

[M.C. Lourenço, 2005. *Between two worlds: the distinct nature and contemporary significance of university museums and collections in Europe*. PhD dissertation, Conservatoire National des Arts et Métiers, Paris]

4. Where do they come from? The origins of university collections

An immense collection of everything is necessary to the study of the sciences and the practice of the arts [...] A sort of encyclopaedia for the senses [...] All these things, which are not dispersed all around, as they are in some other places, are put together and thus represent a grand combination, each component of which, taken on its own, would offer nothing worth nothing.

J.W. von Archenoltz, 1787, in Tega (2002: 8)

Wer keine Vergangenheit hat, hat keine Zukunft
[One who does not have a past, has no future]
Wilhelm von Humboldt

Understanding the history of university collections⁴² helps to understand their contemporary role. Historians tend to overlook the role of objects and collections, therefore the history of university collections has remained largely ignored in studies of the history of physics, biology, archaeology and other subjects. Although a recent field of study in itself, it is rather perplexing to realise how much history of science has been studied and published without a single reference to the history of collections, particularly university collections and their relation with higher education research policies, courses, and curricula. In this respect, Kohlstedt's (e.g. 1988, 1991, 1995) works on the history of life sciences in the USA remain largely singular. Perhaps even more telling is the small number of references to university museums and collections in the literature on museum history. University collections are not ignored – many are too important to be ignored – but rather it is the university side of the matter that is often left out. For example, the Ashmolean Museum is generally presented as the first public museum, but the link with the University of Oxford often remains unmentioned (e.g. Belk 1995). Likewise, the Botanical Garden at the University of Pisa is presented as the first botanical garden in the world regardless of having been created at the *University of Pisa*. In *Museums in Motion*, Alexander (1979) approaches the history of museums from a disciplinary perspective and references to university museums are occasional and scattered. More recently, in *Patrimoine et musées: l'institution de la culture*, Poulot (2001) gives an historical panorama of the role of museums and monuments in the shaping of modern culture (mostly art), but no explicit references to university collections or museums are made.

Lewis' (1984) introduction in the *Manual of Curatorship* provides a comprehensive non-disciplinary examination of the history of museums, including major university museums. The remarkable *The Origins of Museums* (Impey & MacGregor 2001) adopted a combination of geographical and disciplinary approach and there is a chapter specifically on university museums (Schupbach 2001). The earlier works by Gilman (1918) and Wittlin (1949) followed a similar approach. Danilov (1996) provided a brief historical account of university collections and museums in the USA, while Boylan (1999) treated university museums as a group and presented a comprehensive historical overview for Europe. MacGregor (2003) asked 'university museums: were they ever worth it?' and gave a broad historical account on the utility of university museum collections, with references to British, Dutch and Italian examples. Clearly, more research is needed on university museums and collections in the

⁴² In this dissertation, the term 'university' is taken in its broadest sense and to mean all European higher education institutions, including for example the *Fachhochschulen*, military academies, the polytechnics and the *grandes écoles*.

context of the history and development of universities. University museums and collections certainly deserve being subject of historical research in their own right. Their creation and development raise distinct issues that are at best watered down and at worst omitted both in 'mainstream' museum history⁴³ and in 'mainstream' history of science.

In this chapter a historical overview of university collections is presented. The organisation follows the typology outlined in the past chapter, thus it is not necessarily chronological. The first part deals with first generation collections, i.e. collections purposefully assembled to fulfil teaching and research needs. I will discuss the origin of the teaching collection, the research collection (and its predecessor, the study collection), as well as first generation university museums. A separate section is devoted to art collections. In the second part I will discuss second generation university collections, i.e. those resulting from the accumulation of historical items related to teaching and research and to university memorabilia. Given that the primary literature provides only limited comparative analyses, the sources for this chapter were mainly secondary – dispersed documents on the history of museums, the history of universities and the history of science. This led to the development of a historical synopsis (appendix A8), which in turn allowed the identification of common patterns in different European countries⁴⁴.

4.1 Early 'collections' for study and teaching

There can be little doubt that objects uniquely loosen the teacher's tongue and enhance the understanding of students (Hamilton 1995). This seems to go back to ancient times. One of the most striking discoveries of early teaching 'collections' was made in the early 20th century by the archaeologist Leonard Woolley at Ur, in present-day Iraq. Woolley excavated a school dating from 530 BC containing a room with several antiquities that pre-dated the school by up to 1600 years. This school was established by En-nigaldi-Nanna, daughter of Nabonidus, the last king of Babylon. If this discovery was not already fascinating enough, what appears to have been a clay 'museum' label was found together with these antiquities (Woolley & Moorey 1982).

There are more examples of early collections. *Sheng Nung Peng Tsao* is considered the earliest *materia medica*, recording more than 10,000 medicinal substances – it was based on the hortus medicus created by Emperor Shen Nung of China, c. 2800 BC. Botanical gardens and menageries existed in Egypt and Assyria from at least 1500 BC (Alexander 1979, Lewis

⁴³ With few exceptions museum history has been written and taught by museum professionals. The museum as a subject of historical criticism has received only limited attention from historians (cf. Hooper-Greenhill 1992, Lopes *sine anno*). Recently, Starn (2005) argued that museums matter to historians and called for a greater involvement of historians in museum history, noting that "[...] museums actually deliver more history, more effectively, more of the time, to more people, than historians" and that the lack of interest is difficult to understand given that "[...] many historians first got the itch for history from museums, surely more than from the textbooks read at school" (2005: 68).

⁴⁴ The history of university collections presented in this chapter is based on the evolution of (arche)types based on common characteristics – e.g. the teaching collection, the research collection, etc. I am aware that museum historians are critical of this perspective, particularly in recent museum history. Hooper-Greenhill warns against finding generalisations and unities and instead proposes "to look for differences, for change, and for rupture" (1992: 9). Her alternative approach presents a succession of individual landmarks: the Medici Palace in Florence, the *Wunderkammer*, the natural history collections of the 17th century, particularly the Repository of the Royal Society of London, and the modern 'disciplinary museum' for which the post-revolutionary Louvre was the prototype. The result is not a connected museum history, let alone a history of *the* museum (Starn 2005). Weil observed that "the history of *the* museum is a pious fraud" (1995: 13, italics in original). I agree and also do not think that a single history of *the* university collection can be constructed. However, as a discipline, museum history has seen 100 years of development and museum historians can therefore afford not to base their perspectives on generalisations. Museum history has access to sufficient primary sources, anthologies and syntheses to aim at alternative and in-depth perspectives. This is not the case with the history of university collections and museums and to some extent this fact *per se* justifies finding 'generalisations and unities', paving the way for future research and alternative historical approaches.

1984, Foster 1999), although the study function was likely to be intertwined with leisure as well as social status. In the 4th century BC, Aristotle collected specimens for teaching and study in his *Lyceum* in Athens, which also included a menagerie donated by Alexander the Great (Whitehead 1970). The *Museion*, founded by Ptolemy Soter in Alexandria in 290 BC, had cloisters, a public lecture room, a botanical and zoological garden, a library, and paintings, sculptures and casts for the instruction of artists (Bateman 1975, Canfora 1990, Boylan 1999). The *Museion* was the scientific, artistic and literary mecca of its time, attracting scholars such as Demetrius, Strato, Euclid, Archimedes, Apollonius and Eratosthenes. Dissections were performed at the *Museion*. Generally, during the Hellenic and Roman periods several academies “devoted to particular philosophical traditions would have had significant portrait collections, presumably on public display” (Boylan 1999: 44). In Europe, herbs were cultivated since the 9th century⁴⁵. Early ‘universities’ established in Muslim Spain, particularly Cordoba, Seville and Granada, taught medicine and *materia medica*⁴⁶. The Persian scholar Ibn Sina (980-1037), known in the West as Avicenna, described fossil remains of aquatic and other animals found on mountains and explained the mountains as effects of upheavals of the crust of the earth (Van-Praët 2004, Toulmin & Goodfield 1965 in Heads 2005).

There is an abundant literature on early Islamic science and technology, but as far as I know, there has been no research into the existence of collections or proto-collections in Iberian Islamic ‘universities’ or, for that matter, elsewhere in the early Islamic world (e.g. Constantinople and Baghdad). Although our current state of knowledge does not allow discussion of the regularity or permanency of these early ‘collections’, let alone what notion of ‘collection’ early scholars and teachers had⁴⁷, it is hard to believe that teaching and study collections only appeared in the mid-16th century. The use of collections for teaching (and study) is likely to be as old as teaching (and study) itself.

It is difficult to pinpoint a precise date for the creation of universities, because criteria vary (courses start on one date, official papal bull or royal decree comes later, etc). Bologna is considered to have had the first university in Europe. Although the year 1088 is not fully documented, it is widely accepted as the foundation date (Rüegg 1996a). The University of Paris was created between 1150 and 1170, although official recognition came in 1211 (Verger 1996). During the early Middle Ages, the University of Bologna was the model for universities in southern Europe and the University of Paris for those in northern Europe. The first title of Chancellor was conferred in 1214 at the University of Oxford.

4.2 The teaching collection

The teaching collection is a long survivor – it is the Methuselah of university collections. When and where the teaching collection first appeared is unclear and some authors maintain

⁴⁵ The first record is from the Abbey of Saint-Gall, Switzerland, in the 9th century (Paiva 1981). It is virtually unknown what early monastic gardens really looked like, but the plan of Saint Gall survived and shows orchards, fish ponds, grape arbours, herbs and vegetables for food and medicine, and decorative flowers for the altar. For more on the history of botanical gardens, see Ingwersen (1978) and Morton (1981).

⁴⁶ Islamic civilization flourished in parts of Iberia from the 8th to the 14th century. The ‘University’ of Cordoba was founded in the 10th century and attracted scholars from all over the medieval world. At its height (900s-1030s), Cordoba was exemplary for its social, political, scientific, artistic and cultural development. Both Christian and Jewish communities flourished, making it the most cultured city in Europe, and, with Constantinople and Baghdad, one of the three cultural centres of the medieval world (see ‘Abd al-Rahman III in: *Britannica Concise Encyclopedia* 2005, <http://concise.britannica.com/ebc/article?tocId=9354388>, accessed 3 June 2005). With a population of about half a million (for comparison, Paris had 40,000 inhabitants at the time), the city had 70 libraries. The library of Caliph al-Hakam II contained c. 400,000 volumes (while the Abbey of Saint-Gall, mentioned above, had c. 600 titles). For more on early Islamic civilization in Europe, see e.g. Hayes (1992). There also exists an extensive literature in Spanish on the subject.

⁴⁷ The term ‘collection’ apparently did not exist. The use of the term in the English language started in the 14th century (Merriam Webster On Line Dictionary).

that, apart from the royal treasures and religious collections, there were hardly any collections in medieval Europe (e.g. Lewis 1984, Belk 1995).

The scholastic atmosphere and theoretical nature of medieval teaching did not stimulate the assemblage of collections, as direct observation and experimentation were not customary. Medieval culture venerated the rare, the unusual, the wonderful and the miraculous. Natural history was largely dominated by mythical beasts like unicorns and mermaids, mostly due to the writings, between the second and fifth century, of the anonymous author known as Physiologus (Ritterbush 1969, Whitehead 1970). Moreover, the notions of 'research' and 'scientific progress' were unknown in medieval universities (Verger 1996)⁴⁸. The engagement of universities in the discovery and advancement of knowledge came only with the Enlightenment and the establishment of nation states (Rudy 1984).

Pedagogy was also seen quite differently. In early universities, a typical class would begin with the reading of the official texts, followed by comments by the teacher – this was called the *lectio* and its purpose was to accustom students to the 'authorities'. The *lectio* was followed by the *disputatio*, an oral debate in which specific cases were discussed and constant reference to the authorities was required, either to establish, sustain or refute a given thesis. The *lectio-disputatio* model was universal in early universities (Verger 1996, 1999; Rudy 1984)⁴⁹. Within this framework, there was little need for collections.



Fig. 4.1 – Medieval teaching and learning (14th century manuscript, Biblioteca Nazionale Braidense, Milano).

However, when looking more closely at the subjects and courses taught in medieval universities, the supposed absence of collections becomes questionable. Universities were organised under the classical model of the four faculties: Arts, Theology, Law and Medicine. There were seven Arts, grouped into the *trivium* and the *quadrivium*. The *trivium* included Grammar, Rhetoric and Logic, and the *quadrivium* comprised Music, Arithmetic, Geometry and Astronomy. Could there at least have been some form of 'collections' for the teaching of medicine and in the *quadrivium*?

⁴⁸ Professors were, however, supposed to achieve some degree of 'progress', meaning that their formulations got closer and closer to the truth (Verger 1996), but this 'progress' was obtained through the study and interpretation of Greek, Roman and Arab manuscripts. By the end of the 12th century, the majority of Aristotle's works had been translated into Latin and were studied in most universities (Whitehead 1970, Leff 1996, Rüegg 1996a). Albert Magnus (1206-1280) and his pupil, Thomas Aquinas (1225-1274), for example, were prominent interpreters of Aristotle's texts.

⁴⁹ At the time, universities systematically opposed other forms of intellectual expression. Both the mystical exegesis used in monastic culture and the more innovative methods of experimentation, measurement, and historical analysis were not permitted. The latter were gradually introduced in the late 15th and early 16th centuries with the humanist movement (Verger 1996). For more on the impact of humanism in universities, see Rüegg (1996b).

The history of universities and science shows that these questions are not without basis. In the first half of the 14th century, the calculators in Merton College (Oxford) were pioneers in the application of mathematical laws to the study of motion and they also measured physical properties of bodies (Leff 1996). The same happened in Paris in 1350 with Nicole (d')Oresme and, before him, with Jean Buridan and Albert de Saxe (Leff 1996). Leff (1996: 329) argued that “the Oxford calculators and the Parisian logicians created mathematical and mechanical instruments” – and if so, they most likely used these instruments for teaching. In general, physics and the *quadrivium* developed musical, optical and astronomical instruments that served “both for practical purposes and for research” (Rüegg 1996a: 27). Instruments like the quadrant, early models of astrolabes, solar clocks and the *equatorium* (for the study of Euclidean Astronomy) were used for teaching. The University of Krakow provides an early example, with an independent Astronomy course starting there as early as 1349 (North 1996).

As for Medicine⁵⁰, “practical demonstrations existed ever since the first medical schools in Salerno [Italy]” (Siraisi 1996: 366). Public dissections started in Bologna as early as 1316, and in Montpellier dissections were statutorily established in 1340 (Siraisi 1996). Anatomy and pathology were taught in Paris from 1267 onwards and although official dissections were not frequent, teachers regularly performed private dissections for their students (Clin 1994). The objectives of dissections were related to the teaching of human anatomy rather than to mastering dissecting techniques (supposedly the task of surgeons)⁵¹, and therefore bones were likely to be preserved for future use. Moreover, although the first confirmed record of a *hortus medicus* in a university dates from the 1450s, they probably existed before in a more or less rudimentary form because: a) as said before, herbs had been cultivated for medical reasons in Europe at least since the 9th century, b) the Arabic treatises used in medieval university teaching explicitly considered botanical pharmacology (*materia medica*) as an independent area of study (Siraisi 1996), and c) medical students had to be familiar with Aristotle's *libri naturales*.



Fig. 4.2 – Dissection depicted in the frontispiece of *De Humanis Corporis Fabrica* (1555) by Andreas Vesalius (1514-1564), professor of Anatomy in Padua. Vesalius was a Flemish naturalist who studied in Louvain and Paris and went to Padua in 1537. He rejected Galen's description of the human body and for the first time practiced modern dissections. As a result, he commissioned an anatomical theatre (which did not survive) and he is likely to have assembled collections.

Object-based teaching probably took place in medieval universities to facilitate the transmission of ideas. These objects were likely to have been used repeatedly, individually and in groups, but records of their organisation and use only exist after the 16th century. It is important that historians of collections, historians of universities, and museum historians in general, examine primary sources of university history to shed light on these aspects. The

⁵⁰ For overviews of the study and practice of medicine in medieval universities, see Siraisi (1996) and Clin (1994), the latter specifically related to the early history of medicine at the University of Paris.

⁵¹ It is historically relevant to distinguish between physicians and surgeons because often medical and surgical collections evolved separately. In fact, physicians were taught in universities and received a book-oriented training – physicians were scholars. In contrast, surgeons were considered craftsmen and received practical training (Clin 1994). Only during the 15th and 16th centuries did surgeons begin to receive university training.

teaching collection continues through the Renaissance university and to the 19th century up until the present. In the Renaissance university – more open to pedagogical innovation than its medieval counterpart (Verger 1996) – models, maquettes, casts, reproductions, and real objects like specimens and instruments, were made, assembled and used to illustrate, demonstrate and explain.

4.2.1 The *hortus medicus* and the *theatrum anatomicum*: paving the way for the teaching ‘museum’

Renaissance cabinets⁵² of curiosities have been studied in detail (e.g. Pomian 1987, Impey & Macgregor 2001, Alexander 1979, Mauriès 2002). Many *Wunderkammer*, despite their symbolic and mannerist arrangements, were considered important by university teachers and scholars, who visited them regularly (Aimi *et al.* 2001) and many ended up in universities⁵³. Together with the humanist movement and the Reformation, the same conditions that triggered the development of private collecting during the Renaissance (such as the discoveries of foreign lands, European population growth following the plague, new inventions such as the clock and the printing press, humanism, and the rise of the bourgeoisie), also affected the university and university teaching⁵⁴.

Two important landmarks should be considered in connection with the history of university collections during the Renaissance: the rise of botanical gardens and anatomical theatres. These led to the development of the first (recorded) collections and ‘museums’ in universities.

In line with the history of medieval universities, the first organised collections were undoubtedly related to the teaching of medicine: the physic garden (*hortus medicus* or *hortus simplicium*) and the anatomical theatre (*theatrum anatomicum*) (Olmi 2001, Schupbach 2001). The first garden was established in Italy in either Padua or Pisa in the 1540s and the first anatomical theatre in Padua in 1594. Botanical gardens and anatomical theatres quickly spread to other European universities, always with medical teaching at their roots⁵⁵. In the first decades of the 17th century, there were anatomical theatres at the universities of Bologna, Ferrara, Leiden and Montpellier. Physic gardens and anatomical

⁵² The term ‘cabinet’ precedes ‘museum’. Derived from the Latin *cavea*, meaning cavity, it initially referred to a piece of furniture in which specimens were kept. Later the meaning was expanded to include a whole room or building in which a collection was housed. The Italians gradually began to call these cabinets *museo naturale* (Bateman 1975). In 14th century France, the predecessors of the cabinets were designated *estudes* and in 15th and 16th century Italy they were known as *studioli*. The terms *Kunstammer* and *Wunderkammer* first appeared in Samuel Quiccheberg’s famous treatise on museography *Inscriptiones vel Tituli Theatri Amplissimi* published in 1565 (Mauriès 2002).

⁵³ The cabinet of King Frederik II of Denmark (1609-1670) formed the basis for the Zoology and Mineralogy Museums of the University of Copenhagen, established in 1862 and 1870 respectively (Gundestrup 2001). The 19th century sculpture cast collection of the University of Prague has its origins in the cabinet of Count Nostitz (Dufková 1988), and the cabinet of antiquities and natural history of Sir Andrew Balfour (1630-1694) went to the University of Edinburgh in 1697 (MacGregor 2001a). In the USA, the collection of electrical instruments belonging to the Dutch Groenendijk family was acquired by the Dibner Institute for the History of Science and Technology (Massachusetts Institute of Technology) in 1959. The Groenendijk Collection in turn had its origins in the Felix Meritis Society of Amsterdam, founded in 1777 (D.A. Pantalony, *in litt.* 18 February 2005). Many European universities incorporated collections from scientific societies – for example the University of Athens incorporated collections from the Natural History Society of Athens and the University of Amsterdam from the Royal Zoological Society ‘Natura Artis Magistra’ (Roselaar 2003), which became the core of important university museums.

⁵⁴ For more on Renaissance and early modern universities, see Ridder-Symoens (1996).

⁵⁵ The creation of the Amsterdam Botanical Garden is both typical and interesting. In 1635, Amsterdam was hit by an epidemic of plague, so severe that almost half of the population perished. Merchants, apothecaries, pseudo-medical doctors and doctors were selling all sorts of (would be) remedies. In 1636, the town of Amsterdam established a training and certification programme for physicians, forcing them to pass an examination (the *keur*). The *hortus medicus* was founded to support the training and placed under the supervision of a group of physicians from the *Athenaeum Illustre* (predecessor of the University of Amsterdam). In 1638, the first director of the garden, Johannes Snijpendaal, was appointed (B. Ursem, *in litt.* 13 August 2002).

theatres are relevant to the history of university museums and collections for two reasons: a) several types of collections and the development of early preservation techniques originated from them and b) because they represent the first organised attempts to congregate objects in a permanent location for a specific audience. A couple of these early botanical gardens still survive today (though transformed), but most anatomical theatres have been destroyed or adapted for other use.

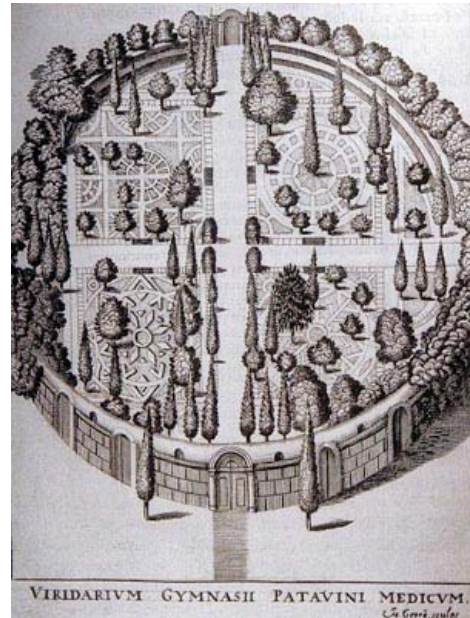


Fig. 4.3 – The *hortus medicus*, University of Padua. Ground-plan published in 1654.



Fig. 4.4 – Anatomical Theatre, University of Padua (1594) (photo S. de Clercq, reproduced with kind permission of the University of Padua).

In these gardens, plants were dried and mixed for medical purposes, thereby giving rise to herbaria and *materia medica*. Perhaps more unexpectedly, geology specimens were also collected, because these were considered to have healing power as well as symbolic meaning (Torrens 2001, Mauriès 2002). Late 16th and early 17th century teaching collections of *materia medica* at Cambridge University included a large proportion of minerals and fossils and such specimens were found also in other European faculties of medicine, e.g. Leiden and Oxford (Torrens 2001). The first records of wax models also appeared in the 16th century, displayed along with osteological material in anatomical theatres (Olmi 2001, Schubach 2001).



Fig. 4.5 – Dried seed of *Lodoicea maldivica* (double coconut) (reproduced with kind permission of the Botanical Garden of the University of Lisbon).

4.2.2 The teaching 'museum'

Naturally, these botanical and *materia medica* teaching collections required a special space in order to be easily accessible for both students and scholars. Therefore, it was probably near botanical gardens and anatomical theatres that exhibits were first mounted in universities. Although we cannot speak of museums in the modern ICOM sense, exhibitions of teaching collections became known as 'teaching museums' – an expression still used today. In fact, the use of the term 'museum' is not completely inappropriate, since the exhibitions were permanent and occasionally visited by a more general public (fig. 4.6). Therefore, it seems fair to claim that 'teaching museums' have existed since the early 1600s and that these were clear predecessors of the Ashmolean Museum and the university museum in general.

The first record of a teaching 'museum', built in the 1590s, comes from Pisa's botanical garden (Alexander 1979). A similar one was built in Leiden in 1600. Anatomical teaching museums – located near anatomical theatres – appeared later and the first was probably constructed in Leiden⁵⁶. However, a word of caution is necessary. One should keep in mind that this was the late 16th-early 17th century. Galileo was about 30 years of age, Giordano Bruno had barely been burned at the stake in Rome, Newton would not be born for 50 years, and Linnaeus not for 100 years. The earliest teaching 'museums' are ambiguous, they amalgamated students and public (that is, privileged elite and travellers), teaching and wonderment, and proto-classifications with symbolism. MacGregor (2003) points out that at Pisa's Cabinet, there were "natural curiosities as well as man-made rarities ranging from Mexican idols to distorting mirrors" and in the Cabinet near the Leiden Garden were "specimens lacking any direct relation to botanical studies – Brazilian animals, rattlesnakes, elephant's tusks, etc." The collection of anatomy at the Library of the University of Altdorf (Nuremberg) included a Croatian "who had terrorised the streets of Nuremberg before being hunted down, and whose skeleton was [...] displayed on horseback in the library with a pipe stuck in his mouth" (MacGregor 2003).

The display of teaching collections was practical for obvious reasons and later the teaching 'museum' spread to other fields such as the arts. The 17th century marks the beginning of the golden age of the schools of 'beaux-arts'. Painting, sculpture, and architecture were learnt by direct observation, and frequently imitation, of famous artists. During this period, plaster casts became objects of study both in sculpture and in architecture (Mossi re 1996). Like their anatomical and botanical counterparts, art teaching museums presented originals, reproductions, *maquettes*, and pedagogical models. Teaching 'museums' and cabinets were also created near chemical laboratories and astronomical observatories, particularly after the higher education reforms of the 19th century.

⁵⁶ The teaching museum model was also adopted outside universities. For example, in the 1650-60s, societies of surgeons in Rotterdam and Delft were among the first to construct anatomical theatres where curiosities were displayed (Schupbach 2001).

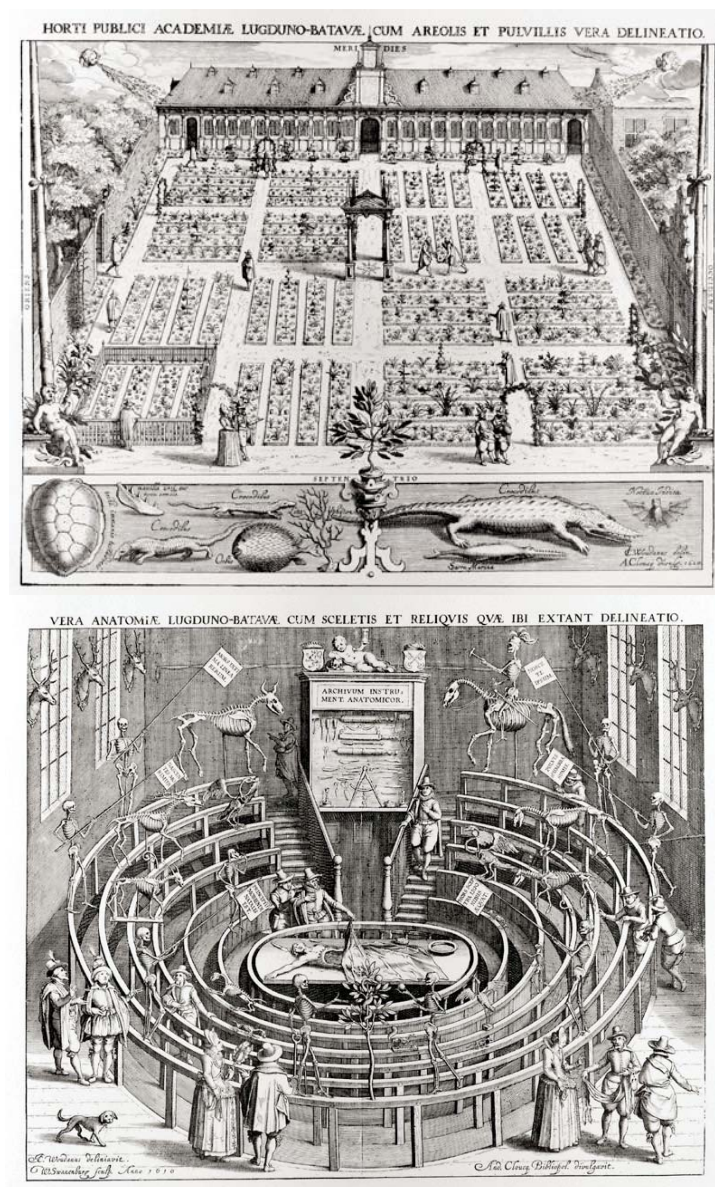


Fig. 4.6 – University of Leiden: *hortus medicus* (1587) with the annexed teaching cabinet and anatomical theatre (1597), depicting specimens and public. The engravings date from 1610.

Many teaching ‘museums’ established regular opening hours and facilitated public access, therefore becoming museums in the present sense of the term. However, even after ‘going public’, many preserved their teaching vocation both in interpretation and museography and, as a result, often served limited and specialised audiences. Many teaching museums were eventually absorbed by existing university museums. In the 19th and 20th centuries, the complexity of museums and collections increased substantially.

4.2.3 The Cabinet of Natural Philosophy (Cabinet of Physics)

A special type of teaching collection is the cabinet of physics or cabinet of natural philosophy⁵⁷. Common in 18th and 19th century European universities, this type of cabinet

⁵⁷ Not to be confused with private cabinets of curiosities that *also* included physics instruments – e.g. de Medici’s, etc. Only collections of instruments assembled by professors to teach natural philosophy in universities are dealt with here.

consisted of a collection of instruments assembled for teaching purposes, often in one location (hence the designation 'cabinet'). The Cabinet of Natural Philosophy at the University of Padua (1739), the Cabinet of Physics at the *Colégio dos Nobres* (College of Nobles) in Lisbon (1766; transferred to the University of Coimbra in 1772, where it continued to be used for teaching) and the Cabinet of Physics (Volta Cabinet) at the University of Pavia (1778), are three important examples of natural philosophy teaching collections in 18th century Europe⁵⁸. There were earlier university cabinets of physics, such as the Leiden University Cabinet (1675) and the Utrecht Cabinet of Physics (1706)⁵⁹. Often, the establishment of these cabinets was directly connected with the appointment of a professor charged to create a course in physics, which in practice meant writing the curriculum and assembling the collection to support it – for example Giovanni Dalla Bella (1730-c. 1823) in Lisbon and then Coimbra, Alessandro Volta (1745-1827) in Pavia, and Giovanni Poleni (1683-1761) in Padua.



Fig. 4.7 – Device to illustrate the parabolic trajectory of projectiles, 18th century cabinet of physics of the University of Coimbra (*Index* 1788: G.IV.178) (photo José Pessoa © Divisão de Documentação Fotográfica do Instituto Português de Museus, reproduced with kind permission of the Museum of Physics, University of Coimbra).

Cabinets of physics continued to be assembled in the 19th century and a particularly fine example is the Cabinet of Physics at the *Istituto Tecnico Toscano* in Florence. This Cabinet has survived almost intact and includes “c. 3000 items” and is “certainly the largest in Italy and one of the most complete in Europe as far as 19th century teaching and study of physics are concerned” (Brenni 2000: 9)⁶⁰. Today, the Cabinet, together with other historical teaching and research collections of the former *Istituto*, is under the responsibility of the *Fondazione Scienza e Tecnica*, which is restoring it and plans to open an exhibition soon (P. Brenni, interview 13 January 2004).

⁵⁸ For the history of the Coimbra collection, see Carvalho (1959, 1978). Gil & Canêlhas (1987) and Gil *et al.* (1987) also provide a comprehensive historical account of the teaching of physics from the *Colégio dos Nobres* to the establishment of the Faculty of Sciences at the University of Lisbon in 1911. For the Volta Cabinet, see Bellodi *et al.* (2002) and the notable *Mediateca Voltiana*, a four DVD box released by the Istituto Lombardo and the University of Pavia in 2002. For the Padua Cabinet, see Peruzzi & Talas (2004).

⁵⁹ For the Leiden cabinet, see Clercq (1992, 1997); for the Utrecht cabinet, see Natuurkundig Gezelschap te Utrecht (1977) and Clercq (in press).

⁶⁰ For further information on the Cabinet, see also Brenni (1995) and Giatti & Miniatti (2001).



Fig. 4.8 – Cabinet of Physics of the *Istituto Tecnico Toscano* in 1898 (reproduced with kind permission of the *Fondazione Scienza e Tecnica*, Florence).

At this point, two aspects should be briefly mentioned. Firstly, these teaching collections (which might include astronomical instruments and mathematical models) could also be used for study – by both students and professors – and this double usage would increase as physics developed during the 19th century. Secondly, the collections often included both instruments acquired from commercial manufacturers and instruments built in-house (i.e. in university workshops). Dalla Bella acquired part of his instruments from commercial manufacturers in England, yet a considerable number of instruments were constructed by the Portuguese instrument maker Joaquim José dos Reis, who was a craftsman at the *Colégio dos Nobres* (Carvalho 1959). The role of these ‘internal’ instrument makers often went far beyond following strict instructions from superiors. Many of them were remarkably talented craftsmen, employed or contracted by the university and frequently anonymous, as they did not sign the instruments they made. Their work encompassed designing and building the instruments, adapting or making replicas of instruments acquired from commercial instrument makers and often conceiving the experiments and assisting the professor in his demonstrations (Carvalho 1959, Gil & Canêlhas 1987).

Sometimes instruments were designed, made, used, improved and re-used by professors themselves. An illustrative example is the Leiden Cabinet, the instruments of which were entirely built by professors from the University of Leiden (Clercq 1992). The best known were W.J. ‘s-Gravesande (1688-1742) and Peter van Musschenbroek (1692–1761). ‘s-Gravesande, in particular, constructed and assembled “a systematic collection of instruments with the purpose of mathematically demonstrating Newton’s theories to students” (Clercq 1992: 62). Like any other university teaching collection, major changes in science or teaching procedures impact cabinets of physics. As the teaching of physics evolved from lecture-demonstration to practical and laboratory-based in the mid- to late-19th century, the role of the physics workshop and the ‘internal’ instrument maker became even more prominent.

Most of the cabinets of physics that survived were organised into second generation university museums during the 20th century. The cabinets of Coimbra, Padua, Pavia and Utrecht have remained in their original universities – at the Museum of Physics of the University of Coimbra (1938), the Museum of History of Physics at the University of Padua (1990), the Museum of History of the University of Pavia (1932) and Utrecht University Museum (1928), respectively. The Cabinet of the University of Leiden is presently part of the National Museum for the History of Science and Medicine (Boerhaave Museum), also in Leiden.

4.3 The Study Collection

During the 16th century another important landmark collection makes its appearance: the study collection. As the teaching 'museum' or 'cabinet' represents the embryo of the university museum, the study collection is the embryo of the research collection. Study collections of many sorts prospered in 16th to 18th century Europe at the hands of learned societies and academies, merchants, noblemen, etc.⁶¹. The kind that interests us here, however, is the study collection closely associated with the university – i.e., gathered by university professors as a result of their own personal and professional interests and simultaneously used for study and teaching. The first was probably assembled by Ulisse Aldrovandi (1527-1605), professor *de fossibilis, plantis et animalibus* at the University of Bologna (Olmi 2001).



Fig. 4.9 – Ulisse Aldrovandi (1527-1605).

What was so special about these collections and what is it that makes them the embryos of modern research collections? Study collections probably represent the first attempts to study and document objects in an organised manner through direct observation and experiment, supported by an increasingly 'natural' classification (Ritterbush 1969, Whitehead 1970). Contrary to the *wunderkammer*, where reality was symbolically reconstructed, the study

⁶¹ Some private study collections include: Manfredo Stella in Milan, Lodovico Moscardo in Verona, Ferdinando Cospì and Antonio Giganti in Bologna (Olmi 2001); Gerolamo Cardano, Gian Battista Clarici and Pietro Antonio Tolentino in Milan (Aimi *et al.* 2001) – the two latter joined Aldrovandi's collections and can be seen today at the Palazzo Poggi, University of Bologna. In Zurich in 1550, Conrad Gesner (1516-65), "the greatest naturalist of his century" (Rudwick 1985: 1), had one of the first museums primarily devoted to natural history (Alexander 1979); Felix Platter (1536-1614) of Basel had one of the most remarkable museums of his time, particularly rich in natural history specimens (Whitehead 1970). In pre-Revolutionary France, anatomists father and son Sue had a collection of more than 1000 items (of which the majority were wax models, later donated to the École des Beaux Arts), the anatomist Desault had a *Museum Chirurgicum*, and Fragonard had an anatomy cabinet in Alfort (Delmas 1995). At his house in Paris, Jacques Bonnier de la Masson had seven ground floor rooms for his art collection and a first floor room devoted to science (Bateman 1975). For more on French cabinets of natural history, see Laissus (1986). In the Netherlands, the collections of Albert Seba (1665-1736), an apothecary and merchant in Amsterdam, (Whitehead 1970), Jacob Swammerdam, also an apothecary, and Levinus Vincent, a merchant (Rooseboom 1958), must be mentioned. In Britain, the study collections of the Tradescants, John Ray, Francis Willughby, Joseph Banks, John and William Hunter, Ashton Lever, and Hans Sloane, among others, cannot be ignored. As for learned societies, at least the following gathered collections: the Accademia del Cimento (1650) in Florence; the Académie Royale des Sciences (1666) in Paris; the Royal Society (1660) in London; the Etruscan Academy (1726), which held excavations and a *galleria del pubblico* in Rome (Lewis 1984); the Natuurkundig Genootschap (1777) in Utrecht (S. de Clercq, *pers. comm.* 11 August 2002); and the Hollandsche Maatschappij der Wetenschappen (1778) in Haarlem (Lewis 1984). Other academies, such as the Accademia dei Lincei (1603) and the Accademia Fisico-Matematica (1677), both in Rome; the German Academia Naturae Curiosorum (1652) in Schweinfurt had plans for museums (Schupbach 2001), but never accomplished them. However, Torrens (2001) mentioned that the Accademia dei Lincei had geological collections. Many of these private collections intersected university collecting, both in Europe and in the USA (Kohlstedt 1988).

collection was seen as an instrument for the exploration, documentation and understanding of the world (Whitehead 1970, Olmi 2001, Laurencich-Minelli 2001). In Aldrovandi's collection, works of art were separated from natural objects (Ritterbush 1969) and common objects – like animals and plants from Bologna – were also represented (Olmi 2001). However, most authors do not regard these early study collections as 'real' research collections. Mannerism and symmetry in display were the prevailing organisational criteria (Olmi 2001), an arrangement legacy that "retained aspects of the medieval treasury" (Mauriès 2002: 50). Many of the different classification systems⁶² were not only still incomplete, but based on the living animal and its way of life (e.g. whales and dolphins being classified as 'fish') – a tradition going back to Pliny and Physiologus (George 2001, Olmi 2001). Research collections, in order to become just that, would have to transcend symbolism to a large degree and in the case of natural history this meant the acceptance of the basic assumption that specimens represented reality (Ritterbush 1969).



Fig. 4.10 – The *Tetrodontide* or balloon-fish, from Aldrovandi's collection (reproduced with kind permission of the Museo Palazzo Poggi, University of Bologna).

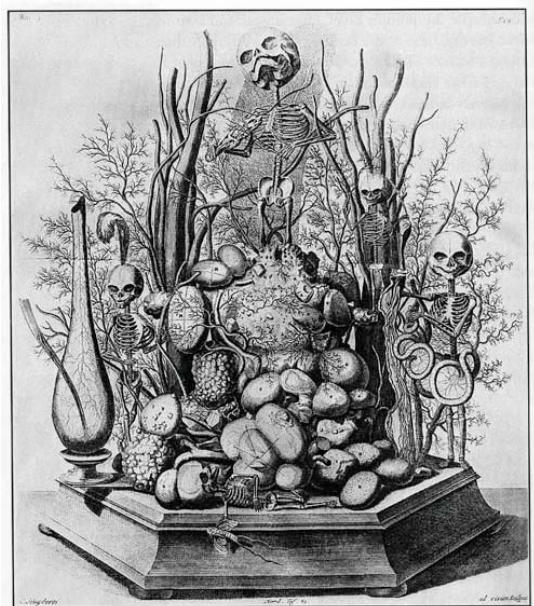


Fig. 4.11 – Anatomical group composed by Frederik Ruysch, professor of Botany at the *Atheneum Illustrre*, Amsterdam. The plate was published in his *Opera Omnia* (1721).

Nevertheless, the importance of study collections should not be underestimated. Scholarly collecting continued well into the 17th and 18th centuries, with for example Olaus Worm (1588-1654) at the University of Copenhagen, Frederik Ruysch (1638-1731) at the *Atheneum Illustrre* (predecessor of the University of Amsterdam), Johann Heinrich Schulze (1687-1744)

⁶² Both Conrad Gesner and Aldrovandi developed their own classification system (Rudwick 1985, Ray 2001), as did John Ray and Francis Willughby (Ray 2001). John Tradescant adopted the system developed by the German Georgius Agricola (1494-1555), at least in his mineral collection (Rudwick 1985, Torrens 2001).

at the University of Halle-Wittenberg, and many others. Many university professors maintained study collections in the university and at home (frequently visited by students) and often also in learned societies, with specimens moving from one to the other when needed for study and teaching⁶³.

The study of antiquities and natural history specimens in study collections paved the way for the classification system of Linnaeus and the zoogeographical theories of Buffon in the mid 18th century, the classification of minerals by Haüy in 1781, Lamarck's evolutionary theory in 1809, the establishment of the new disciplines of palaeontology and comparative anatomy by Cuvier c. 1800, and the archaeological classification of Thomsen in 1836. Initial identification and classification of specimens took several generations. In due course, the majority of these collections would become research collections and many were incorporated in museums.

4.4 The Research Collection

It is impossible to say when and where the first research collection appeared as the line between study and research collections is a thin one⁶⁴. As Laissus (1986: 659) noted, when discussing cabinets of natural history in 18th century France: "Les distinctions, en effet, que nous faisons aujourd'hui sont artificielles: les cabinets étaient rarement spécialisés et leur contenu ressortissait presque toujours non seulement à la physique, à la chimie et aux sciences naturelles, mais aussi à l'anatomie, à l'art et souvent même à l'archéologie". In the 18th century, the Anatomy Museum at Oxford University included in its collection: "a Moor's ear cut off; a frightful large Indian Bat; the Hand of a supposed Siren, dried; a Mermaid's hand; the teat of a witch; the skeleton and stuffed skin of a woman who had eighteen husbands" (Whitehead 1970: 51). These objects are hardly typical of what one would call a research collection and demonstrate that the 18th century (and even 19th century) was a transitory period in the history of research collections.

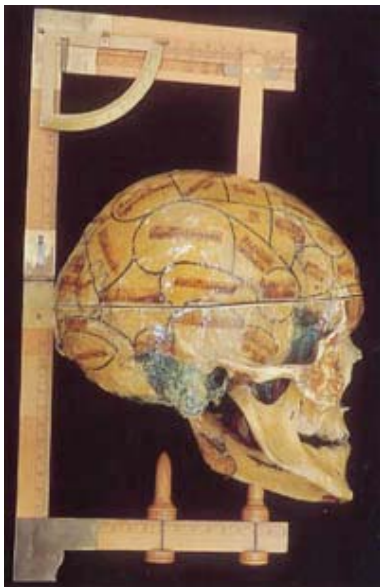


Fig. 4.12 – Phrenological skull with measuring apparatus, Utrecht Universiteitsmuseum, Inv. No. Up. 363. (photo Rosamond Purcell, courtesy of Utrecht University Museum).

⁶³ The use of collections by students was dependent on the way courses were designed. In the absence of standard courses in natural history in the USA, class demonstrations for students were "casual" and "intermittent" before the 1830s: "[...] students paid fees for special instruction at natural history societies or from private individuals where specimens could be used to illustrate scientific points" (Kohlstedt 1988: 413). Of course, these private individuals were often the professors themselves.

⁶⁴ For the development of biology in the USA, see Benson (1991) and Kohlstedt (1988, 1991). Garstka (1982) gives a concise historical overview on the subject.

From the late 18th century onwards, research collections arose in those sciences that require the accumulation of specimens and artefacts in order to compare and produce new knowledge. Research collections flourished in zoology, palaeontology, botany, mineralogy and geology, archaeology, anthropology and ethnography, and some fields of medicine.

The history of these sciences is well-documented (e.g. Parr 1959, Sturtevant 1969, Zusi 1969, Watson *et al.* 1971, Rudwick 1985, Greene 1995, Farber 1997). Undoubtedly, the great expeditions and the continuous use of study collections, the works of such writers as Bacon, Buffon, Cuvier, Lyell, Darwin and Haeckel, together with the development of preservation techniques and scientific illustration, had a major impact on the development of natural history (Whitehead 1970, Farber 1997). Moreover, the work of Linnaeus gave rise to the first standardised and widely accepted nomenclatural system for both botany and zoology⁶⁵. Research collections in archaeology were only developed after 1836, when C.J. Thomsen introduced the three-age period of pre-history based on the materials used (Stone, Bronze and Iron). Subsequently, Jens Worsaae divided the Stone Age into Palaeolithic, Mesolithic and Neolithic, and regional variation within these periods was recognised⁶⁶. Anthropological/ethnographic research collections also only appeared after those in natural history. The divorce between anthropology collections and natural history collections, giving rise to separate anthropology museums, started in the 1830-40s. Formal university training of anthropologists in France began in the 1850s, followed by Germany in the 1860s, the Netherlands in the 1870s, England in the 1880s, and the USA in the 1890s (Sturtevant 1969).

From the study to the research collection, the object acquired an increasingly important documentary value – it was collected to answer a particular question or to archive the answer (Clercq & Lourenço 2003). This role was adopted and adapted by archaeology and anthropology (Greene 1995, Boylan 1999) and other fields (e.g. art collections representing particular styles or periods). Research collections continue to fulfil their role until the present day. They may not be much used but the role and thus the relevance are there.

4.5 The art collection

Art collections have a long history in European universities, but a distinct line of development. In medieval universities there are records of archives, commemorative objects, portraits, sacred art, manuscripts, and in due course, printed books (Gieysztor 1996). As Boylan (1999: 44) indicated, “Almost certainly the first collections of artefacts in universities would have fallen into two main categories: religious and ceremonial collections, and works of art”. Presumably, works of art had the same role as in contemporary noble cabinets: to adorn walls of majestic rooms, chapels and colleges, and simultaneously project an image of social status. The first art collection in a university was probably the Picture Gallery at Christ Church College, University of Oxford, founded in 1546. More than half of the collection of the Ashmolean Museum (University of Oxford) was art, antiquities and coins, along with natural history specimens, on display for the general public for the first time in 1683. The acquisition of art works marks the history of universities and continues in the 21st century, even at times of restricted financial resources⁶⁷.

⁶⁵ For a comprehensive historical account of nomenclature systems, particularly in zoology, see Melville (1995).

⁶⁶ Before the 19th century, we cannot speak of archaeology proper, but rather of “amorphous antiquarianism” (S. Piggott, *in* Greene 1995: 8).

⁶⁷ In the USA, art museums in universities are more frequent and have been considerably expanded since the 1960s (Danilov 1996). In the USA, the appreciation of art is considered to lead to the development of taste, the ability to experience beauty, as well as instilling moral values in students (Read 1943). Moreover, and contrary to Europe, where most universities are built in towns or cities and art museums are plentiful, many campuses in the USA were established in rural areas, often hundreds of kilometres away from the nearest art museum (Rosenberg 1964-65). In fact, the first also accounts for the constitution of art collections and galleries in the UK, as Kelly (1999) reported, citing an art curator: “[...] the hope is [...] that the art will rub off, be taken in out of the corner of the eye. Because the corner of the eye is a good shortcut to the back of the mind” (A. Bennett *in* Kelly 1999: 28). Artworks are often displayed in offices of senior personnel or ceremonial rooms to which students do not have free



Fig. 4.13 – Frescos dating from the 1930s at the Faculty of Law, University of Amsterdam.

Decorative art collections may assume many forms, from paintings to sculpture parks and frescos, of which the Renaissance frescos in Italian universities are particularly remarkable. Kelly (1999: 28) remarked that art displays in present-day universities provide “an escape from the pressures of academic life, a special place of contemplation, conviviality [...] and attractive backdrops for receptions, conferences and open-days or form part of a grand tour for visiting VIPs” – in other words, a mixture of inspiring atmosphere and public relations tool. One should remember that an image of status and prestige is usually just as important as the performance in teaching and research and often even more so. Ever since the beginning, universities have drawn on the tension between respected tradition and academic innovation and collections have at times become expedient instruments for both. In the 19th century, art collections that started as merely decorative may have been reorganised for teaching and research. Although art collections are an old university tradition, the university art museum is a relatively recent phenomenon in European universities.

4.6 The university museum

The Greek *museion* or the Roman *museum* or *musæum* indicated a place for learned discussion and study (Whitehead 1970, Lewis 1984, Hunter 2001, Taub 2001). The *Museion* of Alexandria, founded c. 290 BC, was a community of astronomers, mathematicians, physicians, naturalists, writers, historians and philosophers who lived and worked and thought together. They were invited by the king, who paid their salaries, provided them with a library, lecture rooms, dining rooms, laboratories, quiet gardens for contemplation, a botanical garden, a menagerie, and a collection of paintings and sculpture casts (Whitehead 1970, Lewis 1984, Canfora 1990, Boylan 1999). The *Museion* was a research and teaching centre, an academy, where learning through direct observation and perhaps some experiments took place. It has often been pointed out that the *Museion* had little to do with what we call a *museum* today (e.g. Bateman 1975, Lewis 1984, Canfora 1990). According to Lord (2000: 3), “[the] *Museion*, with its college of scholars and its library, was more the forerunner of the university than an institution to preserve and interpret material heritage”.

or regular access, therefore beneficial contact with art was probably not the predominant factor in acquiring and displaying it (see Collet 2004 for Australia).

Indeed, Odegaard (1963: 32) asked why the 'university' was not in fact called 'museion': "[if] in its origin the university was [...] a community of scholars devoted to the life of learning and teaching, one wonders why they did not pick up the word *museion* for university" (possibly because they valued the inspiration brought by being together, '*universitas*', more than the inspiration of the muses). In any case, it is not by chance that the university museum has a lot in common with the *Museion*.

4.6.1 The Ashmolean model

The Ashmolean Museum has been accepted as the first university museum in a recognizable modern form – it was a permanent institution, had collections, and was open to the public since 1683. Universities had assembled collections for centuries, but caution is needed when passing to the 'museum' level for two related but distinct reasons. Firstly, creating a museum requires commitment, investment and mobilisation from the university. It also requires that the university realises the implications resulting from that commitment. Macgregor (2003) argued that "until the very end of the 16th century at the earliest, it was simply inconceivable that such a device [the museum] might find a place in the curriculum and it took several centuries more before museums found an undisputed role in the university milieu". In other words, assembling and using collections is one thing – it is intrinsic to teaching and research in some disciplines – yet when it comes to museums, universities had to 'learn' how to accommodate them in their mission. They eventually found a perfect match, but only in the 19th century and after a lengthy and, at times, painful process. Secondly, as a result of this gradual process, the idea of a primordial university museum is too simplistic. There is not one unique common 'ancestor' after which all university museums created thereafter were modelled⁶⁸. Nevertheless, the Ashmolean Museum left a major legacy for its successors and, contrary to what is commonly thought, this legacy was not the general public. The most significant legacy of the Ashmolean for university museums was its structure: a coherent architectonic, organisational and functional complex aimed at combining "[a] repository for rare and curious materials, [a] research institute and [an] educational academy" (MagGregor 2001b: 5) – in other words, a symbiosis between teaching, study and display.

European universities did not wake up to the general public only in 1683. As early as 1316, there had been public dissections in Bologna. In Leiden, the public used to flock by the hundreds to attend the dissections at the *theatrum anatomicum*, announced by the city's church bells (Rooseboom 1958). When the Ashmolean opened its doors, there were already several collections open to the public. At the University of Oxford, the Picture Gallery of Christ Church College had been founded in 1546 and curiosities displayed at the Bodleian Library are mentioned in the notes of the German traveller Georg Christoph Stirn in 1638 (MacGregor 2003). In 1617, Aldrovandi's and Cospi's 'museums' went on display in the Palazzo Publico, Bologna (Laurencich-Minelli 2001). In 1662, the city of Basel bought Basilius Amerbach's cabinet and donated it to the university. Public access to the cabinet was granted in 1671, 12 years before the opening of the Ashmolean (Lewis 1984, Ackerman 2001). In fact, Bateman (1975: 159) remarked that the Basel museum "was probably the first [university museum]".

The Ashmolean has been the subject of several in-depth studies (e.g. MacGregor 1983, 1988, 2001a,b, MacGregor & Headon 2000, Ovenell 1986). Only a single original document provides insight about how it was organised. In a letter dated 1683 (the founding year), Robert Plot, Professor of Chemistry and first Keeper, explained how the Ashmolean functioned: it had a school of natural history with lecture and demonstration rooms (ground

⁶⁸ As Hooper-Greenhill (1992: 191) pointed out – her words being probably even more appropriate in the particular case of university museums – "There is no essential museum. The museum is not a pre-constituted entity that is produced in the same way at all times. No direct ancestors [...] or fundamental role [...] can be identified". The recent debate on the definition of a museum in ICOM-L is particularly illustrative of this complexity (ICOM-L is the web-based discussion forum of ICOM; see <http://icom.museum/distlists.html>, accessed 4 June 2005).

floor), a chemistry laboratory (basement) and a display area (upper floor), all under the direction of Plot himself (MacGregor 2001a). This organisational structure, designed at integrating teaching (the School), study (the Laboratory) and public display (the Exhibition) represented a rupture with earlier customs. The previous teaching 'museum' or 'cabinet' was merely a location where collections were displayed for teaching convenience and occasional display. The same applies to the occasional display of collections in university libraries or galleries. As far as known, these collections had no particular structure, no director or appointed staff, in short no specific institutional mission or existence. The Ashmolean provided regular access for all, which is obviously significant. However, its major breakthrough was the fusion of the teaching, research and public display and its organisational placement under, and in conjunction with, a professorship. The Ashmolean institutionalised the triple mission. It was this model that constituted the Ashmolean's major legacy to university museums. From the late 18th century until the mid-20th century, this model would be emulated and adapted by university museums across the world. From Stockholm to Sydney and Tokyo, no matter how small and specialised, university museums were equipped with class and study rooms, demonstration rooms and auditoriums (theatres), display areas, and a library, under the direction of one professor.

Although the model was innovative, in substance the Ashmolean did not trigger a revolution in the university. The fundamental objective of the Ashmolean was still the same as that of earlier collections, libraries and archives: to be an *instrument* in support of teaching and to play an active role in explaining, describing, and archiving nature. With the Ashmolean, this objective is given a purposeful structure.

Ironically, the Ashmolean was also the first university museum on record to fall prey to the 'Curse of the University Museum' (or perhaps it 'invented' it): either the museum is relevant for teaching and research – which by definition means constantly reinventing itself – or it stagnates and dies a slow death. Although the Ashmolean enhanced its palaeontology collections, 100 years after its foundation the Ashmolean collections had faced a "process of progressive fragmentation", stagnation, assaults from pests, moulds and natural decay and had subsequently lost the capacity "to contribute anything of value to the curriculum" (MacGregor 2003). The fact that it was open to the public provided little consolation. In a notorious clean-up fire in 1755, the head, leg and foot of the Ashmolean's dodo *Raphus cucullatus* were rescued from complete destruction at the last minute. These are now kept at the Oxford University Museum and represent the only remaining soft-tissue specimens of this ill-fated flightless bird from Mauritius, driven to extinction in the 18th century.

With few exceptions⁶⁹, the Ashmolean Museum would remain singular for many decades – in many respects its model was *avant la lettre*. Of course, universities continued to assemble teaching and study collections, but only during the 19th century would the triple mission model multiply and flourish. This required new developments, particularly the idea of institutional research as we know it today.

4.6.2 The Golden Age of university museums

On the one hand, scientific advancement throughout the 18th and early 19th century increased the quantity and quality of collection-based research. On the other hand, when Wilhelm von Humboldt laid out the programme for the University of Berlin, created in 1810, he placed

⁶⁹ For example the Zoology Museums at the Universities of Lund (1735) and Turin (1739), the Museums of Natural History at the Universities of Pavia (1771), Coimbra (1772) and Perpignan (1777), the Hunterian Museum at the University of Glasgow (1783), the Muséum national d'Histoire naturelle (1793) and the Conservatoire des arts et métiers (1794), both in Paris (some of which may not have followed the triple mission at all times). Botanical gardens, cabinets of physics and other teaching and research collections and teaching 'museums' continued to follow their own path.

research and training for research at its very core⁷⁰. This meant that 19th century science places collections at the very heart of research, while at the same time the Humboldt model places research at the very heart of the university⁷¹. Several European countries implemented higher education reforms that stimulated the establishment of collections and museums. Under these conditions, university collections and museums could expand and flourish.

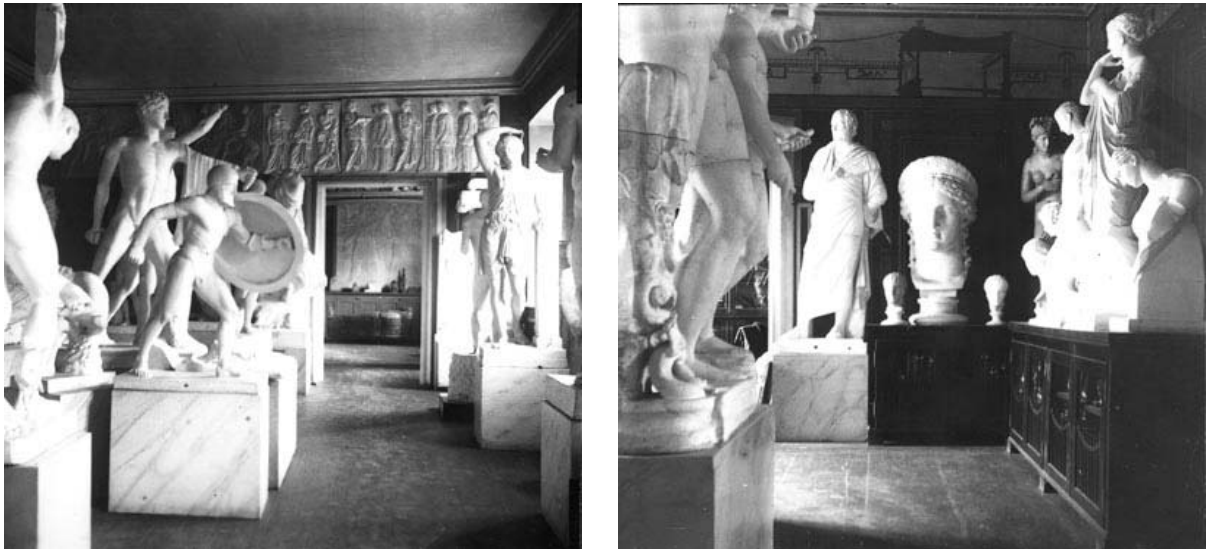


Fig. 4.14 – Tartu University Art Museum, a first generation university museum (teaching and study in the history of art), created in 19 April 1803 – the oldest museum in Estonia and one of the oldest plaster cast collections for teaching and study in European universities. Both photos date from 1898 (Art Museum Archives, reproduced with kind permission from the Tartu University Art Museum).

Moreover, during the 19th century, history of art, archaeology, anthropology and other humanities obtained a scientific and institutional identity of their own and collections of antiquities and art acquired a different meaning. Several institutions initiated overseas expeditions as well as local archaeological excavations. Gradually, the artefact ceased to be viewed merely as an ornament for adding lustre or status and became a document, a tool for the systematic understanding of the *other* – either distant in space (anthropology) or in time (archaeology). Universities that already had arts and humanities collections assembled them in newly created museums: in 1803, the Tartu University Art Museum (fig. 4.14); in 1816, the Fitzwilliam Museum at Cambridge; in 1819, the Museum of Archaeology at Pavia; in 1820, the Cabinet of Engravings at Halle-Wittenberg; in 1823, the Musée Atger in Montpellier; in 1833 the Marischal Museum (anthropology, archaeology and art) at Aberdeen; in 1894, the Museum of Ethnography in Bordeaux; in 1869, the Museum of Anthropology in Florence; in

⁷⁰ The modern university was proposed by Wilhelm von Humboldt. Humboldt organised the University of Berlin around the key idea of research while at the same time preserving the humanistic tradition in training, i.e. seeking knowledge and understanding of all matters pertaining to earthly, secular life while emphasizing the importance of human existence and culture. The Humboldt model promoted the advancement of research in favour of the training for professional careers, the latter being the French model at the time. This model was central to Germany's intellectual and scientific vigour and it was admired for instance by Emile Durkheim, who studied in Berlin in 1885. When the Sorbonne was reformed during the Third Republic (1870-1940), some aspects of the German model were incorporated (however, the French university system remained a complex and hybrid system until the present). The Humboldt model spread all over Europe and the world. Although some have doubts about the financial costs and the difficulty to adapt it to contemporary economies, Humboldt's is still the prevailing university model today.

⁷¹ Note that the Zoological Museum was created *with* the University of Berlin. The Museum opened to the public in 1814. For more on the history of the Berlin Museum, see Ahrens (1925).

1890 and 1899, the Musée de Moulages of Montpellier and Lyon, respectively, among many others⁷².

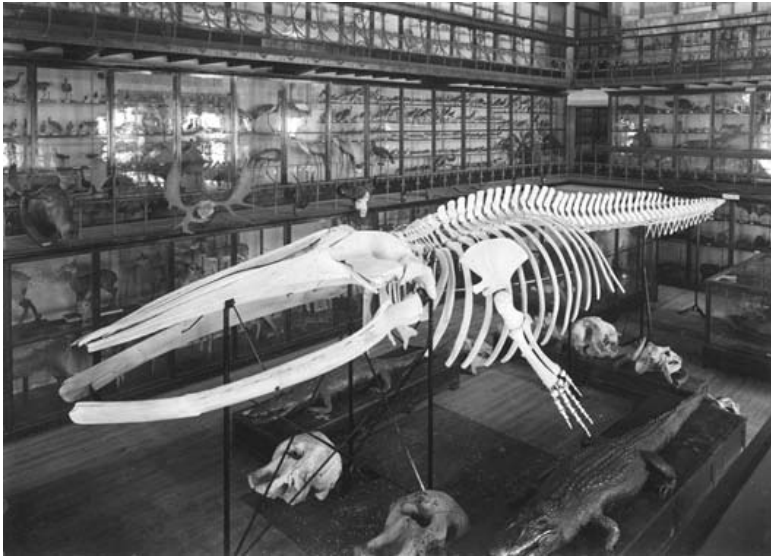


Fig. 4.15 – Museum and Laboratory of Zoology, University of Porto. It was created in 1916 but the collections date at least back to 1885 (photo Archives of the Museum of Zoology 'Augusto Nobre').

At the same time, the Museum of Natural History in Florence was divided into various disciplinary museums in 1878⁷³. In Oxford, the Ashmolean's natural history collections were the first to go and form the core of the Museum of Natural History, created in 1860. Also in 1860, the coin collection was transferred to the Bodleian Library. In 1886, the ethnographic specimens joined General Pitt Rivers' collections in the Pitt Rivers Museum, created three years earlier (Blackwood 1991, Petch 1998)⁷⁴. What was left of the 'old' Ashmolean at this point was archaeology and art. The Museum moved to the site where it is today with a mission dating from 1683 but reinvented in the light of the 19th century disciplinary specialisation: "[...] to ensure the university teachers and students had the means of supplementing their book-learning with a study of objects and specimens" (Harden 1947: 142)⁷⁵. The former Ashmolean site is today occupied by another university museum: the Museum of the History of Science, created in 1925.

The majority of university museums of arts and humanities were founded between 1800 and the 1930s, just like the majority of university museums of natural history and medicine (anatomy and pathology). During this period, collection-based papers and PhD theses multiplied and specimens, artefacts and objects were intensely used in the classroom to illustrate, demonstrate and explain. Museums were at the core of university departments, quite often preceding them (e.g. the Sedgwick Museum in Cambridge). This was the Golden Age of university museums, an age summarised in 1904 by David Murray in *Museums: Their History and their Use*: "Every Professor of a branch of science requires a museum and a laboratory for his department; and accordingly in all our great universities and other

⁷² In the USA, the first university art museum was established at Yale in 1831-32, followed by Vassar (1863), Princeton (1882), Stanford (1885), Wellesley (1889) and Harvard (1895). Previously, there already existed art collections based on the Oxford model (Christ Church Picture Gallery) at Harvard, Dartmouth and Bowdoin College (Rorschach 2004). For the history and function of the university and college art museum in the USA, see also Danilov (1996), Russell & Spencer (2000) and earlier works by Read (1943), Coolidge (1956, 1966), Sawyer (1964-65), Petheo (1971), and Sloan & Swinburne (1981).

⁷³ Universities themselves also separated humanities and sciences within faculties. For example, in 1848 the University of Turin separated the Faculty of Sciences and Mathematics from the Faculty of *Lettere* and Philosophy, which until then represented a single faculty.

⁷⁴ For more on the history of the Pitt Rivers Museum, see e.g. Gray (1905) and Petch (1999, 2001).

⁷⁵ The British Museum's natural history collections were also separated from those of archaeology – between 1880 and 1883, natural history moved to South Kensington where it still resides today, gaining autonomy from the British Museum in 1963.

teaching institutions we have independent museums of botany, palaeontology, geology, mineralogy and zoology, of anatomy, physiology, pathology and *materia medica*, of archaeology – prehistorical and historical, classical and Christian – each subject taught having its own appropriate collection” (D. Murray *in* Arnold-Foster 1989: 2).

4.6.3 Is there a ‘specificité française’?

The history of university museums and collections in the different European countries remains largely unstudied. Although it would be impossible to fill in this gap in this dissertation (which is not the objective), the museological situation that emerged in France after the French Revolution in 1789 is to a great extent unique in Europe and thus deserves a brief discussion.

France does not have a pattern of university museums of natural history similar to Germany, Italy and UK. I have pondered over this matter during study visits to French universities. Van-Praët & Fromont (1995) offered an explanation. They argued that a combination of two factors contributed to a special context in France. Firstly, the Jardin royal des Plantes médicinales (1635), transformed after the Revolution into the Muséum national d'Histoire naturelle (1793), and both created outside the sphere of the Sorbonne, had a predominant role in the development of the natural sciences in France. Secondly, the creation in the 19th century of a system of 22 natural history muséums in every major French town also took place outside the academic sphere and under the jurisdiction of local authorities (*mairies*). Moreover, after conducting a survey among these municipal muséums, Van-Praët & Fromont (1995) found that whenever the initiator of the muséum could be identified (i.e. in one third of the cases), the local university was not involved, while university professors were personally involved in 10% of the cases.

The remarks made by Van-Praët & Fromont (1995) are pertinent. Given that by 1892 France had an active network of natural history museums like no other country in Europe, or indeed the world, there was no need for museums of natural history in universities. I would like to take their arguments further in the broader context of French university collections.

The Muséum of Paris was created by the Convention (and not by a university) with an unequivocal idea of *patrimoine national*, but at the same time it was fully integrated in the European tradition of university museums – and the same applies to the Conservatoire des arts et métiers, which will be discussed below. The Muséum followed (and follows today) a triple mission – teaching, research and public display. The Muséum was organised as a small integrated academy in itself, with departments and collections evolving around a professorship⁷⁶. It is not by chance that Louis Agassiz, the Swiss ichthyologist who studied at the Muséum under Cuvier, was profoundly inspired by the idea of developing collections in conjunction with professorships (Kohlstedt 1988). When teaching at Harvard University, it was the Muséum model Agassiz used for his Museum of Comparative Zoology, created in 1859. Although the Muséum monopolised a considerable part of natural history research in France, it could not grant degrees, and this aspect is crucial because universities retained a significant portion of teaching and doctoral research. Like their European counterparts, French universities developed natural history teaching and research collections before and after the Muséum was created. What they did not do, unlike their European counterparts, was to organise them in museums, because there was no need for public dissemination of natural history. Lyon had a Muséum, Strasbourg had a Muséum, Toulouse had a Muséum and, above all, Paris had a Muséum with one of the most important natural history

⁷⁶ In fact, the professorships existed already at the Jardin des Plantes. In 1788, the Jardin had three professorships “in the same subjects that had been taught since the seventeenth century” (Appel 1987: 17). There are many sources on the history of the Jardin des Plantes and the Muséum, see e.g. Limoges (1980), Pieters (1981), Van-Praët (1991).

collections in the world. The *specificité française* exists at the museum level, but not at collection level.

We know for example that there was a cabinet of natural history at the University of Perpignan since 1777 (Bourgat 2002) and the mineralogy collections at the University of Paris (now Pierre et Marie Curie) date from 1809 (Ruppli 1996). Also in Paris, the collections of mineralogy at the *École des Mines* probably date from before 1789 and there were palaeontology collections at the University of Lyon from the 1840s onwards (Prieur *et al.* 2003), not to mention the teaching collections proper, such as countless pedagogical boards, mineralogical and botanical models, etc.



Fig. 4.16 – Collections at the Institute of Zoology, University of Strasbourg Louis Pasteur. The collection of ‘*panneaux pédagogiques*’, below, is especially remarkable, well-preserved and catalogued (photo S. Soubiran, courtesy University of Strasbourg Louis Pasteur).

We also know that professors moved from the Paris Muséum to, say, the *École Normale* and from there to the Sorbonne, often holding chairs in two institutions simultaneously – e.g. from 1808 to 1841, E. Geoffroy Saint-Hillaire held both the Chair of Mammals and Birds at the Muséum and the Chair of Zoology at the Faculty of Sciences and Henri Milne Edwards held the same two positions from 1862 to 1876 (Appel 1987)⁷⁷. Although managed by the *mairie*, the Director of the *Muséum* in Strasbourg traditionally held a professorship at the University of Strasbourg (M.-D. Wandhammer, interview 9 December 2003)⁷⁸.

⁷⁷ At the time, professors at the Sorbonne were recruited rather fluidly among other higher institutions in Paris. As Appel (1987: 62) wrote, “At first, the Faculty of Sciences was no more than another source of free, public courses, and its existence did little to transform the training of zoologists”. Typically, an aspiring zoologist would “instead [...] obtain a medical degree and at the same time [...] audit the courses at the Muséum, the Collège de France, and the Faculté de Sciences” (Appel 1987: 62). Apparently, Henri Milne Edwards was the first professor of zoology at the faculty who took his job of educating zoologists seriously.

⁷⁸ Already the *hortus medicus*, created by the *mairie* (1619), followed this tradition of having a professor of the University of Strasbourg as its director (Le Minor 2002). Strasbourg probably puts forward a *specificité* itself in the context of French higher education system, given that it was shaped after the German model.



Fig. 4.17 – Palaeontology collections at the University of Lyon Claude Bernard. In terms of the scientific importance of fossils, Lyon's collection rates second in France for vertebrate palaeontology and first for invertebrate palaeontology (Prieur *et al.* 2003) (courtesy University of Lyon Claude Bernard).



Relations between universities and muséums appear to have been close at various times. René Koehler's deep sea dredging campaign in the Golfe de Gascogne in 1895 was an initiative of the Faculty of Sciences of Lyon (where he was professor of zoology), supported by the Muséum de Lyon (Richoux *et al.* 1997). Collections were often transferred from the muséum network to universities and vice versa – for example, the core collections of the Muséum of Perpignan, created in 1840, were the university cabinet collections (Bourgat 2002); in 1890, the mineralogy and geology collections at the Muséum of Strasbourg were transferred to the Institute of Mineralogy and Geology at the University (Leypold 1996), and recently, in the 1970s, the geology collections of the Catholic University in Lyon were transferred to the Muséum of Lyon (J. Clary, interview 18 May 2004), among several other examples⁷⁹. The nature of these exchanges – of people, collections and knowledge – between French universities, the Muséum and the muséum network is certainly worth further study. Why did they happen? Was it for scientific reasons, personal involvement of a given curator, financial difficulties? Were collections reorganised according to different criteria when they passed from universities to muséums and vice versa?

In other fields of knowledge where the Muséum did not collect and display (or at least did not collect and display significantly), French universities *did* organise museums. This happened in medicine and, later, the arts and humanities. In these areas, French universities followed the pattern of their European counterparts. As far as medicine is concerned, French university heritage is very significant and dates from before the French Revolution. The University of Paris was the second in Europe (1211)⁸⁰ and, although medicine had been taught in Paris since 650 AD (Clin 1994), the first evidence of an organized faculty dates from

⁷⁹ In the 20th century, there were significant exchanges of natural history collections between universities as well. Prieur *et al.* (2003) reported that the University of Lyon Claude Bernard received palaeontology collections from the University of Clermont-Ferrand in 1972, from the École des Mines in 1978 (presumably when the École moved to Fontainebleau), from the Catholic University in Lyon in 1995, and from the Collège de France (date unspecified).

⁸⁰ Although probably founded 40-60 years earlier, the official year of recognition is generally taken to be 1211. Inevitably, the precise founding dates of early universities are controversial and that of the University of Paris' is particularly difficult to establish as "[it] was never founded as such, at a particular moment; instead it slowly evolved spontaneously, out of the cathedral school that already existed in the town" (Rudy 1984: 20).

1213 (Siraisi 1996, see also Crémer 1997). The École de Médecine of Montpellier had its statutes approved by the Pope in 1220 (remaining unaltered until 1789) and officially became a university in 1289 (a single *Studium generale*) (Rüegg 1996b). By 1788, like many other institutions of the Ancient Regime, higher education in France was rather “arid, obscurantist and reactionary” (Rudy 1984: 83). In 1600, Henri IV had assumed full control of the Sorbonne, going as far as regulating in minute detail every aspect of the its curricula. For almost two centuries, pedagogical innovation was disapproved, controversial issues shunned and works by Montesquieu, Rousseau and others judged subversive and banned from the academia. However, French universities created herbaria, materia medica collections (*droguiers*), botanical gardens and anatomical theatres and had assembled collections for teaching and study at least since the mid 16th century. There is, however, evidence that medicine had been taught in Montpellier at least from 1180 (Siraisi 1996, Verger 1996). In Strasbourg, the first official dissection took place in 1517 and the anatomical theatre was established in 1670 (Le Minor 2002). In 1593, inspired by Padua’s garden, Henri IV commissioned a botanical garden to Pierre Richer de Belleval, professor of botany and medicine at the École de Médecine of Montpellier (Jarry 1995, Cuénant 2002). The Faculty of Medicine in Paris was quick to follow, with the construction of its first anatomical theatre and botanical garden in 1604. Before, students did study medical herbs, but they had to travel to the plains of Gentilly (Clin 1994). In the preceding centuries, several other universities had been created (e.g. Toulouse in 1229, Avignon in 1303, Aix-en-Provence in 1409), but I have been unable to find data indicative of the creation of early collections or proto-collections in these institutions.



Fig. 4.18 – Anatomical dissection, Gui de Chauliac, *La Grande Chirurgie*, 15th century (Ms. H 184, folio 14 verso) at the Library of Medicine, University of Montpellier 1 (reproduced with the kind permission of the BIU de Montpellier, Atelier photo).

The French Revolution had a huge impact in the French higher education system, reforming it completely⁸¹. It impacted the teaching of medicine too. After having been discontinued in 1792, the faculties of medicine of the Universities of Paris, Montpellier and Strasbourg were re-established by a Convention decree (24 December 1794). The decree explicitly stipulated that each school should possess a ‘conservatoire’ encompassing anatomical teaching collections, a collection of surgical instruments and a collection of medical natural history

⁸¹ For the history of French universities, see Verger (1986). More broadly, the French Revolution marked a transition point between the traditional order and a new era in history (Rudy 1984). The combined influence of nationalism, secularism, democracy, technology and science in the century that followed the French Revolution had a considerable impact on the European higher education system and changed it fundamentally.

(Cuénant 2002). The 'conservatoire' in Paris opened within less than a year (Clin 1994) and so did Montpellier's (Cuénant 2002, Bonnel *et al.* 2002)⁸² – and this could not have happened so promptly unless collections were already there. At Strasbourg, collections existed since the creation of the anatomical theatre in 1670 and were merely reorganised for the purpose of the conservatoire (Le Minor 2002)⁸³.

Like their European counterparts, 19th century French universities witnessed the specialisation of medicine and the multiplication of disciplinary museums – e.g. the Museum of Anatomy at the University of Lyon (1840), the Dupuytren Museum of Pathological Anatomy (1835) and the Orfila Museum of Comparative Anatomy (1847), all at the University of Paris. In the arts and humanities, the situation was similar: the Musée Atger at the University of Montpellier was created in 1823 (a very special art museum, within a Faculty of Medicine), the Musée Huguier of the École des Beaux-Arts was created in 1836⁸⁴, the Musée des Moulages de Montpellier in 1890 and the Musée des Moulages de Lyon in 1899, among others mentioned before.

Generally, these museums aimed at the triple mission model (the 'Ashmolean model'). For example, in 1889, the Musée Huguier at the École des Beaux-Arts in Paris included several public display areas, a library and an archive, and a subsidiary anatomical museum and laboratory where human bones and articulations were prepared for teaching (Jacques 2001).

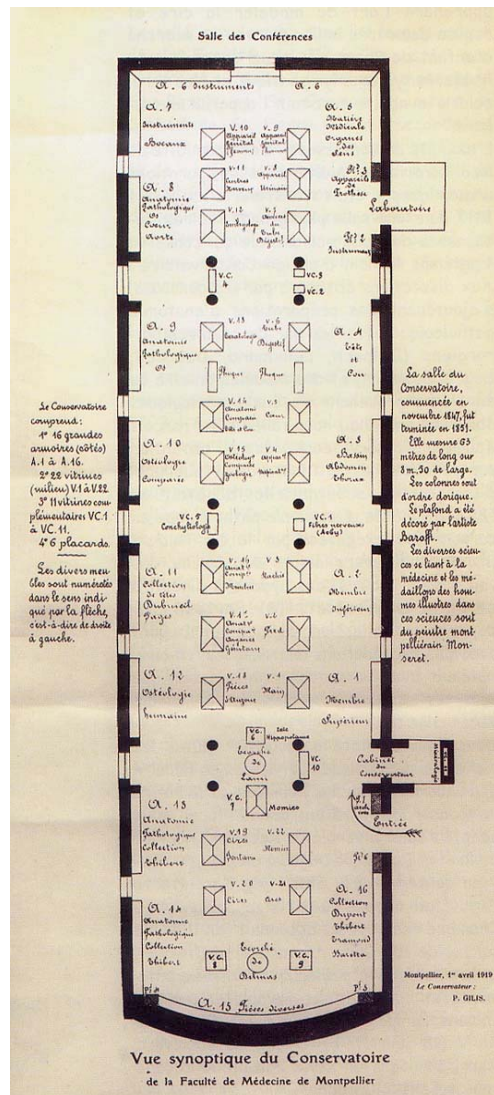


Fig. 4.19 – Plan of the Musée d'Anatomie, University of Montpellier. The document is signed by the conservateur P. Gilis, in 1919 (courtesy Archives of the Musée d'Anatomie, University of Montpellier 1).

⁸² In Montpellier, the École took the term 'conservatoire' quite literally and only allowed students to attend their exams if they brought a specimen to the collection: "Nul élève, ne peut être admis aux examens définitifs à moins qu'il n'ait présenté une pièce anatomique naturelle ou artificielle pour être déposée au Conservatoire." (M. Peronnet *in* Cuénant 2002: 81).

⁸³ The establishment of university collections and cabinets 'by decree' was not uncommon in Europe at the time. For example, the hortus botanicus, physics cabinet, natural history cabinet and anatomical theatre at the University of Pavia were established by a decree issued by Maria Theresa of Austria in 1783. It was in consequence of this decree that Brusati and Borsieri (hortus), Volta (physics cabinet), Scopoli (natural history cabinet) and Scarpa (anatomy) were appointed by the University of Pavia. The decree that created the Polytechnic School of Lisbon in 1837 (predecessor of the University of Lisbon, re-created in 1911), determined the establishment of an astronomical observatory, a cabinet of physics, a chemistry laboratory, a natural history cabinet and a botanical garden (Gil & Canêlhas 1987). A similar decree had been issued in 1815 in the Netherlands when the Universities of Leiden, Groningen and Utrecht become State universities: each should have a cabinet of medicine with anatomical, physiological and pathological preparations and instruments; a cabinet of physics, with scientific instruments, models and apparatus; an astronomical observatory, with astronomical instruments; a laboratory of chemistry; a natural history cabinet, comprising zoology and comparative anatomy; a cabinet of geology and mineralogy; and a botanical garden and herbarium (S. de Clercq, *in litt.* 11 August 2002).

⁸⁴ Between 1795 and 1806 there was a museum at the former convent Petits-Augustins, the *Musée des Monuments Français*, created by the city of Paris and Alexandre Lenoir as appointed Director since 1791 (Poulot 2001: 61). For details on the convent (founded in 1608) and its adaptation to the École des Beaux Arts, see Jacques (2001: 7-11).

The same can be said of the Conservatoire des arts et métiers, established in Paris in 1794 and the network of astronomical observatories mostly established outside the academic sphere (though possibly less influential as far as public dissemination than the muséum network). Unlike other European countries (e.g. Whipple Museum at Cambridge, Museum of the History of Science in Oxford, Museum of Physics in Coimbra, Museum of Science in Lisbon, Museo di Fisica in Bologna and Naples⁸⁵), there is no network of museums of the history of science in universities in France. There simply was no need. When there was need, museums were created – for example in the areas traditionally not covered by the Conservatoire (e.g. museums of the history of medicine and the history of pharmacy). At the collection level, however, French universities did not differ from their European counterparts: there were collections of instruments because the Conservatoire did not hold the monopoly on teaching and research of the so-called exact sciences and engineering. There are significant historical university collections of physics, mathematics and astronomy in France – e.g. at the École Polytechnique (Thooris *et al.* 1997, Thooris 1999), the École Normale Supérieure de Lyon (Artu 1996) and the University Louis Pasteur in Strasbourg, where apart from the physics and astronomy collections, the Musée de Sismologie et du Magnétisme Terrestre was created in 1900.

This is not the place to describe the history of the Conservatoire des Arts et Métiers, which is well documented, particularly in recent research works resulting from its renovation in the 1990s (e.g. Mercier 1989, 1994, Fontanon & Grelon 1992-1994, Le Moël & Saint-Paul 1994, Ferriot *et al.* 1998, Ferriot & Jacomy 2000, Jacomy 2000, Ferriot 2001). The role of the Conservatoire and its remarkable collection are internationally acknowledged. Here, I will only briefly examine the historical role of the Conservatoire in the context of European university museums.

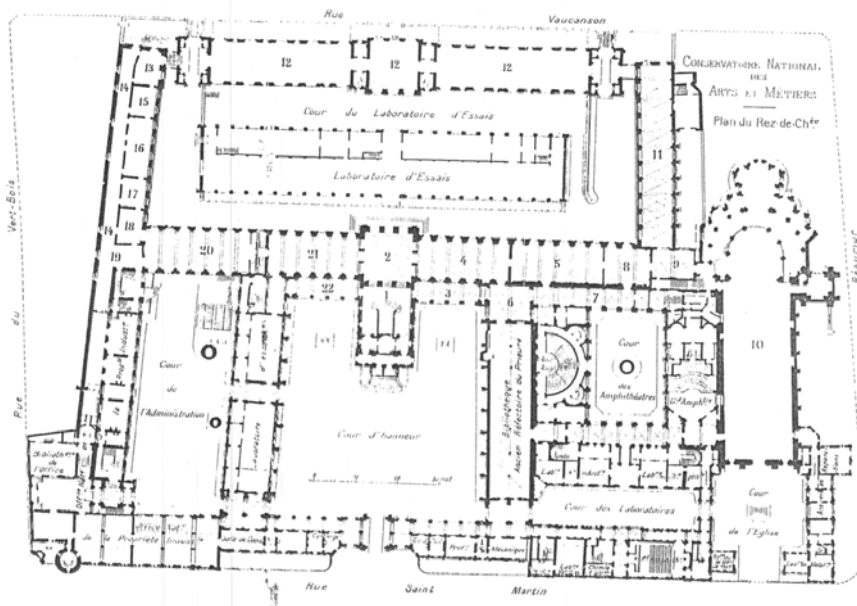


Fig. 4.20 – Plan of the ground floor of the Conservatoire des arts et métiers from the *Catalogue des collections*, 1905 edition, which also includes plans of the first and second floors (reproduced with kind permission of the Musée des Arts et Métiers).

Just like the *Muséum*, the *Conservatoire* fits in the broader tradition of European university museums: it had laboratories, classrooms and exhibition areas and its organisation institutionalised the triple mission (fig. 4.20). The Conservatoire also had professorships from 1819 (Ferriot *et al.* 1998). Both students and public were welcome to attend classes and

⁸⁵ Although it should be noted that in Europe the university museum of historical nature is a phenomenon of the 20th century.

demonstrations in the amphitheatres, visit the exhibitions rooms or use the library. Ironically, as at the Ashmolean too, after 100 years of existence a progressing fragmentation set in: “As science teaching becomes more abstract, the goals of conservation and demonstration had progressively moved apart” (Ferriot *et al.* 1998: 15). The public mission became gradually divorced from the other two missions (research/innovation and teaching) and this ultimately led to a museum crystalized *inside* a higher education institution, instead of the single and integrated institution that it was in 1794 and particularly since 1819: “In the 1920s, at the time when the Conservatoire was gradually affirming its vocation as a higher education establishment, the Museum suspended its evolution, and became frozen in time [...]” (Ferriot & Jacomy 2000: 33). As a result, the Museum underwent a severe identity crisis and only refound its identity and role during the renovation of the 1990s – an identity that is respectful of its original mission in 1794, as Dominique Ferriot underlines: “la première mission du Conservatoire était de contribuer à ‘perfectionner l’industrie nationale’ en permettant aux artisans de ‘copier les bons modèles’ ou , pour ceux qui étaient capables de ‘voir à plus longue distance’ de ‘faire des combinaisons nouvelles’, c’est-à-dire d’inventer; c’est pourquoi le Musée des arts et métiers rénové est fidèle à sa mission première en étant un musée de l’innovation technique (histoire et actualité des techniques)” (D. Ferriot, *in litt.* 29 July 2005).

A second aspect worth highlighting is the influence of the Conservatoire on museums created in European universities during the 19th century. For example, the Conservatoire model had a clear influence on the *Museo Industrial Italiano* created at the Politecnico di Torino in 1862 and still has a significant influence on its current successor, the *Museo e Archivio del Politecnico* (V. Marchis, interview 7 April 2003). Perhaps less known, the Conservatoire also influenced the *Museo Tecnologico* of the *Istituto Tecnico Toscano* in Florence, whose Cabinet of Physics was mentioned earlier in this chapter. The Museo Tecnologico, created by the same decree that established the Istituto in 1857 and the first director of which, Filippo Corridi, visited and corresponded with the director of the Conservatoire (Brenni 1990, Gori 2001), was not meant to be “a mere repository of machines, models, natural and artificial products”, but these “were to be made useful to the industrials, tradesmen and technicians – available for these to manipulate, study and copy in the name of the progress of Tuscany industry” (Brenni 1990: 77)⁸⁶. The analogy between this excerpt and the original Convention Decree of 10 October 1794 that created the Conservatoire is remarkable.

So, is there a ‘singularité française’? Did the Muséum and the Conservatoire create a special situation in France that conditioned the creation and evolution of university museums and collections? The answer is yes at museum level and particularly in the subjects covered by the Muséum (and muséum network) and the Musée des Arts et Métiers. French universities did not create university museums of natural history and history of science and technology. The answer is no at collection level. French universities developed first and second generation collections in a wide range of subjects –including natural history and history of science and technology, as well as anatomical theatres, botanical gardens, herbaria, like their European counterparts.

Regardless of the ‘specificité française’, which is a topic that certainly could benefit from further in depth historical research (particularly as far as the history of French university collections are concerned), the fact of the matter is that French university heritage outside the Muséum and the Conservatoire is certainly rich, diverse and significant at European scale

⁸⁶ Article 35 of the Museo’s founding decree reads: “The Museo Tecnologico has several collections that are useful for the technical teaching of the students of the Istituto, as well as craftsmen, tradesmen, and all those interested in knowing the applications of sciences” Article 36 details the type of collections: “scientific equipment and machines, technical equipment and machines, domestic equipment and machines, collection of drawings and models, of minerals and rocks, of organic products, metallurgic samples” (Brenni 1990: 77). The Conservatoire also inspired the creation of similar museums in Lisbon and Porto: the *Conservatorio das Artes e Officios* (1836) and the *Conservatorio Portuense das Artes e Officios* (1837), respectively – but not within the university and, in any case, both of only ephemeral existence.

and beyond. It has not yet received the recognition it deserves. All in all, it has systematically been left behind in surveys, reports and major renovations. My view is that the collections of the Muséum, the CNAM, and other French higher education institutions have in essence the same nature: they were assembled and organised to research and to learn. Unless this heritage is seen in an integrated way, as a nationally distributed collection of the history of knowledge, French university collections will not receive the recognition they deserve and possibly in a few decades a substantial part risks being lost. Much more collaboration than so far has been the case is needed.

4.7 The second generation: the historical collection

During the 20th century, another generation of university collections makes its appearance: the historical collection. The genesis and therefore the development of second generation university collections is distinct from what has been presented so far – although they are also related to teaching and research.

University collections of historical nature emerge through the accumulation of items that are no longer relevant for their original purposes. These may include instruments, machines, models, pedagogical panels, prototypes, replicas, or any other item used for teaching and research, but for one reason or the other is no longer considered adequate to fulfil its purpose. The exact sciences (physics, technology and suchlike) are particularly important in the accumulation of historical collections, but historical collections also encompass medicine and pharmacy. Resulting from the accumulation of university memorabilia, collections of university history also belong to the second generation of university collections. Records of second generation museums only appear in the 20th century. The two major reasons for this are 1) the nature of these objects and the mechanisms of their use for teaching and research tend to result in a long-term collecting processes and 2) historical collections presented new challenges to the university as an institution. I will discuss these two points below.

The 'natural fate' of historical instruments and equipment in university laboratories is to be thrown away. Scientific equipment – like cats – has seven lives and objects are used and re-used, their research and teaching qualities being exploited until exhaustion. At the end of their seventh life, the instrument may be trashed or its importance may only be recognised after years. In universities, there is no formal inheritance of care or responsibility for this equipment. Experimental equipment is not considered a 'collection', nor are users generally concerned with the possible historical significance of the instruments they use every day. In fact, 'historical significance' is a relative concept at best. An instrument can be tens of years or even centuries old, yet still be 'in use'. Paolo Brenni, researcher and president of the Scientific Instrument Commission (SIC), illustrated this with an example: "I have once seen a half destroyed 19th century spectrometer. Only the tripod bearing the plate with the graduation survived – it was used in a modern experiment dealing with a completely different field of physics." (P. Brenni, *in litt.* 28 April 2005). As a result, if historical collections are to be formally assembled, someone needs to be aware of the significance of the objects, collect them (i.e. save them) and put them aside in order to be protected. If this happens at all, it is usually thanks to one or more professors.

One of the finest collections of instruments in Europe – the 18th century physics cabinet of the University of Coimbra – was sold for the best price at the door of the Physics Department in the early 1900s, undoubtedly because the right person was not there at the right time. Some of the instruments were later recovered and restored and in 1937 the former cabinet was re-created by Mário Silva, a professor of physics (Silva 1939, 1963). Today, the cabinet is protected and integrated in the Museum of Physics of the University of Coimbra. Similarly, a large number of physics and astronomy instruments from the University of Strasbourg Louis Pasteur was deemed to be lost in the 1980s, yet was saved by a group of professors who literally collected the instruments from the waste-bins and created an association to frame

their protection, the *Association pour un Musée de Sciences à Strasbourg (AMUSS)*⁸⁷. Although not accessible, the collection has been inventoried and studied and will hopefully be integrated in the *Jardin des Sciences*, the new project aiming at reorganising the collections of physical and natural sciences of the University Louis Pasteur. The importance of the Strasbourg collection is beyond doubt and was confirmed by Paolo Brenni, following a visit in October 2003: “[...] le nombre d’instruments qui ont survécus est encore très important. Leur qualité est généralement remarquable, étant sortis des meilleurs ateliers des fabricants français et allemands de la fin du XIXe et du début du XXe siècle” (Brenni 2003).



Fig. 4.21 – Museum of Physics, University of Coimbra (partial view) (photo G. Pereira, reproduced with kind permission).

Although admittedly extreme, these examples might be seen as ‘proof’ of the rather careless and negligent way in which scientific equipment is treated in universities. The line between practices of daily teaching and research and practices of negligence can be very thin. Dynamic use, re-use and disposal are not only commonplace, but are intrinsic to the ways instruments are used and often tangible (e.g. cannibalised instruments). When the time comes for public interpretation, this dynamic nature is an added value that should not be omitted but, on the contrary, explained to the public.



Fig. 4.22 – Historical collection of physics, University Louis Pasteur of Strasbourg.

⁸⁷ AMUSS has now become Association de Muséographie et de Culture Scientifique (S. Soubiran, *in litt.* 23 June 2005).

In short, individual initiative and sensitivity towards academic heritage are crucial ingredients when it comes to assembling university historical collections. Consequently, such collections arise more arbitrarily and have longer collecting processes than others. As for university memorabilia, the collecting process is perhaps less arbitrary as objects are generally perceived as academic heritage (e.g. busts, portraits, seals).

Once 'historical' importance is acknowledged, formal recognition by the institution and the creation of a museum is usually the next step, although this may take decades too. Historical collections may be displayed for decoration in corridors, classrooms, libraries or auditoriums before an actual museum materialises. The formal constitution of the Museum of Science of the University of Lisbon stems from the 1980s, yet the instruments had been gradually collected for more than 20 years prior by the museum's first director, Fernando Bragança Gil. Robert T. Gunther listed and collected 'old' instruments, scattered around the University of Oxford, from at least 1916, but the Museum of the History of Science only opened to the public in 1925 (Bennett 1997). It takes persistence at an individual level (often against the prevailing mood amongst colleagues) and the agreement of a dean or rector to create a second generation museum whereas first generation museum emerge naturally from the teaching and research collections in a given department. Second generation museums did not emerge before the 20th century. Moreover, they started slowly and only grew in numbers after the 1960s.

The first university museums of a historical nature were created in the early 1900s. These included the Musée de Sismologie et du Magnétisme Terrestre at the University of Strasbourg Louis Pasteur (1900), the Musée d'Histoire de la Médecine et de la Pharmacie at the University of Lyon Claude Bernard (1913) (donation), the Scott Polar Research Institute Museum (1920) and Museum of the History of Science (1925), both in Oxford, the Utrecht University Museum (1936), the University Museum of Pavia (1932), the Museum of the History of Medicine at the University of Porto (1933), and the University Museum at Groningen (1934). The Whipple Museum in Cambridge was created during World War II (1944), but only opened to the public in 1951 (Bennett 1997). After 1945 there were for example the Musée National de l'Education in Rouen (1950) and the Museum of the History of Medicine at Louvain (1950).

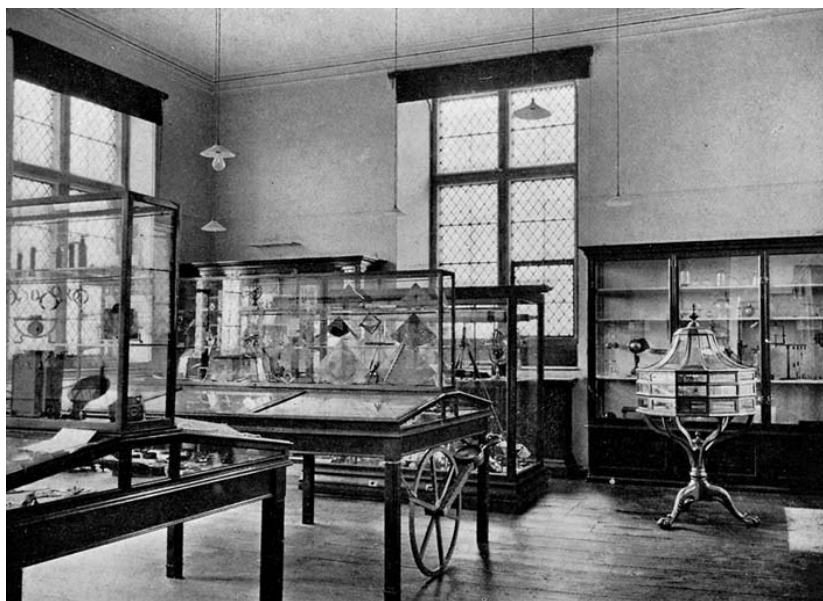


Fig. 4.23 – Museum of the History of Science, University of Oxford, first opened in 1925 as the Lewis Evans Collection on the top floor of the Old Ashmolean Building. This is possibly one of the earliest second generation university museums in Europe (photo originally published in *Country Life* Vol. 56, No. 1479, p. 734, 1925, reproduced with the kind permission of the Museum of the History of Science, University of Oxford).



Fig. 4.24 – University Museum at the Martin-Luther University of Halle-Wittenberg (left the section devoted to the history of the Faculty of Philosophy and right the sceptres and early engraving depicting the town). Often, university museums present both historical instruments and university memorabilia, particularly in north and central Europe (reproduced with kind permission).

Only after the 1960s, second generation university museums underwent a considerable increase in number, with the opening of the Robert Koch Museum at Humboldt University Berlin (1960), the Collection of Minerals at the University of Paris Pierre et Marie Curie (1970), the Sacred Art Museum at the University of Coimbra (1972), the Musée Dentaire at the University of Lyon Claude Bernard, the Musée de la Pharmacie 'Albert Ciurana' at the University of Montpellier 1 (1972), the Helsinki University Museum (1978), the Hunt Museum of Decorative Art, Limerick University (1978), the Musée de Louvain-la-Neuve (1979), and many others (see appendix A8).

Even considering the long and often arbitrary collecting process, why did second generation university museums take so long to actually take off? A combination of two factors probably contributed to the slow start. During the first decades of the 20th century, the notion of 'museum' was far from alien to universities. In fact, it was the Golden Age of university museums. In those days, museums were actively used for teaching and research by professors and students, the triple mission was at their core, and most were located in, and managed by, departments. However, the *historical* museum, in which objects suffered loss of context and were preserved to be displayed for the general public, represented a wholly new direction and development. There was no internal drive for the deliberate creation of historical museums in universities, there were no formal internal structures prepared to accommodate them and no trained staff to curate the collections. Second generation museums represented a challenge and a major mentality leap for universities. It is probably for this reason that it took almost the whole of the 20th century for universities to adapt to the idea. Furthermore, often they were not spontaneously created. It required strong catalysers – e.g. centenaries and other celebratory occasions – to trigger the creation of the large majority of second generation museums.



Fig. 4.25 – Museum of Science, University of Lisbon. The Museum has integrated and displays 18th - 20th century historical equipment from the Faculty of Sciences (departments of physics, chemistry, mathematics and derived sciences) and the Polytechnic School (predecessor of the University of Lisbon, created in 1837). It also integrates a practically intact late 19th century Laboratorio Chimico, as well as items of university history. The Museum was created officially in 1985, although it only opened to the public in 1993. See e.g. Gil (1994, 2003) (photo A. Cabral, reproduced with the kind permission of the Museum of Science, University of Lisbon).

Although universities often use their historical record as an argument for social and academic legitimacy, they generally only mobilise resources for the study and preservation of their heritage – through publications or exhibitions – at times of special commemorations. Many historical museums are created or renovated on these occasions. For example, at the University of Utrecht, an important physics collection was discovered in the attic in 1918. Years of deliberations followed and promises were made, but the Utrecht University Museum was only created in the aftermath of an exhibition in 1936 commemorating the 300th anniversary of the University (S. de Clercq, *pers. comm.* 5 May 2003). The Musée Dentaire at the University of Lyon Claude Bernard was created due to the 75th anniversary of the École de Médecine. A similar situation arose in connection with the restoration and reorganisation of the Volta Collection at the University of Pavia, which resulted from the commemoration of the bicentenary of Volta's battery in 1997 (F. Bevilacqua, interview 20 March 2003). The Museum of Science of the University of Lisbon was organised after an exhibition commemorating the 150th anniversary of the Polytechnic School and the 75th anniversary of the Faculty of Sciences. Sometimes, first generation university museums are also the outcome of special commemorative or scientific events. For example, the Museum of Mineralogy Giovanni Capellini at the University of Bologna was created in 1881, coinciding with the Second International Congress of Geology. There are many more examples. These facts *per se* are remarkably illustrative of the rather celebratory concept universities often have of their own heritage.

Possibly as significant and perhaps even more so, there is a second reason for the slow take off. The 1960s represented a turning point for the museum sector, with an increasing emphasis on the educational role of museums for society at large. Since second generation

university museums targeted the general public from their very beginning, they are likely to have benefited from this wave of change too⁸⁸.

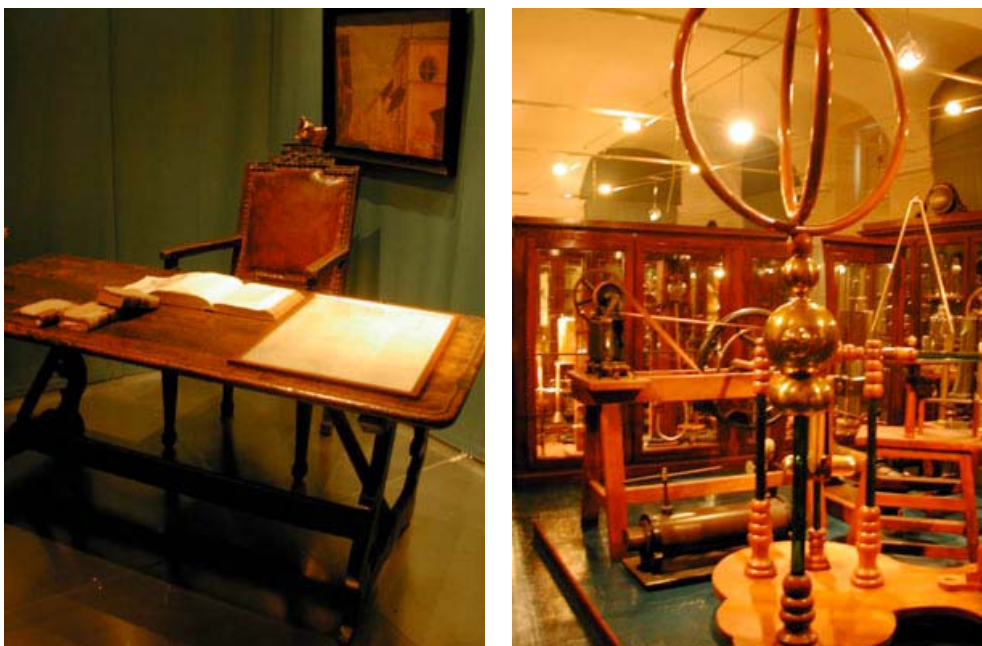


Fig. 4.26 – Gabinetto Volta at the Museum for the History of the University of Pavia, restored on the occasion of the bicentenary of Volta's battery in 1997 (photo reproduced with kind permission).

4.8 Summary and discussion

The development of university collections and museums paralleled the development of universities and the advancement of teaching and research. For first generation university collections and museums, the general picture first became visible in the late 19th century (fig. 4.27). Teaching collections were possibly born together with the first universities and survived essentially unaltered until today. Research collections arose during the mid to late 18th century and were anticipated by late 16th century study collections. First generation university museums in the modern sense began with the Ashmolean in 1683, although their golden age only occurred after the 19th century higher education reforms.

In essence, the model adopted by (first generation) university museums during the golden age was that of the Ashmolean: the institutionalised integration of teaching, research and public display. The university museum (including the botanical garden) was an independent unit that encompassed classrooms, laboratories, exhibition areas, and at least one library, under the responsibility of one or more professorships. Second generation university museums and collections only appeared in the 20th century, initially slowly and gradually increasing since the 1960s. Universities were slow in absorbing the concept of historical heritage. Collections and museums of a historical nature are marked by long and often arbitrary collecting and their founding was often determined by important celebratory events.

⁸⁸ The post-1960s expansion of second generation university museums also took place in the USA. According to Danilov (1996), nearly half of American university museums were created between 1945 and 1995, and approximately two-thirds of them in the 1960s and 1970s. Of the new museums, 70% were in the field of the arts, coinciding with the growth of universities and colleges and with the development and expansion of history of art, studio and art-related courses. In the USA, historical museums and history-related facilities were the second group in terms of growth, also catalysed by celebratory occasions, particularly the bicentennial celebrations of the 1970s. Danilov (1996) noted that – compared with the previous 100 years – first generation museums experienced a decrease in their development rate during this period. As yet, data are insufficient to infer whether the same trend occurred in Europe and the possibility of a similar correlation should be investigated.

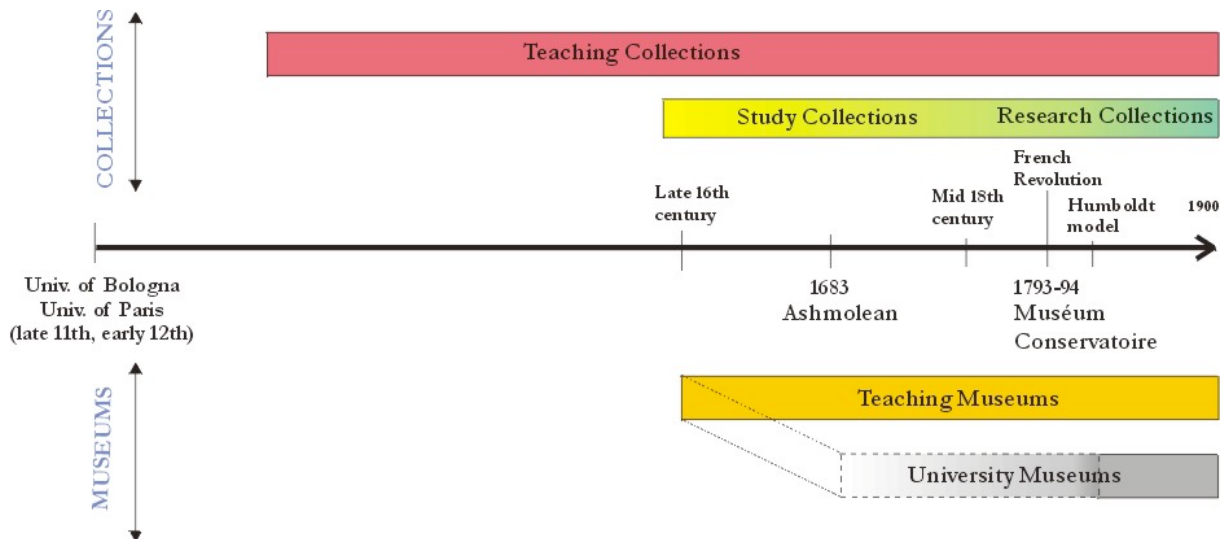


Fig. 4.27 – Development of first generation university museums and collections (timeline not to scale). Second generation museums and collections appeared in the 20th century and are not depicted.

Although first and second generation university museums coexist on campus, they have distinct origins, epistemological processes and missions and were subject to different historical developments. With few exceptions, their paths did not cross until recently, as the trend of integrating first and second generation university collections only became prominent during the last decade.

In the mid to the late 20th century, the complexity of the museological panorama in universities attests that first and second generation collections and museums of all disciplines, sizes and users, coexist and persist to the present day⁸⁹. The borders between these entities were - and still are - often nebulous. Although the first impression is one of chaos, the cohesion and homogeneity of university collections is striking.

There is no distinct 'national' university museum in the sense in which, for example, the *ecomusée* is a typical French product or the *heimatmuseum* a result of early 20th century Germany or even the open air museum as a special Scandinavian creation. Doubtlessly, there are national and geographical factors that influenced the nature and development of specific university collections and museums: the Herbarium at the University of Turin focuses on the flora of the Italian region of Piemonte; the Robert Koch collection is housed at the Humboldt University of Berlin and not elsewhere, because Koch developed his scientific work in Berlin and the same goes for the collection of Alessandro Volta in Pavia. Likewise, the memorabilia related to the history of the University of Utrecht are different from those of the University of Bologna. Clearly, there is a 'local component' to be found in any university collection and this is important in their significance.

When governments intervened, this was not primarily done to introduce a national, political or ideological bias⁹⁰. As illustrated by the Dutch and Italian examples given above and by the

⁸⁹ First generation collections did not suddenly stop in the 20th century. Sciences developed at different times and the majority of ethnology, archaeology and anthropology teaching and research collections developed in the early 20th century. Moreover, new types of first generation collections only develop after the 1950s (e.g. DNA banks).

⁹⁰ We know that in extreme cases of dictatorial regimes research was subordinate to ideological criteria. In Europe, the case of T.D. Lysenko under Stalin and the machinations in Nazi Germany are well-known and emblematic. It should be noted that, although there is an extensive literature on these two cases (including a recent editorial in *Nature*, see 'Uncomfortable truths', *Nature* 434: 681, 7 April 2005), we know little about the fate of university collections under oppressive regimes and how collecting, displaying and interpreting was used as a tool to promote political ideas (and 'national identity'). National and local museums were often 'normalized' and

Convention decrees that established the Muséum, the Conservatoire and the conservatoires of the faculties of medicine in France, governments intervened to establish and regulate higher education and research policies, which eventually resulted in collections and museums. In different countries, these laws were analogous in nature and more or less simultaneously implemented. Driven by a desire for progress in science and society, they did not introduce any significant 'national' bias. The result has been that, if one excludes the 'local component', university collections are remarkably consistent from Tartu to Dublin. The universal nature of knowledge and the proverbial communication and collaboration between scientists of different nationalities (intrinsic to science itself) signified that the major scientific questions were the same across the continent (and elsewhere) at any given moment in history. Similarly, the fundamentals of what was taught and how it was taught were basically the same as well. If one could look back and take a photograph of European universities frozen in time in, say, 1890, we would see scattered groups of researchers and students of physics, biology, anatomy, anthropology and astronomy in Cambridge, Leipzig, Toulouse, Naples and Uppsala, *grosso modo* operating within the same fundamental scientific frameworks⁹¹. The picture that would emerge would not be one of heterogeneity or multiplication (i.e. chaos), but one of cohesion and harmony – not thousands of chaotic and scattered collections, but an immense and consistent collection distributed across Europe. Moreover, the consistency is not only synchronic but also diachronic: there is a subtle and continuous line that can be traced back from the 'golden age' to the Muséum and the Conservatoire, to the Ashmolean and to teaching and study collections and indeed possibly all the way back to the early medieval Arab 'universities', monastery gardens, the *Lyceum*, the *Museion*, and the 530 BC school uncovered in Ur with teaching collections of antiquities.

Ultimately, what binds university collections together is the quest for knowledge about natural phenomena, as well as human creation. We are in the world of direct observation and comparison of artefacts and specimens, the world of understanding by doing, measuring and experimenting. Knowledge – how it is constructed, how it is transmitted – is the single main factor that affects the constitution and evolution of university collections. It is knowledge that provides them with the common shared character in their awesome disciplinary diversity.

used to boost nationalistic feelings, but the case of university museums is more intriguing because, at least theoretically, the nature of their collections and the traditional autonomy of universities should have acted as a protection shield against undue interference. An interesting sub-topic for further research is the development of university collections during occupation regimes. For example, during the Japanese occupation of Korea (1910-1945), university museums assumed the role of catalysers and guardians of Korean culture. As T. Noach observed: "[...] It was very interesting to note that [South] Korea has no national Natural History museum, and that the small collections of natural history within universities are not regularly on display and are not the primary concern of the collection and exhibition policies. The major focus within university museums in Korea is archaeology and ethnography, [...] partly because of their links with the Japanese colonial period and the need to preserve unique, original Korean culture, and also because the primary area of academic research at the institutions is in these fields" (T. Noach in Macquarie University, <http://www.els.mq.edu.au/korea.html>, accessed 12 December 2004). Interestingly, there are signs that the rule of Mussolini in 1920s and 1930s fascist Italy seemed to coincide with a growth of interest in archaeological and artistic university collections to the detriment of scientific university collections – at least in some universities. This is an issue that deserves further work (S. Talas, *pers. comm.* 1 July 2005).

⁹¹ In physics in 1890, this meant operating within the framework of classical physics (mechanics, electricity, optics and heat), where in fact all major discoveries appeared to have been made in as much that Albert A. Michelson (1852-1931) predicted that subsequent developments would basically be in the sixth place of decimals. In the life sciences, this meant a quest for the mechanisms of evolution, ignited by the rediscovery of Mendel's work.

