta Lourenço's 2005 dissertation, Between Two Worlds: The Distinct Nature and Contemporary Significance of University Museums and Collections in Europe, which was written in the field of "Histoire des Techniques, Muséologie" at the Paris Conservatoire National des Arts et Métiers.
  28. ^ [www.naturkundemuseum-berlin.de/institution/](http://www.naturkundemuseum-berlin.de/institution/) [14.05.2012].
  29. ^ Plesker, Das Königlich Akademische Museum in Göttingen 2006, p. 261.
  30. ^ The Theatrum anatomicum in Padua, built in 1595 and recognized as the oldest anatomical theatre in Europe, still exists. The oldest garden in the Netherlands can be viewed in a reconstruction in Leiden. The Foundation Hortus Academicus Lugduno-Batavus was established in 1590; the first verified planting took place in 1594.
  31. ^ Richter, Das Anatomische Theater 1936, p. 6.
  32. ^ "that university teachers themselves should dissect and demonstrate the body's anatomy", transl. by W.P. (Neumann, Körperkonzepte 2007, p. 81).
  33. ^ Fichtner / Siefert, Padua 1978.
  34. ^ Cf. Habrich, Zur Typologie medizinischer Sammlungen im 17. und 18. Jahrhundert 1994.
  35. ^ In Germany a relatively high number of such collections that existed in the early modern period have been preserved; among other places at the universities of Erlangen, Greifswald, Halle, Jena, Leipzig, Marburg and Würzburg.
  36. ^ Müller, Zur Geschichte Botanischer Gärten 1991, p. 27.
  37. ^ Torrens, Early Collecting in the Field of Geology 2001.
  38. ^ Olmi, Science-Honour-Metaphor 2001.
  39. ^ Soldano, L'erbario di Ulisse Aldrovandi 2000.
  40. ^ Shetler, The Herbarium 1969, p. 695.
  41. ^ Findlen, Die Zeit vor dem Laboratorium 1994, p. 196.
  42. ^ Schupbach, Some Cabinets of Curiosities in European Academic Institutions 2001, p. 232.
  43. ^ *ibid.*, p. 232: "Paaw arranged the anatomical museum as a kind of Museum of Mortality. Six human skeletons standing around the perimeter held pennants inscribed with admonitory mottoes: memento mori; homo bulla; pulvis et umbra sumus. There were skeletons of a cow, cat, rat, ram and swan, and of an eagle with gilt talons. The pioneers of death, Adam and Eve, were represented by skeletons of a man and a woman beside a tree."
  44. ^ Gundestrup, From the Royal Kunstkammer to the Modern Museums of Copenhagen 2001.
  45. ^ Lichtenberg, Etwas vom Akademischen Museum 1779, p. 48.
  46. ^ Roselaar, Inventory of Major European Bird Collections 2003, p. 255.
  47. ^ For the University of Jena Gerhard Müller demonstrated this in an exemplary fashion: Müller, Vom Regieren zum Gestalten 2006, p. 146.
  48. ^ "the epitome of a successful reform university, as the most enlightened modern university of the kingdom, if not of Europe", transl. by W.P. (Walther, Das Ideal 2001, p. 33).
  49. ^ Meiners, Ueber die Verfassung 1801, vol. 1, p. 60.
  50. ^ Cf. Lichtenberg, Etwas vom Akademischen Museum 1779; or Nawa, Zum "öffentlichen Gebrauche" bestimmt 2010.
  51. ^ De Clercq, The Leiden Cabinet of Physics 1997.
  52. ^ [www.museumboerhaave.nl/](http://www.museumboerhaave.nl/) [14.05.2012].
  53. ^ <http://nautilus.fis.uc.pt/museu/museuinfoi.htm> [14.05.2012].
  54. ^ <http://ppp.unipv.it/museo/Pagine/fisica/FisicMainFrame.htm> [14.05.2012].
  55. ^ [www.strw.leidenuniv.nl/outreach/history.php?node=45](http://www.strw.leidenuniv.nl/outreach/history.php?node=45) [14.05.2012].

56. ^ [www.bo.astro.it/dip/Museum/MuseumHome.html](http://www.bo.astro.it/dip/Museum/MuseumHome.html) [14.05.2012].
57. ^ [www.universitaetssammlungen.de/sammlung/1113](http://www.universitaetssammlungen.de/sammlung/1113) [14.05.2012].
58. ^ A dissertation on the model chamber at Göttingen is being written at Humboldt University.
59. ^ Cf. Kaiser / Völker, Johann Heinrich Schulze 1980.
60. ^ "as a university subject", transl. by W.P. (Graepler / Migl, Vorwort 2007, p. 7).
61. ^ "Archeology or the Knowledge of Art and the Art works of Antiquity", "a notion of the real size and plastic form of these sculptures", transl. by W.P. (Fittschen, Christian Gottlob Heyne und die Göttinger Gipsabgußsammlung 2007, p. 89).
62. ^ [www.akbild.ac.at/Portal/einrichtungen/kupferstichkabinett](http://www.akbild.ac.at/Portal/einrichtungen/kupferstichkabinett) [14.05.2012].
63. ^ Wagner, Die Geschichte der Akademie der bildenden Künste in Wien 1967.
64. ^ [www.chch.ox.ac.uk/gallery](http://www.chch.ox.ac.uk/gallery) [14.05.2012].
65. ^ Simon, Das Berliner Phonogramm-Archiv 2000.
66. ^ For example, IODP/ODP - Kernlager / Bremen Core Repository (BCR) at the University of Bremen.
67. ^ Cf. for example, Göbbel, Annals of Morphology 2007.
68. ^ [www.ut.ee/artmuseum/](http://www.ut.ee/artmuseum/) [14.05.2012].
69. ^ Cf. the Model database at [www.universitaetssammlungen.de/modelle](http://www.universitaetssammlungen.de/modelle) [29.02.2012].
70. ^ Cf. for example, Hackethal, The Blaschka Models 2008; Schultes / Davis, The Glass Flowers at Harvard 1992.
71. ^ Cf. Beuermann / Minnigerode, Die Sammlung historischer physikalischer Apparate 2001, p. 183.
72. ^ A "collection of artworks, and more often books and products of nature", an "art cabinet", a "coin-cabinet", a "chamber of art and curiosities" or a "place where people come together who are engaged in the study of science and the fine arts", transl. by W.P. (cf. for example, Zedlers Universallexicon 1731–1754, vol. 22, col. 1375; Krünitz, Ökonomische Encyclopädie 1773–1858, vol. 98, p. 450).
73. ^ The International Council of Museums (ICOM) defines a museum as 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 purpose of education, study, and enjoyment ". See ICOM-Statutes Article 3.1.
74. ^ Nicolai, Wegweiser für Fremde und Einheimische durch Berlin und Potsdam 1833, p. 128.
75. ^ "Es giebt deren drei: a) Das anatomische Museum ... gegen Einlaßkarten, die Tags zuvor daselbst ausgetheilt werden, im Sommer Mittwochs und Sonnabends von 4 bis 6 Uhr, im Winter Vormittags von 10 bis 12 Uhr geöffnet. b) Das mineralogische Museum ... ist dem Publikum nicht geöffnet. Man wendet sich an den Direktor desselben, Prof. Weiß, im Universitätsgebäude. c) Das zoologische Museum ... Dienstags und Freitags von 12 bis 2 Uhr offen gegen vorher sich dort zu schaffende Einlaßkarten" ("There are three: a) The Museum of Anatomy ... accessible upon presentation of an admission ticket issued the day before entrance is desired; open in summer Wednesdays and Saturdays from 4 to 6 p.m., in winter from 10 to 12 a.m. b) The Museum of Minerals ... is not open to the public. Please contact the Museum Director, Prof. Weiß, in the University administration building. c) The Zoological Museum ... is open on Tuesdays and Fridays from 12 to 2 p.m. and can be visited upon presentation of an admission ticket to be acquired previously on the premises", transl. by W.P., *ibid.*, pp. IV–V).
76. ^ Since 2001 under the umbrella of the International Council of Museums (ICOM), university collections worldwide have been organized in the committee University Museums and Collections (UMAC). Another supra-regional network is the European Academic Heritage Network UNIVERSEUM.
77. ^ [www.josephinum.meduniwien.ac.at/](http://www.josephinum.meduniwien.ac.at/) [02.07.2012].
78. ^ Marković / Marković-Živković, Development of Anatomical Models 2010, p. 57.
79. ^ Cf. Grob, The World of Auzoux, 2000.

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## Link #ab

- Weltausstellungen (<http://www.ieg-ego.eu/de/threads/crossroads/wissensraeume/alexander-c-t-geppert-weltausstellungen>)

## Link #ac




- Johannes Rückert (1854–1923) VIAF [↗](http://viaf.org/viaf/47519543) (http://viaf.org/viaf/47519543) DNB [↗](http://d-nb.info/gnd/116673648) (http://d-nb.info/gnd/116673648) ADB/NDB [↗](http://www.deutsche-biographie.de/pnd116673648.html) (http://www.deutsche-biographie.de/pnd116673648.html)

## Link #ad



- <http://www.ieg-ego.eu/en/mediainfo/lime-wood-skull>  
Lime Wood Skull

#### Link #ae

- Johann Nathanael Lieberkühn (1711–1756) VIAF   (<http://viaf.org/viaf/441684>) DNB  (<http://d-nb.info/gnd/104196645>) ADB/NDB  (<http://www.deutsche-biographie.de/pnd104196645.html>)

#### Link #af

- European Encounters (<http://www.ieg-ego.eu/en/threads/backgrounds/european-encounters/guido-abbattista-european-encounters-in-the-age-of-expansion>)

#### Link #ag

- Anders Celsius (1701–1744) VIAF   (<http://viaf.org/viaf/67259216>) DNB  (<http://d-nb.info/gnd/118653326>)





#### Link #ah



- (<http://www.ieg-ego.eu/en/mediainfo/linnean-garden>)

Linnean Garden

#### Link #ai

- Carl von Linné (1707–1778) VIAF   (<http://viaf.org/viaf/34594730>) DNB  (<http://d-nb.info/gnd/118573349>) ADB/NDB  (<http://www.deutsche-biographie.de/pnd118573349.html>)


#### Link #aj

- Ulisse Aldrovandi (1522–1605) VIAF   (<http://viaf.org/viaf/100190422>) DNB  (<http://d-nb.info/gnd/118898825>)

#### Link #ak

- Science (<http://www.ieg-ego.eu/en/threads/backgrounds/science/paul-ziche-joppe-van-driel-science>)

#### Link #am

- Andreas Vesalius (1515–1564) VIAF   (<http://viaf.org/viaf/51696979>) DNB  (<http://d-nb.info/gnd/118768204>) ADB/NDB  (<http://www.deutsche-biographie.de/pnd118768204.html>)



- (<http://www.ieg-ego.eu/en/mediainfo/andreas-vesalius-1514-1564>)  
Andreas Vesalius (1515–1564)

#### Link #an



- (<http://www.ieg-ego.eu/en/mediainfo/the-anatomical-theatre-in-padua>)  
The Anatomical Theatre in Padua

#### Link #ao







- (<http://www.ieg-ego.eu/en/mediainfo/veduta-dellorto-botanico-di-padova>)  
Veduta dell'orto botanico di Padova





#### Link #ap

- Dutch Anatomy (<http://www.ieg-ego.eu/en/threads/models-and-stereotypes/the-dutch-century/rina-knoeff-dutch-anatomy-and-clinical-medicine-in-17th-century-europe>)

#### Link #aq

- Pieter Paaw (1564–1617) VIAF   (<http://viaf.org/viaf/46989335>) DNB  (<http://d-nb.info/gnd/122246918>) ADB/NDB  (<http://www.deutsche-biographie.de/pnd122246918.html>)


#### Link #ar

- Otto van Heurn (1577–1652) VIAF   (<http://viaf.org/viaf/64766585>) DNB  (<http://d-nb.info/gnd/116782951>) ADB/NDB  (<http://www.deutsche-biographie.de/pnd116782951.html>)

#### Link #as

- Frederik III of Denmark (1609–1670) VIAF   (<http://viaf.org/viaf/29694205>) DNB  (<http://d-nb.info/gnd/118693484>) ADB/NDB  (<http://www.deutsche-biographie.de/pnd118693484.html>)


#### Link #at

- Christian Wilhelm Buettner (1716–1801) VIAF   (<http://viaf.org/viaf/45072870>) DNB  (<http://d-nb.info/gnd/117145068>) ADB/NDB  (<http://www.deutsche-biographie.de/pnd117145068.html>)

#### Link #au

- Alessandro Volta (1745–1827) VIAF   (<http://viaf.org/viaf/9950567>) DNB  (<http://d-nb.info/gnd/119292556>)

#### Link #av

- Johann Heinrich Schulze (1687–1744) VIAF   (<http://viaf.org/viaf/8287965>) DNB  (<http://d-nb.info/gnd/123165350>) ADB/NDB  (<http://www.deutsche-biographie.de/pnd123165350.html>)

#### Link #aw

- Christian Gottlob Heyne (1729–1812) VIAF   (<http://viaf.org/viaf/14819364>) DNB  (<http://d-nb.info/gnd/11855073X>) ADB/NDB  (<http://www.deutsche-biographie.de/pnd11855073X.html>)

#### Link #ay

- John Guise (1682–1765) VIAF   (<http://viaf.org/viaf/8284052>) DNB  (<http://d-nb.info/gnd/123021065>)


#### Link #az

-  (<http://www.ieg-ego.eu/en/mediainfo/kham-hom>)  
Kham Hom

#### Link #b0

- Laboratory (<http://www.ieg-ego.eu/en/threads/crossroads/knowledge-spaces/henning-schmidgen-laboratory>)

#### Link #b2

-  (<http://www.ieg-ego.eu/en/mediainfo/model-of-a-polyp-and-a-young-medusa>)  
Model of a Polyp and a Young Medusa





#### Link #b3

- Leopold Blaschka (1822–1895) VIAF   (<http://viaf.org/viaf/5801837>) DNB  (<http://d-nb.info/gnd/12196647X>)

#### Link #b4

- Rudolf Blaschka (1857–1939) VIAF   (<http://viaf.org/viaf/67336571>) DNB  (<http://d-nb.info/gnd/121966488>)

#### Link #b5

- Georg Christoph Lichtenberg (1742–1799) VIAF   (<http://viaf.org/viaf/27067718>) DNB  (<http://d-nb.info/gnd/118572628>) ADB/NDB  (<http://www.deutsche-biographie.de/pnd118572628.html>)



- <http://www.ieg-ego.eu/en/mediainfo/georg-christoph-lichtenberg-174220131799-en>  
Georg Christoph Lichtenberg (1742–1799)




#### Link #b6

- Cultural Transfer (<http://www.ieg-ego.eu/en/threads/theories-and-methods/cultural-transfer/wolfgang-schmale-cultural-transfer>)

#### Link #b7

- Clemente Susini (1754–1814) VIAF   (<http://viaf.org/viaf/41419242>) DNB  (<http://d-nb.info/gnd/119276364>)

#### Link #b8

- Emperor Joseph II of Austria (1741–1790) VIAF   (<http://viaf.org/viaf/39386414>) DNB  (<http://d-nb.info/gnd/118558404>) ADB/NDB  (<http://www.deutsche-biographie.de/pnd118558404.html>)

#### Link #b9

- Louis Auzoux (1797–1880) VIAF   (<http://viaf.org/viaf/62332373>) DNB  (<http://d-nb.info/gnd/117669504>)



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