

Chapter 12

City and University—An Architect's Notes on an Intriguing Spatial Relationship



Helmut Bott

The university as a European institution has grown in the complex relationship of local, national, and even pan-European interests and power structures (see Bott, 2015, p. 12). From the beginning, universities have had a distinctive internal orientation with their rituals and regulations, privileged by a kind of academic autonomy. At the same time, however, they have been an important element of local society, culture, and economy, having a strong relationship to the place they are located. Lastly, yet importantly, universities have always been nodes in a network of science. Going beyond the local bonds, their orientation is to the international scientific community. Universities have thus developed within multidimensional relationships, of which the polarity between territorial exclusivity outside urban society and integration into urban structures is just one. This chapter deals with the change in the architectural concepts of university buildings and in the spatial relationship between university, town, and landscape over the centuries up to the present.

The Early European University Within the Power Structure of Town, Court (Government), and Pope

Higher learning revived during the High Middle Ages, when private schools of cities were founded and complemented exclusive institutions such as cathedral and monastery schools of the pan-European Roman Catholic Church, along with court schools and palace schools. The papal administration declared some of these private schools to be legal and granted them special rights, such as tax exemptions,

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municipal services, or special rights of judicial practice. However, conflicts between legalized universities and local governments were not resolved forever by these acts. They flared up from time to time.

European universities were founded as of the eleventh century, first in Bologna and Paris, somewhat later in Oxford and Cambridge, spreading throughout the Roman Catholic European empires and countries (see Bott & Teodorovici, 2015, p. 24; Verger, 1992). Because universities provided a pool of educated graduates from which feudal courts and ecclesiastical institutions could draw their qualified staff, the founding of universities became a matter of vital importance and crucial interest throughout western Europe. At the same time, it posed a serious conflict between Church and kingdom.

Universities were founded, funded, legalized, and protected by feudal clerical or secular powers (Fig. 12.1), who appointed rectors and controlled these institutions of higher education. University life was initially similar to monastic life but also had elements of self-government as practiced in medieval municipalities, craft guilds, and associations of those towns in which professors, scholars, and students lived (Bott & Teodorovici, 2015, p. 25; Nardi, 1992).

Internal academic controversies about dogmas and theoretical principles were commonplace and could escalate into violent conflicts, even to the final exodus of a group of scholars from famous universities. In fortunate cases these disputes led to new foundations that also eventually became eminent academic institutions (e.g., Bologna—Padua, Oxford—Cambridge). From the outset, universities had both this strong inward orientation to their academic world and necessarily to the relation with urban life, but they were simultaneously part of the international world of the Latin—Christian sciences. Latin was the *lingua franca*, and all texts had to be written in that language. Diplomas of universities recognized by the pope had to be accepted everywhere. Academic mobility, such as that of students of Canon and Roman law at the renowned law school of Bologna, was nothing extraordinary. Traveling scholars were common in the medieval world (Bott & Teodorovici, 2015, p. 25; de Ridder-Symoens, 1992; see chapter by Meusburger & Probáld in this volume).

Until the early modern era universities were not research universities, which constantly seek new scientific knowledge. On the contrary, the main task of their scholars was to interpret the Bible and to read, comment, and explain to students well-known works by celebrated theologians and texts by ancient philosophers (Bott & Teodorovici, 2015, p. 27).

Urban Integration and Architecture of Early Universities

At first, lessons were held in small public houses. Prominent and successful schools grew house by house, plot by plot. Whenever spatial and financial conditions improved, school buildings were erected. They were arranged similarly to urban monasteries: mostly four wings around a central courtyard with entrance gate, chapel or prayer rooms, classrooms, library, dormitories for professors and students, dining



Fig. 12.1 Inauguration ceremony in the Cathedral of Basle, Switzerland, 1460. Bishop Johann von Venningen appoints provost Georg von Andlau (front left) as the first rector of the University of Basle. However, he gives the papal founding bull to the mayor of Basle. This anonymous drawing shows the institutional involvement of power at different levels: local (mayor), regional (bishop as sovereign of the canton), and international (pope). Very specific indeed was the fact that this papal bull was signed by an antipope whose reign was brief and recognized by only a few states, including the Swiss Confederation.

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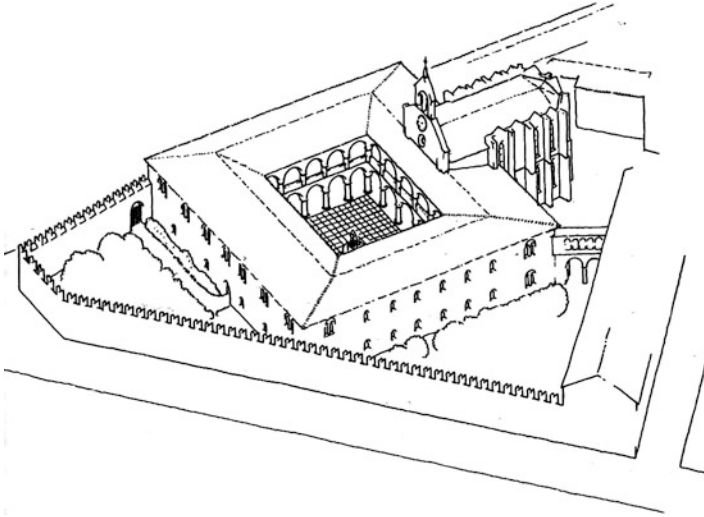


Fig. 12.2 Spanish College, Bologna, Italy.

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hall, kitchen, and ancillary rooms. Furniture and equipment were poor (Bott, 2015, p. 26; see also Schwinges, 1992).

The first collegium following a new concept was the Spanish College in Bologna (1365–1367), which became the future model for European collegiate buildings (see Capitani, 1987; Teodorovici, 2015a). The four wings of the school complex facing the inner courtyard were clearly arranged in a functional manner: western wing with classes, assembly room, and dining hall; east wing with chapel, offices, and rectorate (Fig. 12.2). The central cloister courtyard demonstrates the introverted community living and working like monks. In many cases students had to live in rented rooms in citizens' houses or in hostels outside the collegiums. For them, university life and urban life were tightly interwoven.

In the late Middle Ages and the early modern period, university colleges could permeate whole quarters, as in Paris (Latin Quarter), or the whole townscape in smaller settlements (such as Oxford and Cambridge). They could even constitute the city crown (*Stadtkrone*), as in the Portuguese city of Coimbra (Erl & Teodorovici, 2015; Rodrigues, de Almeida, & de Albuquerque, 1990).

Medieval Paris

In the Middle Ages, Paris became one of Europe's leading centers of higher education and academic discourse (Teodorovici, 2015b; Tuilier, 1994). As at many early universities, teaching started there in small private schools, extending room by room, house by house, taking place in the houses of private citizens and in

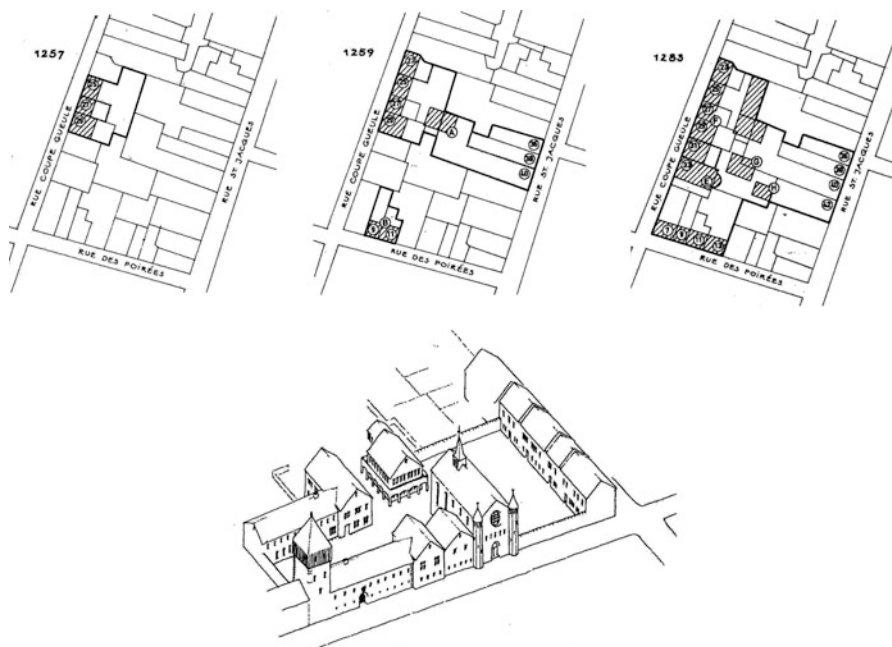


Fig. 12.3 Growth of the Sorbonne, Paris, France.

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former convents. A network of schools and reputed teachers grew steadily, attracting more and more scholars and students. When the University of Paris finally received approval by Pope Gregory IX in 1231 and was provided with funds and privileges, the southern bank of the Seine river experienced the rise of a rich scene of Latin schools and colleges populated by a host of scholars. The area still goes by the name it acquired at that time—the Quartier Latin (Fig. 12.4).

In 1257 Robert de Sorbonne (1201–1274), a theologian and one of the French king's intimate advisors, founded a college to host the faculty of theology (Fig. 12.3). It was named after him, the Sorbonne. It came to be the university's most illustrious department, with the name becoming synonymous with the University of Paris itself. Step by step, the building complex of this institution expanded, forming an inner courtyard. Because of its enormous success, small two-story medieval buildings gradually gave way to larger and higher buildings. A Baroque church replaced the old chapel, and a block of surrounding university buildings shaped an interior courtyard as enclosure. The church, however, was designed as a hybrid building with two main façades, one facing the urban public space, today Place de la Sorbonne; the second, perpendicular to the first, facing the courtyard. To me, it is an expression of the polyvalent character of universities in Europe, with their intense internal academic life and rituals belonging to the international world of science yet simultaneously integrated into public spatial urban patterns.

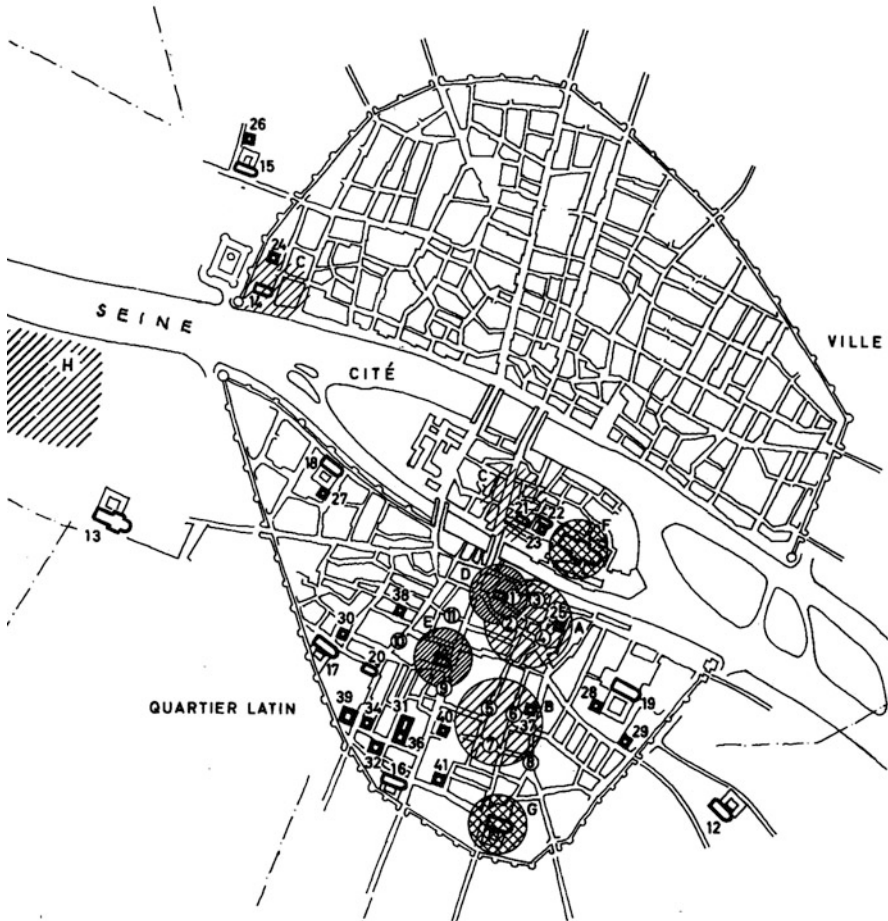


Fig. 12.4 Quartier Latin, Paris, 1200–1300.

Source: Rückbrod (1977, image 8). Copyright by K. Rückbrod. Reprinted with permission.

Medieval Oxford and Cambridge

As in Paris, teaching at the early English universities Oxford and Cambridge started in rented rooms for about a decade for lack of college buildings (Teodorovici, 2015c). The first Oxford College, Merton College (1264), was an ensemble of heterogeneous structures, positioned around an interior patio. The *New College* (1379) became the first English university complex, erected in a homogeneous style shortly after the Spanish College in Bologna (Fig. 12.5). The *New College*

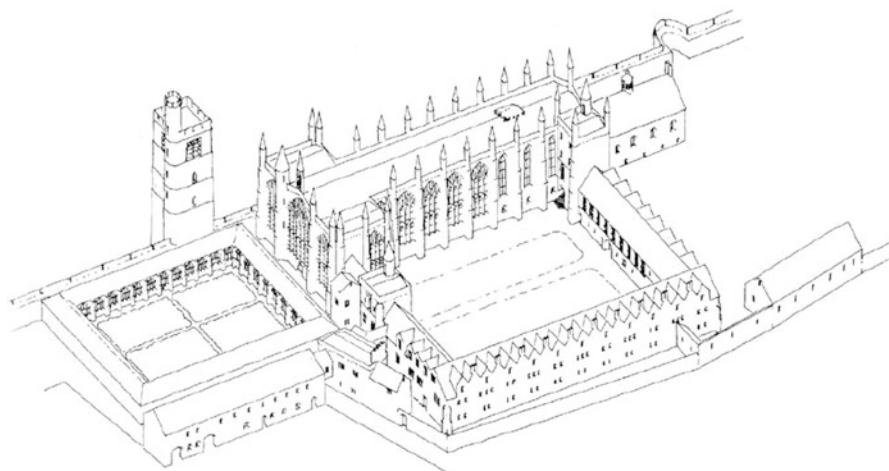


Fig. 12.5 New College, Oxford, England.

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had massive dimensions and a decisive impact on the further development of English college buildings. The rigid, precise gothic façades outside and inside the wide, green courtyards became a typical Anglo-Saxon university style—later complemented by classical architecture.

Compared to Bologna and Paris, places such as Oxford and Cambridge were small towns. The university's influence on their urban life and townscape was therefore much more powerful and enduring. The college buildings permeated the small town's corpus, establishing a very specific relationship between private houses and university institutions. Whereas university facilities in Paris and Bologna were positioned in the city center, far from the surrounding landscape, most colleges in the two English cities, particularly in Cambridge, had a direct spatial connection to the open landscape. They were not separated from it by a town wall (Fig. 12.6). The flood plain of the lovely Cam river became an integral spatial element of daily university life and of the scholar's rituals and customs. A series of colleges, and later the impressive library by Christopher Wren (1632–1722), formed a wonderful town façade facing the Cam green belt. This close interweaving of landscape and university facilities eventually created an early spatial model that ultimately became such a characteristic feature of American campus universities (Fig. 12.7).

Medieval Vienna

It is instructive to contrast this spatial setting with the medieval university quarter in a much larger central European university town such as of Vienna. The university buildings and dormitories were spread throughout that space (Fig. 12.8). Whereas



Fig. 12.7 Aerial view of Cambridge city center from the west. The picture shows the direct connection between the Cam river green belt and the famous colleges.

Source: © CMG Lee (2013), via Wikimedia Commons. Used under Attribution-ShareAlike 3.0 Unported (CC BY-SA 3.0). Retrieved from http://commons.wikimedia.org/wiki/file:cmglee_Cambridge_aerial.jpg.

the basic studies (*artes liberales*) and lecture rooms were located in the central buildings, the main courses for medicine and law were held in smaller buildings some blocks apart. Furthermore, university facilities such as the students' hospitals, a detention cell, and the library were dispersed in the quarter. One can easily imagine that scholars and normal citizens unavoidably mingled with each other in their everyday lives in this area of old Vienna. After all, university members and neighborhood craftsmen, traders, and servants alike had to use public streets to reach the venues of their daily work (Fig. 12.9).

Universities in the Early Modern Era

The Renaissance saw the rise of science and the evolution of the mechanical arts (*artes mechanicae*) from crafts into applied science. Medicine slowly transformed from theoretical narratives into an experimental science based mainly on the dissection of corpses, negating papal interdicts. The transition from text work to experimentation, from theory to empiricism, and from theorizing to practicing required new, specialized university facilities and, hence, new architectural elements. Last but not least, the invention of letterpress printing in the mid-fifteenth century multiplied



Fig. 12.8 Medieval university quarter of Vienna, Austria, prior to the Jesuits' transformation under Emperor Ferdinand II after 1623. "Original plan No. AUA 8549, by Richard Perger Friedmund Hueber, Vienna University archive. The plan shows the city quarter at the Stuben Gate, with house numbers in the area as listed in the 1566 court registry. The colleges, student dormitories, and accommodations for poor students were located there.

Source: Vienna University Archive, No. 109.3, <http://geschichte.univie.ac.at>. Reprinted with permission.

the number of scientific books in circulation, expanding library inventories tremendously. New major libraries became a new building typology for universities.

The reformation also brought about a drastic change of the international university system. Protestant dukes and kings no longer accepted the papal oversight of the universities. This resistance dissolved the unique integrated European system of higher education.

The Turn Toward Research Universities

After the Renaissance numerous universities lagged behind extramural institutions, for circles of scholars at the courts of high sovereigns (e.g., Florence, Milan, Rome, and Urbino), and later at Royal academies, provided scientists with superior research

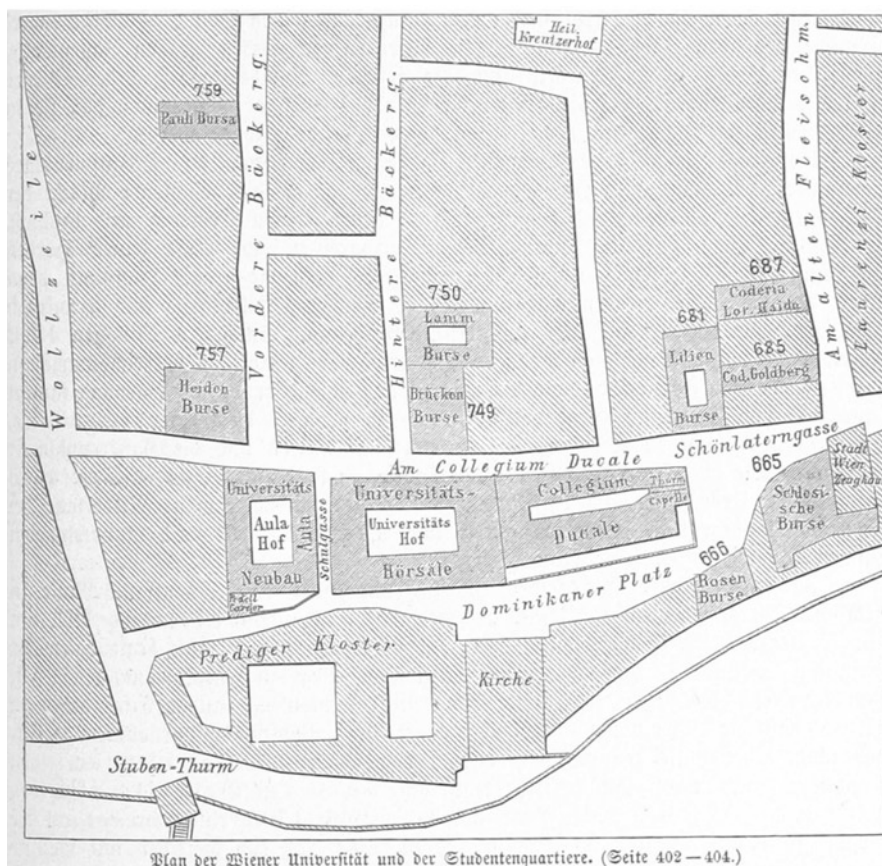


Fig. 12.9 Old University quarter in Vienna before the urban reconstruction by the Jesuits. Source: Bermann (1880, p. 425), via Wikimedia Commons. Copyright: Public domain.

facilities such as telescopes, more funding, and freedom from teaching.¹ Universities could hardly offer similar conditions, although they struggled to develop scientific research, improving the technical equipment as well as introducing experimental methods by creating chairs of natural science and new humanities. Establishing research universities was a long process. In Heidelberg, for example, lectures on physics had been based on Aristotele since 1387 as part of the fundamental *art*

¹Such centers included the Collège de France (1530), the Académie française (1653), the Académie royale des sciences (1666), the Royal Society London (1661), and, in Schweinfurt, an institution later named the Academia Leopoldina (1652). Many famous scientists such as Galileo Galilei (1564–1642) and Johannes Kepler (1571–1630) tried to work for sovereigns and leave the university.

studies. In 1556 a chair of physics was created, but it was not until 1752 that a chair of experimental and mathematical physics was established there.²

In 1609 Johannes Hartmann (1568–1631) received the first professorship for *chymiatry* (chemistry) at the University of Marburg. The new post was in the faculty of medicine. He founded Germany's first chemical university laboratory where students could carry out experiments. The Protestant University of Leiden in The Netherlands built the first astronomical observatory around 1623. The Bavarian university of Ingolstadt, led by the Jesuits, erected the first observatory at a German university in 1637. Thanks to the successes of great researchers in the natural sciences and humanities since the Renaissance, many universities started to extend the canon of subjects to history, geography, natural law, and experimental natural sciences during the Age of the Enlightenment. Lectures started to be given not only in Latin but in national languages, too, improving the accessibility and practicability of research results.³ The purpose of university education became more practically oriented and was intended to serve the needs of state and society. As a result, cameralism was introduced, the optimization of the absolutist state's public administration—a predecessor of economics.

Over the course of the seventeenth and eighteenth centuries, great scholars and researchers improved scientific theories, a broad spectrum of the humanities evolved, and applied sciences drew the close attention of famous scholars. Schools for higher technical education were founded, such as the Bergakademie in Freiberg (1765), a higher school for education in mining and metallurgy in Saxony, where the famous Alexander von Humboldt was educated.

The Integration of New Research Facilities: From Convent to Palace

The *teatro anatomico* at Padova (1594) was the first lecture hall where students seated in steeply raked rows could follow medical professors' demonstrations of their pathology work. This design can be considered the beginning of specialized architecture for research and teaching, an application of an archetypal representation and spectacle like that in classical theaters.

Another specific university facility was the botanical garden, which had its predecessors in herbal gardens. All botanical systematization began in such gardens, in which medicinal plants were organized in two-dimensional arrangements as a *tableau* according to similarity and their effects on diseases—one of the roots of systematic biology in the faculty of medicine. By this time anatomical theaters, botanical gardens, laboratories, and astronomical observatories were specialized

²On the history of the faculty of physics and astronomy, see www.physik.uni-heidelberg.de

³However, this shift also expedited the dissolution of the entire European scientific world into national science traditions.



Fig. 12.10 Archiginnasio. Bologna, Italy (1562). Painting by Contardo Tomaselli e Onofrio Zanolli, *La facciata del palazzo dell'Archiginnasio*, 1849 C.

Source: Bibliotheca Comunale dell'Archiginnasio (n.d.). Copyright: Public domain. Retrieved from <http://www.archiginnasio.it/facciata.htm>.

institutions for teaching and research, which clearly distinguished the equipment of early modern universities from medieval collegiate buildings. But these facilities were seldom seen from the outside. Although architectural style changed to Renaissance and later Baroque, the courtyard archetype for colleges remained dominant during the early modern era up to the eighteenth century. New Protestant universities founded in the sixteenth century, such as Marburg (the first one ever) and Leiden (the famous and oldest university in The Netherlands) used former convent buildings. Most of the details of the well-preserved university of Würzburg (1582–1591) clearly date from the Renaissance. Because of the courtyard type and the traditional steep rafter roof, however, it still looks like a medieval university.

Archiginnasio Bologna

A highly instructive example of the spatial relationship between the city and the university during the Renaissance is the Archiginnasio in Bologna, Italy (1562), erected by Antonio Morandi (1508–1568) directly in the city center close to the main church and near the central square, Piazza Maggiore (Fig. 12.10). All ground-floor rooms open completely onto the public urban space. Remarkably, the ground floor houses primarily commercial units, such as shops and trattorias. Only the main

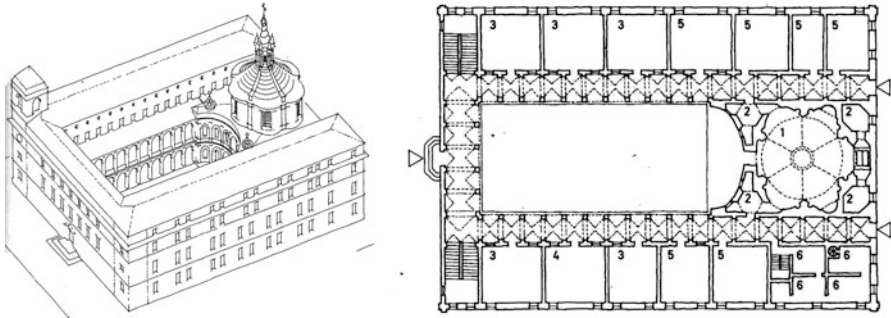


Fig. 12.11 Isometry and floor plan of La Sapienza, Rome.

Source: Rückbrod (1977, images 25, 24). Copyright by K. Rückbrod. Reprinted with permission.

entrance leading to the inner courtyard points to the university. A chapel and some administrative rooms open onto this courtyard. Via two separate staircases one reaches either the rooms of the *Legisti* (jurists) on the right, students of canon and civil law in the main course, or the rooms of the *Artisti*, the students of the basic general studies. The spatial structure thus expresses the institution's hybrid character: (a) the famous university's successful integration into the center of the rich city of Bologna, closely related to commercial urban life; (b) the inwardness of academic life with its regulations and rituals as reflected by the courtyard and the collegium's internal organization.

La Sapienza

The university La Sapienza in Rome, Italy, designed by Giacomo della Porta (1532–1602) in 1585 and completed by Francesco Borromini (1599–1667) a few decades later, shows an interesting evolutionary intermediate step (Fig. 12.11). The architecture is late Renaissance, whereas Borromini's church is Baroque. Della Porta's design follows the traditional medieval patio-type of university building but shows a kind of opening to one side, for the courtyard has only a narrow gallery toward the Corso del Rinascimento. This gallery gives a spatial direction to the west—and vice versa a processional space leading to the church, weakening the strict interior orientation of the courtyard, although it remains an enclosure. The Sapienza building thereby foreshadows the triple-wing concept.

Altdorf University

Altdorf University, founded in 1571 by the Protestant free imperial city of Nuremberg in Bavaria, Germany, is unpretentious architecture with Renaissance elements (Fig. 12.12). Given the buildings and roof proportions, however, the overall impression was still medieval. Yet Altdorf was already a triple-wing system, no longer a

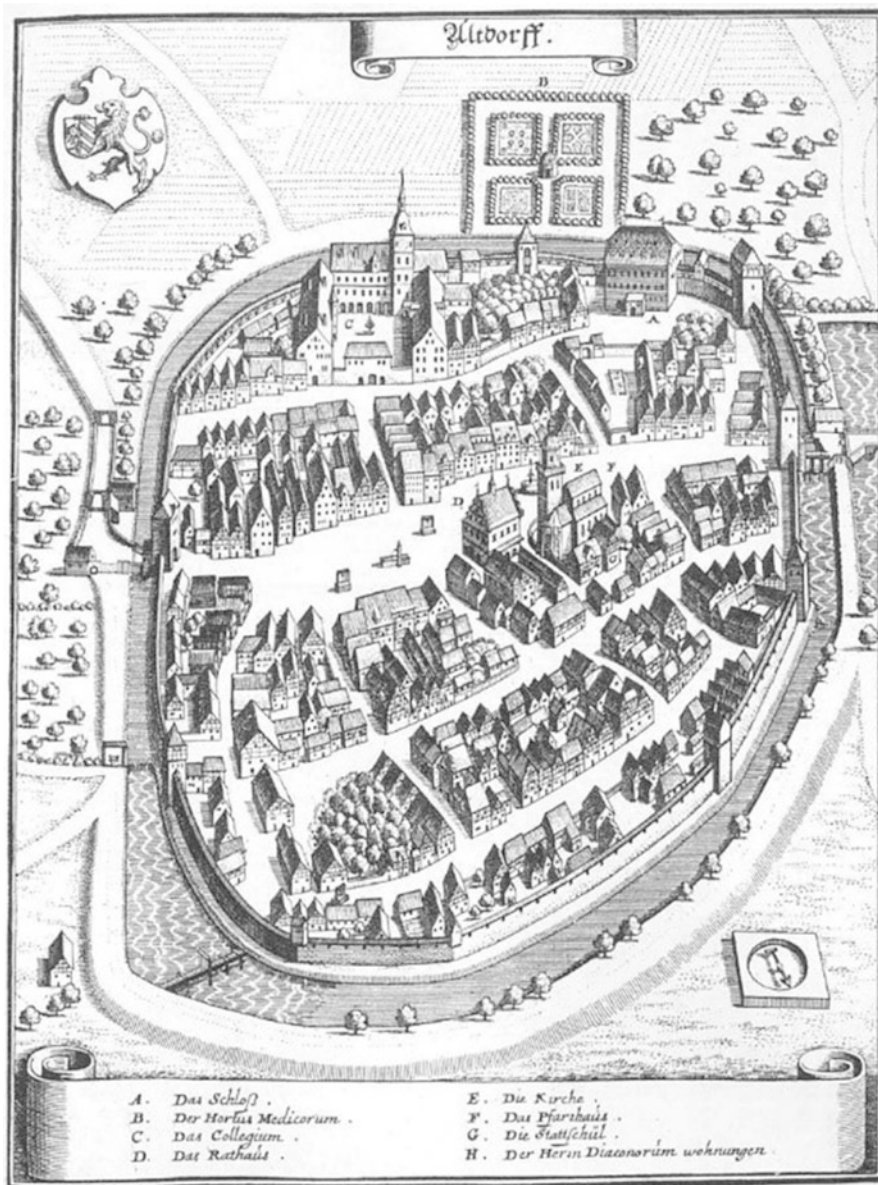
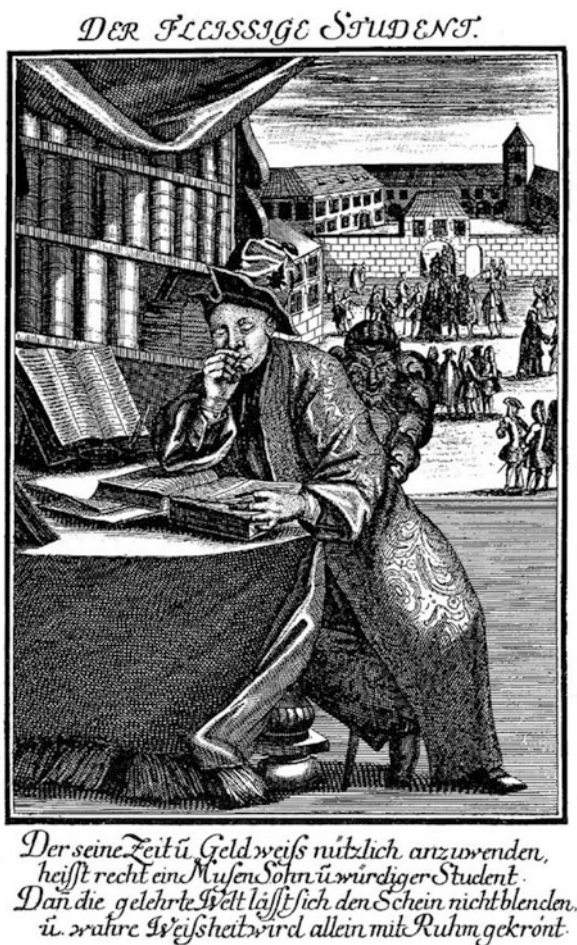


Fig. 12.12 Altdorf with university center (C), (at the southern edge of the town), the botanical garden outside the town wall (B). Engraving by Merian, 1648, *Topographia Franconiae*. (This publication is one of the 16 volumes of the *Topographia Germaniae* edited by Mathias Merian). Source: Merian (1648), via Wikipedia. Copyright: Public domain. Retrieved from https://de.wikipedia.org/wiki/Altdorf_bei_N%C3%BCrnberg#/media/File:De_Merian_Frankoniae_027.jpg.

Fig. 12.13 *The Diligent Student*, Johann Georg Puschner, 1725. Fourteen 14 copper engravings by Johann Georg Puschner (1680–1749). Source: Via Wikipedia. Copyright: Public domain. Retrieved from https://de.wikipedia.org/wiki/Johann_Georg_Puschner#/media/File:Der_Fleissige_Student.jpg.



patio enclosed by four wings. The front courtyard was separated from the public space by a wall and a gatehouse but was much more open to the city than the introverted collegiate buildings of the Middle Ages had been. A later etching, *The Diligent Student* (1725), depicts a notable relation between town and university court, a view onto the University of Altdorf (Fig. 12.13), with university members streaming out of the open gate and mixing in public town life.

This Lutheran university installed a botanical garden in 1626, an anatomical theater in 1650 (Fig. 12.14), an observatory in 1657, and a superbly equipped *laboratorium chymicum* in 1682 (Fig. 12.15). As a modern research university at that time, it provided all the facilities necessary for empirical science.

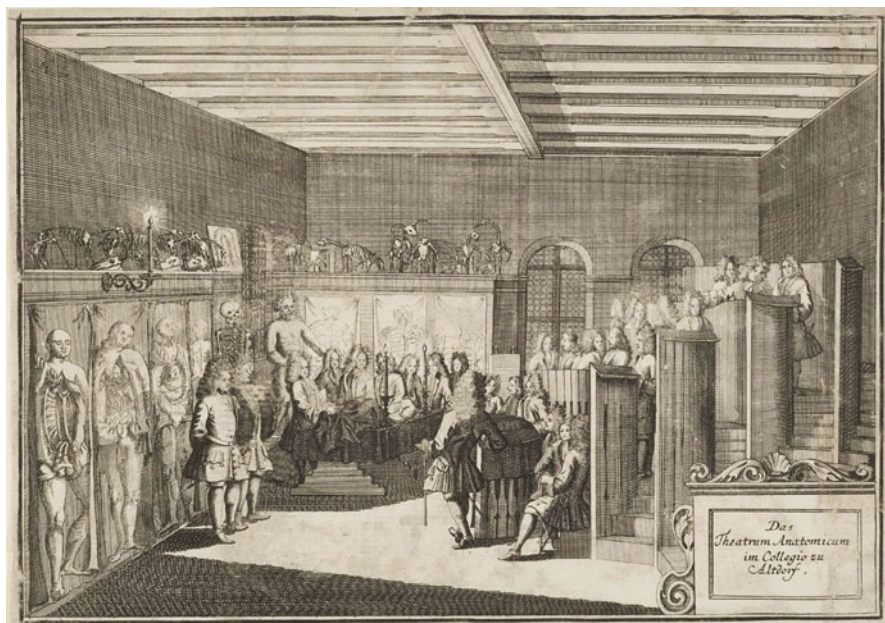


Fig. 12.14 Johann Georg Puschner. *Theatrum Anatomicum* in the Collegio of Altdorf, side view during a lecture.

Source: Braunschweig, Herzog-Anton-Ulrich-Museum, Inv.-Nr. JGPuschner AB 3.1. Copyright: Public domain.

Uppsala University

Another, even more stunning example of modern equipment can be found at the University of Uppsala. This oldest Scandinavian university (1477) commissioned a new building in 1620, funded by King Gustav Adolph (1594–1632), hence its name, *Gustavianum* (Figs. 12.16 and 12.17). It is an modest linear edifice, but in 1662 it was spectacularly “crowned” by the famous physician, Professor Olof Rudbeck (1630–1702). He had a cupola enclosing an anatomic theater constructed on the rooftop center, proudly creating a landmark of modern science,⁴ visible far and wide.

Vienna University

An interesting roof superstructure is found at the Vienna University. Between 1623 and 1655, the medieval university and all student houses were demolished in order to build a Jesuit college on this site, an act of Counter-Reformation by Emperor Ferdinand II of Habsburg (1578–1637), who gave the Jesuits the supervision over

⁴<http://www.uu.se/en/about-uu/history>.

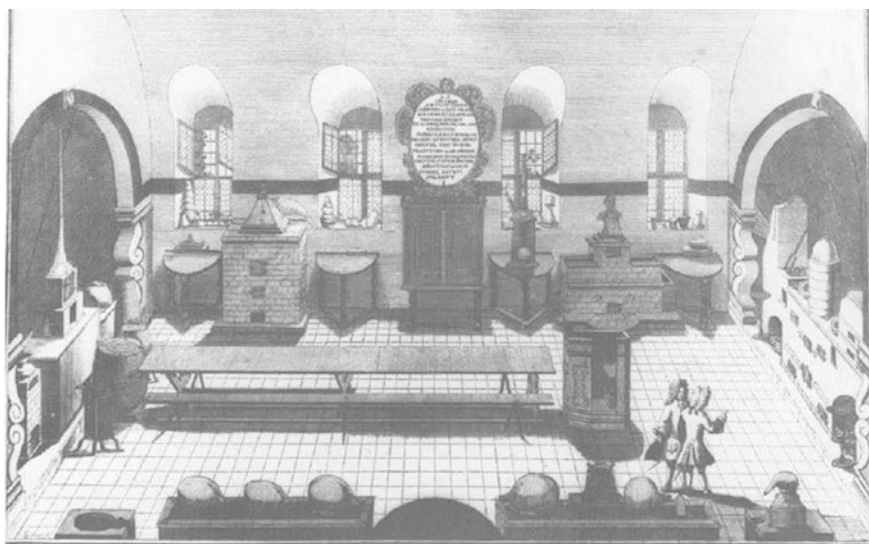


Fig. 12.15 Laboratorium Chymicum [Chemical laboratory, seventeenth century]. University of Altdorf (Bavaria, Germany). Engraving by Johann Georg Puschner.
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the faculties of theology and philosophy. This new university ensemble was built in the Baroque style and comprised a church, lecture halls, a new library, an observatory, a botanical garden inside the patio, a refectory, a Latin school, dormitories, a hall for theater performances and festivals, and even stables—a complete building program. Set atop the new main building, the observatory was indeed an outstanding construction.

No fewer than 17 privately owned houses of citizens had to be bought and destroyed, along with most of the old mediaeval university buildings such dormitories, the library, and the detention cell. All in all, it was a colossal project of urban reconstruction inside the city walls of the Catholic imperial city of Vienna while the Thirty Years' War was raging in the central and northern parts of the Holy Roman Empire of the German Nation.⁵ Under the rule of Maria Theresa (1717–1780), the university supervision was withdrawn from the Jesuits and transferred to state authorities. New buildings were added, including an auditorium and an anatomical theater (Fig. 12.18). The whole complex illustrates the concept of a university integrated into a major city during the early modern period and the Age of Enlight-

⁵<http://geschichte.univie.ac.at/artikel/das-akademische-kolleg>.



Fig. 12.16 *Gustavianum*, built in Uppsala in the 1620s and once the main representative building of *Uppsala University*, now the *Museum Gustavianum*. The anatomical theater inside the cupola was built by Olof Rudbeck the Elder.

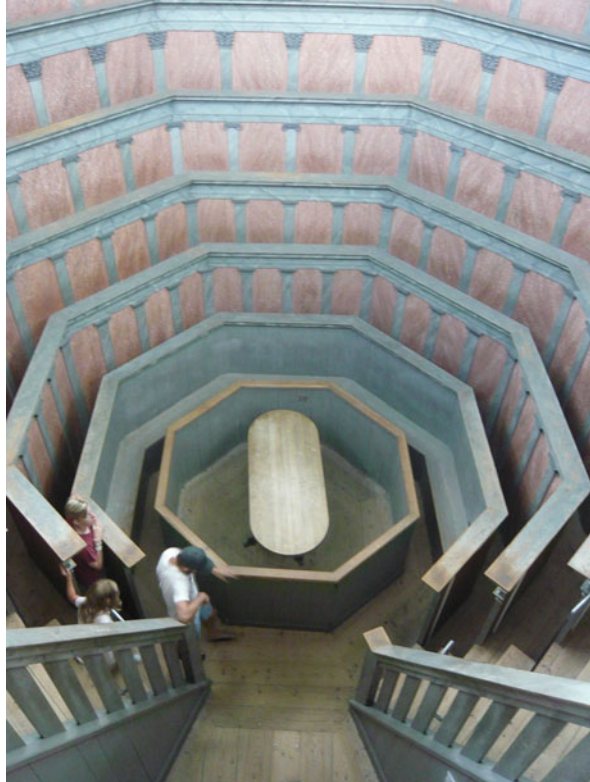
Source: Photo by the author.

enment as well as the state's growing focus on science in the age of enlightened absolutism (Fig. 12.19).

Coimbra University (Portugal)

A truly fascinating university ensemble with Renaissance and Baroque buildings is the old University of Coimbra (founded in 1290). It was reconstructed and expanded with wonderful buildings between the seventeenth and eighteenth century. Set on a hilltop, the whole university crowns the city like an Acropolis (Fig. 12.20) and is organized around several courtyards positioned on platforms at different levels connected by stairs, ramps, and arched gates (Fig. 12.21). The Joanina Library (1728), one of the most fascinating libraries of the early modern age, is positioned at the edge of the main courtyard. Users enter the library from there, coming into the main rooms on the third floor, with archives and other facilities being located down the hill.

Fig. 12.17 Anatomical Theater Gustavianum, 1662.
Source: Photo by the author.



Trinity College in Cambridge, England

Libraries became a particularly interesting construction task requiring wide-span structures, heavy load, and ample light. Very impressive indeed is the library of the Trinity College in Cambridge, designed by Sir Christopher Wren and completed in 1695 (Fig. 12.22). It is a rationally designed building with a strictly serial façade and a spacious, bright interior, an early example of classicism. The totally geometric design shows the structural rationalism of the intellectual scientist Wren, who became an architect as an autodidact

Triple-wing university buildings as new paradigm

Although courtyard designs were still common for university buildings, albeit on a larger scale than medieval patios, the eighteenth century saw the final breakthrough of the triple-wing building type as paradigm of university buildings (Fig. 12.24). Universities had developed from an introverted convent to a palace type, opening a forecourt toward the public space. A clear example of this new type is the

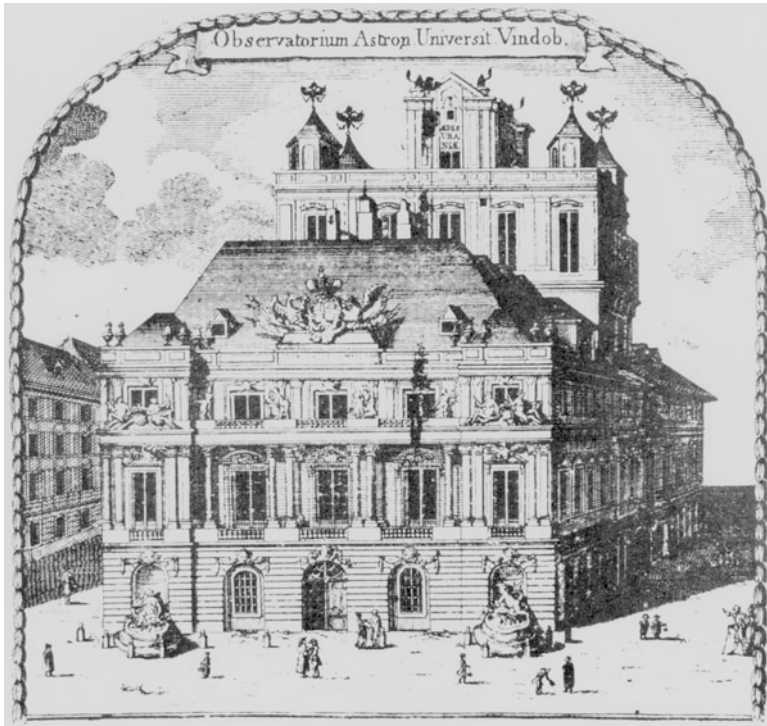


Fig. 12.18 The new auditorium of Vienna University, 1700.

Source: Image from the Vienna University Archive, No. 106.I.3287. Reprinted with permission.

Seminarium Carolinum (built 1751–1752) at Heidelberg University (Hoffmann, 1985) (Fig. 12.23). At the same time, overall university life had changed from a monastic lifestyle to a much more luxurious leadership education of young noblemen (Figs. 12.25 and 12.26).

An Ideal Plan for a University

In 1750 the architect and illustrator Giovanni Battista Piranesi (1720–1778) published a book with engravings, including a design for an ideal university. It is a geometric and axially symmetric figure generating extremely complex spatial sequences with substantial numbers of rooms, halls and stairs, eight bridges, and many small patios. The entire system's center is a circle island with seminar rooms and dormitories, separated by a channel from a surrounding second circle containing halls and central university facilities. The outer circle merges in an encompassing square flanked by two halls, a theater, and an arena, like a sport hall. A longitudinal

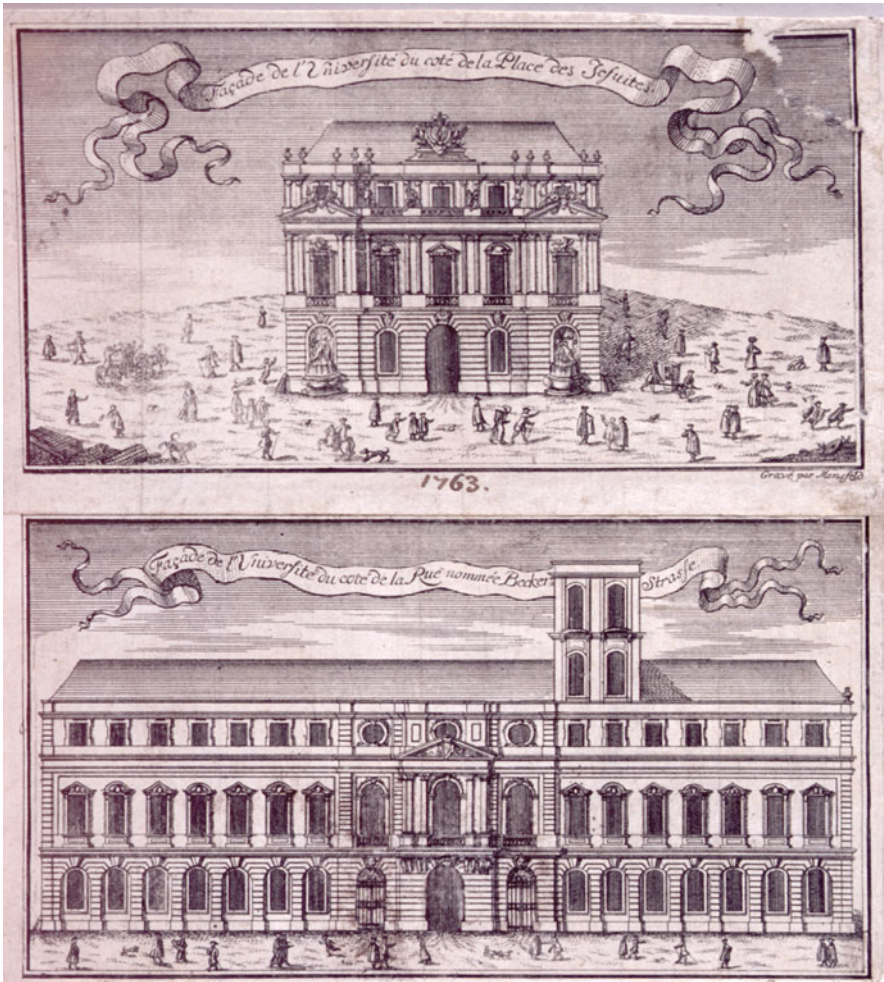


Fig. 12.19 The new auditorium of Vienna University with an observatory on the roof, 1700.
Source: Image from the Vienna University Archive, No. 106.I.3373. Reprinted with permission.

axis crosses these circles from the main entrance with the rector's seat to the church on the opposite side of the complex (Fig. 12.27).

Piranesi thus combined religion, science, art, and aspects of chivalric fitness. All these matters were part of a whole educational system, and riding, fencing, vaulting, and dancing were components of aristocratic physical training. This exuberant design opens a wide field of interpretation. It shows a complex total geometric system. It is a late example of 250-year tradition of geometric ideal urban design figures extending from Filaretes Sforzinda (1464) to the design for Karlsruhe (1715) (Bott, 2013).



Fig. 12.20 Coimbra, Portugal, with university and library (top right).

Source: © Kondephy (2013), via Wikipedia. Used under Creative Commons Attribution-ShareAlike 3.0 Unported (CC BY-SA 3.0). Retrieved from https://commons.wikimedia.org/wiki/File:Coimbra_from_River.jpg.



Fig. 12.21 University of Coimbra, central courtyard with Renaissance and Baroque buildings.

Source: © Andreas Trepte (2007), via Wikipedia. Used under Creative Commons Attribution-ShareAlike 2.5 Generic (CC BY-SA 2.5). Retrieved from <https://de.wikipedia.org/wiki/Coimbra#/media/File:University-of-Coimbra.jpg>.

In many cultures, including European antiquity, the circle represents heaven or the universe, whereas the square symbolizes earth. Niccolò Tartaglia (1499–1557) used the circle to incorporate the realm of science. A frontispiece of his treatise *La Nova Scienza* (1537) showed two circles. The first one, depicting the entrance gate controlled by Euclid, encompasses the *artes liberales* and applied sciences. From there, passing the gate controlled by Plato and Socrates, the procession continues to the second circle, encompassing philosophy. That is, to understand Creation one must learn geometry and mathematics, then study the general fundamentals of science (*artes liberales*) to apply this knowledge and deepen it through professional



Fig. 12.22 Cambridge Trinity College, 1676–1695, Christopher Wren (1632–1722).
Source: Photo by the author.

studies. The person who is successful and even goes on to study the ancient philosophers may become wise and reach the realm of philosophy. Piranesi seems to follow this tradition, but his procession through the first circle of study leads to the church cupola circle at the end of the central axis. His university still stands under the supervision of the Roman Church, using the Bible to explain the Creation, whereas north of Rome the Enlightenment had dawned. At that time even the Catholic Habsburg emperors revoked the Jesuits' supervision of the University of Vienna.

Early European University Export

Latin America

Spain and Portugal's establishment of expansive colonial empires in southern and central America, blessed and regulated by the papal bull *Inter caetera divinae* by Pope Alexander VI. in 1493, brought with it, among other things, the spread of Catholic, especially Jesuit, educational institutions in that part of the New World. In 1538 the University of Santo Domingo was founded, privileged by Pope Paul III.



Fig. 12.23 Seminarium Carolinum (originally college for the Jesuits), Heidelberg University, 1751. Source: Thesaurus Palatinus. Landesarchiv Baden-Württemberg, Abt. Generallandesarchiv Karlsruhe 498-1 Nr. 2826 Bild 1. Copyright: Public domain.

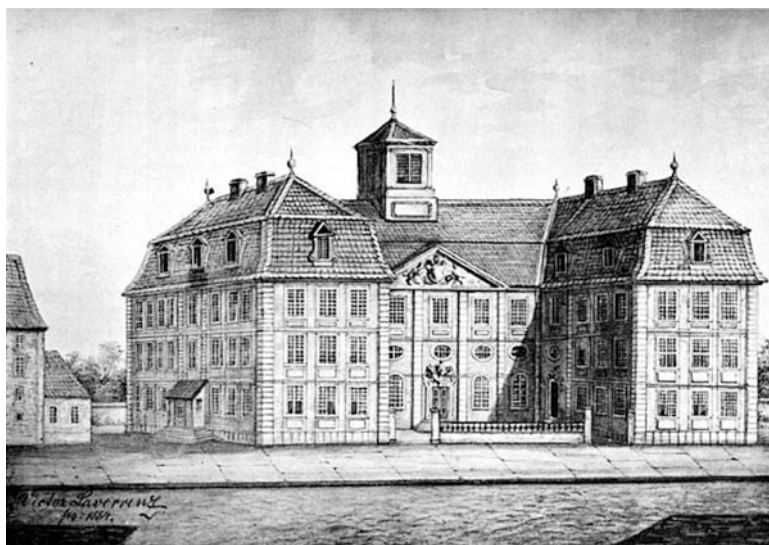


Fig. 12.24 The University of Fulda, Germany (1734), a triple-wing type with a forecourt, 1887. Source: Laverrenz (1887, p. 124), via Wikipedia. Copyright: Public domain. Retrieved from https://de.wikipedia.org/wiki/Datei:Adolphiana_Universit%C3%A4t_Fulda_1887.jpg.

Fig. 12.25 University lectures in the late the fourteenth century.
Source: Grandes Chronique de France. Castres, bibliothèque municipale
Cours de philosophie à Paris
Grandes chroniques de France. Copyright: Public domain. Retrieved from https://commons.wikimedia.org/wiki/File:Philo_mediev.jpg.



Fig. 12.26 The scuffling student. Johann Georg Puschner, 1725.
Source: Via Wikipedia.
Copyright: Public domain.
Retrieved from https://de.wikipedia.org/wiki/Johann_Georg_Puschner#/media/File:Der_Rauffende_Student.



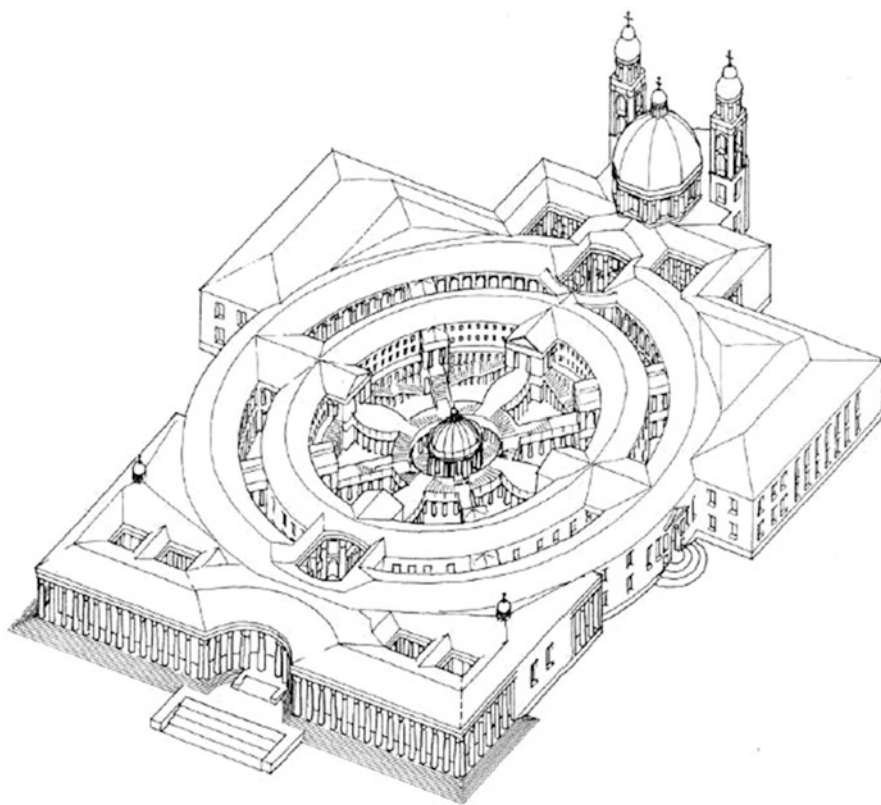


Fig. 12.27 Ideal plan of a university by Giovanni Battista Piranesi, 1750. Reconstruction by K. Rückbrod.

Source: Rückbrod (1977, image 33). Copyright by K. Rückbrod. Reprinted with permission.

The University of Lima followed in 1551, the oldest university on the South American mainland.

In 1553 the representative of the Spanish Crown, Viceroy of New Spain Luis de Velasco (1539–1617), opened the first University of Mexico, on which the Spanish king conferred the same privileges as Salamanca, its mother university. The first building was erected in the historic center of Mexico City, near by the main square, where the principal cathedral and the representative offices of the colonial empire were located. Close to this oldest building a complex of monasteries, colonial palaces, and colleges was built from 1595 onward (Colegio Máximo de San Pedro y San Pablo, cuatro seminarios: San Pedro y San Pablo, San Bernardo, San Miguel y San Gregori). Unfortunately, most of them were destroyed in the twentieth century.

Approval by the pope and institutional organization were not all that was taken over from Europe when Latin American universities were founded. Even the introverted collegiate type of building surrounding a patio stems from the European tradition that the Iberian invaders brought to the Latin American colonies.

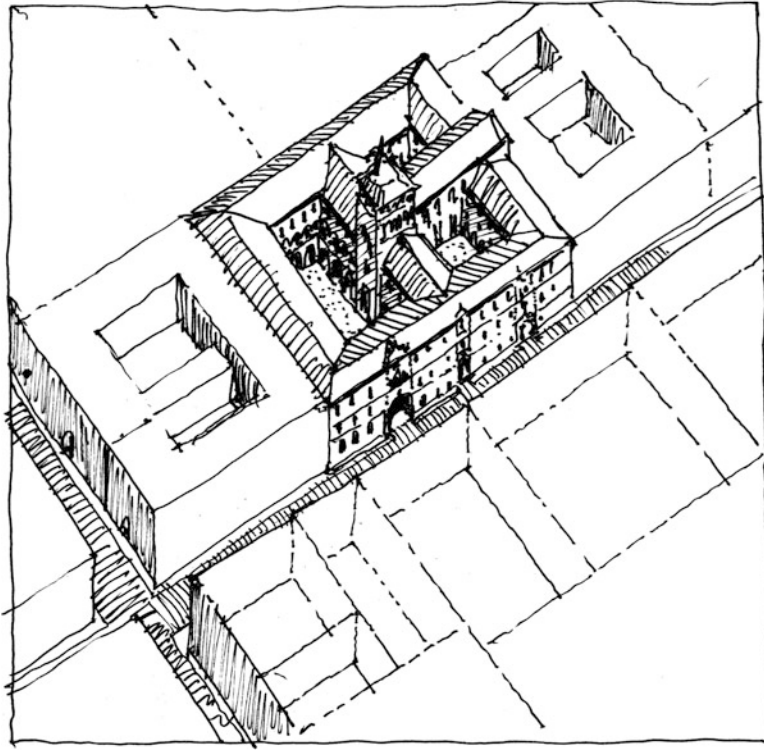


Fig. 12.28 Principles of South American university types, interpretative sketch by Helmut Bott.
Source: Design by author.

Compared to central and western European universities, the southern American universities were huge buildings that filled entire urban blocks (Fig. 12.28). But they were of southern European origin, for they had many courtyards of different sizes that seemed to be carved out of the solid, homogeneous mass of buildings.

Universities in colonial towns used the medieval European architectural concepts for closed courtyard buildings of colleges, sometimes for series of different courtyards. However, Spanish colonial town planning followed Renaissance designs with geometrical rectangular street patterns and rigid regulations of eave heights and street alignment. In many cases college buildings have thus been totally integrated into the urban fabric of the block system.

North America

About one century later, the first Protestant university was founded on the east coast, in the Boston region of New England. Harvard, in Cambridge, Massachusetts,



Fig. 12.29 Collegium Harvardianum Cantabrigiae in Nova Anglia [A Conjectural View of Harvard College in Cambridge, New England, 1668]. Map (1935) by Harold R. Shurtleff. HUV 2038, olvwork374306. Harvard University Archives. Reprinted with permission.

started in 1636 as a school of theology. From the beginning, private donations and private initiative were an important element of its organization.

The first college buildings of Harvard University were neither directly connected to a town nor integrated into a dense, urban structure of a city center, nor did they follow the traditional European courtyard type. Harvard's nucleus was a group of detached Georgian timber buildings surrounding a former meadow—called *the yard*. The ensemble looked less like a European university than it did a rural village or a manor with different annexes, auxiliary buildings, and the houses of farm workers (Fig. 12.29). A new university type had been born. In the following centuries up to the early 1900s, brick façades partly covered with ivy shaped the characteristic appearance of today's most famous university in the world. This edifice has become an image of university life acknowledged around the globe, with innumerable

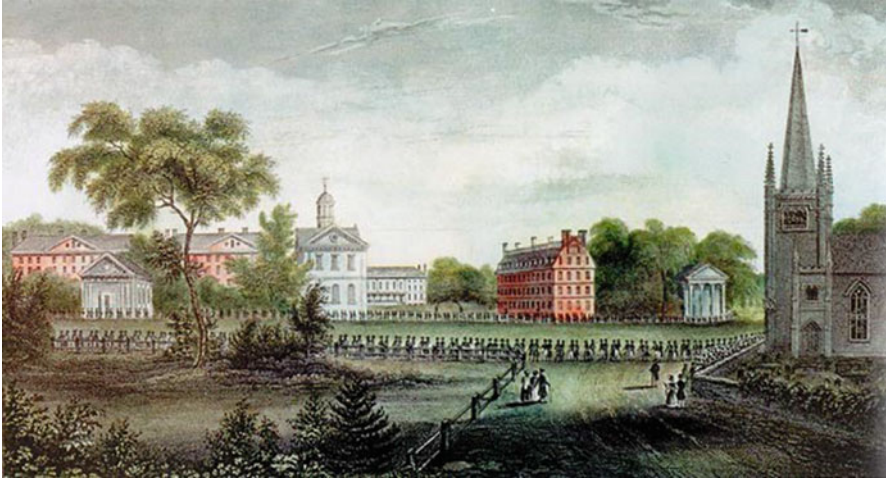


Fig. 12.30 Harvard University. Eliza Susan Quincy's drawing of the September 1836 procession of Harvard alumni leaving the First Parish Meeting House and walking to the Pavilion. Eliza Susan Quincy was the daughter of Josiah Quincy, President of Harvard University (1829–1845). Source: Quincy (1840/1977), via Wikipedia. Copyright: Public domain {{PD-Art}}. Retrieved from https://en.wikipedia.org/wiki/Harvard_College_v._Amory.

movies depicting a university campus with detached buildings in open parks where students sit or walk by.

Even later, when the university positioned outside of the town lost its rural character and became encircled by the expansion of Cambridge, mostly by detached buildings with suburban appearance, Harvard preserved its personality as a park university and proudly continued calling its center the yard (Fig. 12.30).

Toward a Modern Research University

Universities in the Nineteenth Century

Political, social, and economic changes in the nineteenth century triggered a radical reform of the university system (see Bott, 2015, p. 100; Rüegg, 2004). The original system of only four faculties (arts, theology, medicine, and law) was further divided so that new faculties and subjects were created. In revolutionary France the specialized civil colleges were founded from which the *Grandes écoles* emerged. One of them, the *École Polytechnique*, became the model of the new type of technical colleges.

The radical, liberal reform of the university, which the Prussian diplomat and scholar Wilhelm von Humboldt (1767–1835) launched in 1810 by founding the University of Berlin, fostered the development of humanities and natural sciences in

the course of the nineteenth century in Germany and beyond. Through the interconnection and freedom of research and teaching and through self-administration, the Berlin University became one of the prototypes of modern research universities.

The natural sciences, for instance, had evolved from the natural scientific *quadrivium* of the liberal arts as well as from medicine. But it was not until the nineteenth century that independent faculties of natural sciences were established. The humanities developed from the *trivium*, whereas the social sciences grew out of the law faculty, which already included cameralism. This prodigious diversification led to new, more complex structures in the vast majority of universities, to a remarkable proliferation of professorships, and to a large building program with specializations in the lecture hall and laboratory equipment.

The Rise of Technical Universities

State schools for public institutions and commercial enterprises, such as academies for medical officers and engineers in the military service, mining, and metallurgy, had existed since the eighteenth century. Those institutes were mostly founded in residential cities, for the trainees were needed in the army and bureaucracy of the state apparatus. In the nineteenth century, the public sector expanded enormously, especially in central Europe, where, quite unlike England, the state promoted the industrial revolution. The need for qualified civil servants and engineers soared in the technical sectors of construction and military, induced by the rapid development of technology and its use in factory production.

The number and quality of schools for higher technical education therefore had to increase. Polytechnic schools often originated from predecessors, as was the case with the first German technical university in Karlsruhe, founded by the engineer Johann Gottfried Tulla (1770–1828) and the architect Friedrich Weinbrenner (1766–1826). Tulla had become acquainted with the *École Polytechnique* in Paris. Studies there began in the university tradition with basic scientific and theoretical training (e.g., mathematics, geometry, technical mechanics), with engineering as the specific professional orientation coming later. This curriculum became the principle of education in engineering throughout much of Europe—until the Bologna reform inverted it. In 1865 the Karlsruhe Polytechnic School received a new organizing statute with a full university governance structure, but it was not until 1885 that the polytechnic could be named *Technische Hochschule* (Institute of Technology). Almost all states of the German Confederation followed suit with their polytechnic schools, resulting in a highly dense and regionally spread network of technical colleges. This change eventually proved advantageous for promoting further development of technology and industry in Germany.

Whereas the Swiss Federal Institute of Technology (ETH) in Zurich was founded (1854) as a university with technology, humanities, and social science, the dispute between the classical universities and the new polytechnic schools concerning the academic status and subjects, continued in Germany throughout the second half of

the nineteenth century. The technical colleges reinforced natural sciences and the mathematical-theoretical base of their teaching and research, finally claiming the right to award doctorates. In 1899 this right was granted upon intervention of Emperor William II.

State, City, and University in the Nineteenth Century

As the number of chairs, staff, students, and research facilities grew astoundingly in the 1800s, so did the dimension of university buildings, especially compared to that in the centuries before. Laboratory buildings and technical facilities became more and more important. In some instances special architecture departments for university planning were founded in the second half of the century. In central Europe the new university buildings were set up at central locations within the city, for they were seen as important institutions of urban and national culture. They marked and sometimes even shaped whole urban districts.

Humboldt University, Berlin

Humboldt University was founded in 1810 in an empty palace of a deceased Prussian prince (Gandert, 1985). It was first named the *Friedrich-Wilhelms-Universität* after the Prussian king who founded it, and after World War II it was renamed as Humboldt University by the government of the Germany Democratic Republic. Neither the urban location nor the architecture of the triple-wing building contradicted contemporary ideas of universities. The forecourt opens toward the monumental public space of the grand boulevard *Unter den Linden*. The university's central position within the urban fabric, close to the Prussian Royal Palace and midst other buildings of highest importance, proves the high reputation the universities had gained by that time. The urban ensemble composed of the university, the opera house (*Staatsoper*), the royal library, St. Hedwig's cathedral, and the Academy of Sciences, formed an impressive cultural forum (Fig. 12.31). The university courtyard and opera square shaped a major spatial accent on the main urban axis leading from the Brandenburg Gate to the royal palace. The building was extended to the rear into the former palace garden. More and more university functions were allocated to the neighborhood, creating a unique urban university district that still exists (Figs. 12.32 and 12.33).

Ludwig Maximilian University, Munich

The situation in Munich is quite comparable with that in Berlin. In 1840 Friedrich von Gärtner (1791–1847) designed the new building for the Ludwig Maximilian University at the main axis *Ludwigstrasse* (Hederer, 1942, 1964). This monumental



Fig. 12.31 Ground plan of Berlin and surroundings. Drawn by Böhm, Lieut. a. D.; engraved by Carl Jätting, Berlin 1848.
Source: Via Wikipedia. Copyright: Public domain. Retrieved from https://commons.wikimedia.org/wiki/File:Boehm_Grundriss_von_Berlin_mit_n%C3%A4chster_Umgebung_1849.jpg.

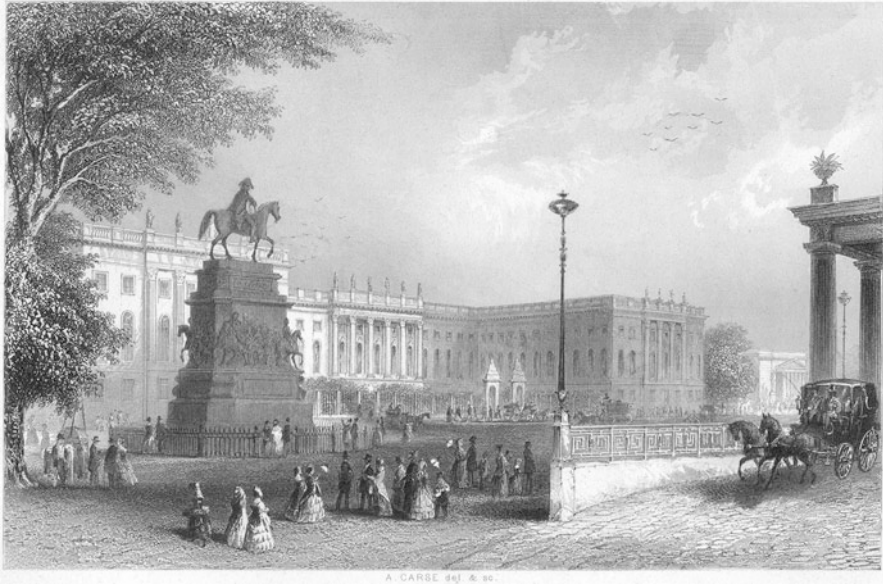


Fig. 12.32 Friedrich Wilhelm University, with equestrian statue of Frederick the Great (Carse, ca. 1850). Picture by A. Carse (1770–1843), steel engraving by A. H. Payne.

Copyright: Public domain, via Wikimedia Commons. Retrieved from https://commons.wikimedia.org/wiki/File:Berlin_Universitaet_um_1850.jpg.

boulevard leads from the historical core of Munich and the Royal Bavarian palace to the northern gate, a triumphal arch. At the last northern segment of the grand boulevard, the street opens toward the university square, formed by the university on the western edge and other educational buildings on the eastern edge (Fig. 12.34).

The building is a triple-wing-palace type, but its open space in front is no longer a fenced forecourt any more but rather a public urban square. The access to the imposing entrance hall is directly from the square, without steps or ramps. The public space flows freely into the entrance lounge. Much as in Berlin, the university is an important spatial element of a magnificent, central urban space, situated right in the heart of the political center of a German royal residence. Soon the main building was expanded and, together with new buildings in the neighborhood, formed an urban university quarter (Fig. 12.35).

University of Vienna

In 1884, a new main university edifice, designed by Heinrich Ferstel (1828–1883), was erected on Vienna's *Ringstraße*, where the most important buildings of the Habsburg imperial dynasty and of the aristocratic-bourgeois urban culture were placed: the new imperial residence with the opposite pole of the parliament, the opera house, the *Burgtheater* (imperial theater), museums, the town hall, and last but



Fig. 12.33 Berlin, aerial view Opernplatz, Unter den Linden. January 1, 1935.

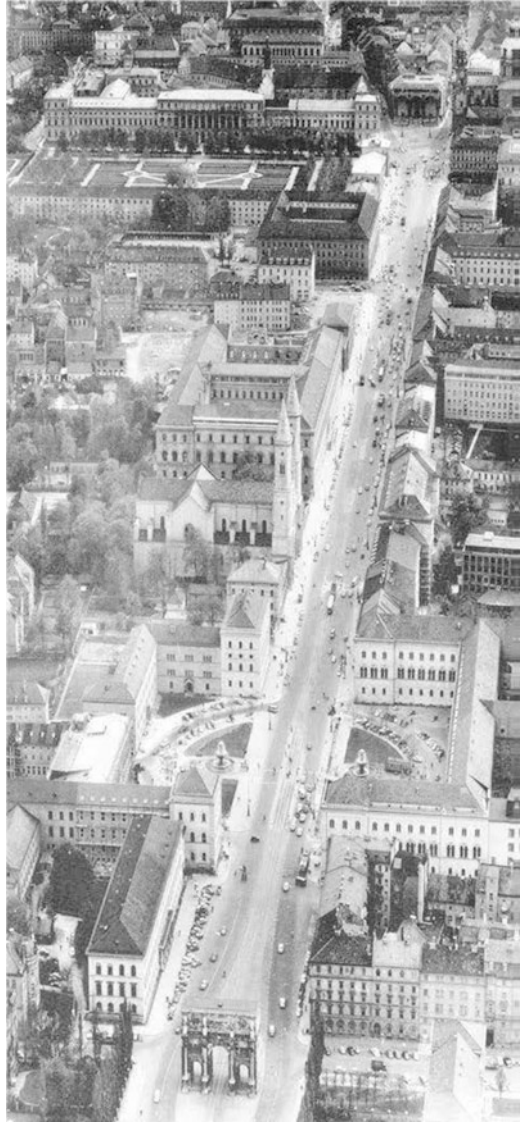
Source: Bundesarchiv Bild 146-2007-0017. Used under Creative Commons Attribution-ShareAlike 3.0 Germany (CC BY-SA 3.0 DE). Reprinted with permission.



Fig. 12.34 Munich 1841; View from University Square south along Ludwigstrasse toward the city center. Sketch by H. Adam 1841.

Source: Hederer (1942, p. 61). Public domain.

Fig. 12.35 Aerial view of Ludwigstrasse, in the foreground the *Siegestor* (triumphal arch) and university square. Source: Hederer (1942, p. 92). Copyright: Public domain.



not least, the new university (Fig. 12.36). They were arranged as monumental ensembles demonstrating the ideas of the late nineteenth century's urban planning for an imperial residence on a gigantic scale. Compared to the Vienna university of the seventeenth and eighteenth centuries, the dimensions of the new university building and the extension of the urban space surrounding it reflect an amazing leap of scale. The academic institution was torn from its traditional busy quarter with its narrow streets and small squares and placed into a majestic capital's ceremonial space. It seems to be a commitment of state and local authorities to the appreciation

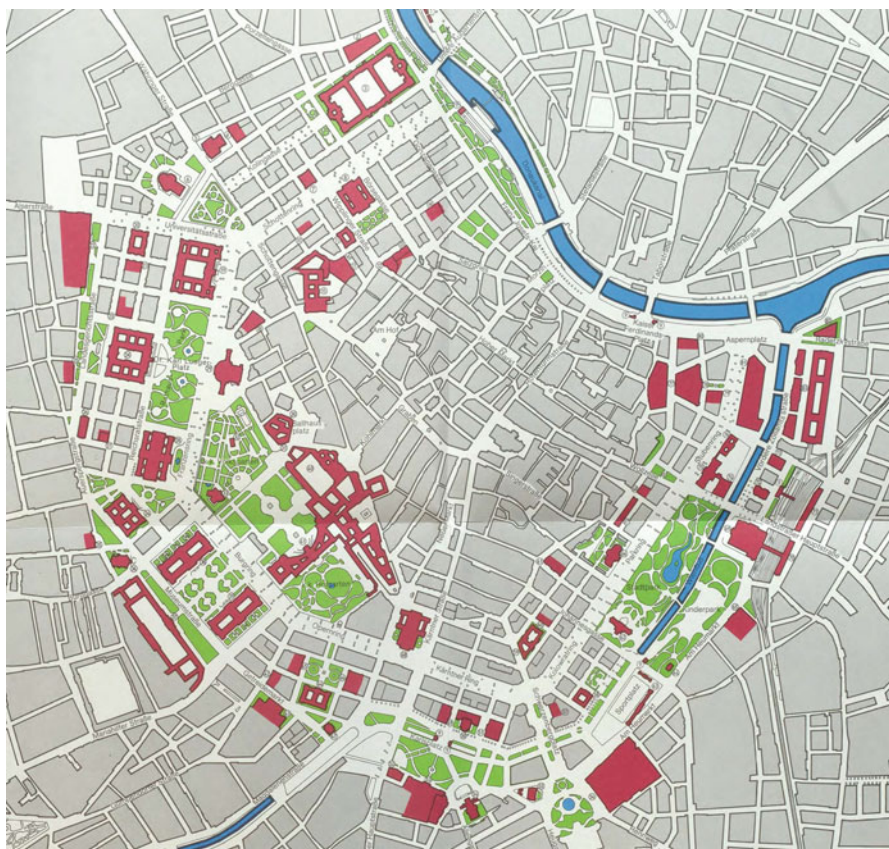


Fig. 12.36 Site plan of the *Ringstraße* (ring boulevard) in Vienna, 1910. All public buildings are marked in red. The university building is in the northwest; public parks are in green. Source: Mollik, Reining, & Wurzer (1980, map 81). Reprinted with permission.

of science and suggests a late demonstration of power by the Habsburg dynasty in its decline.

The university itself is set on a pedestal. A central staircase and side ramps lead into the capacious entrance hall with its pretentious architecture. It is elevated and highlighted in a noble manner and sumptuously decorated. The vast building forms a hermetic block structured by a great central courtyard and four lateral smaller courtyards. Its dimensions compete with the town hall and exceed even those of the national parliament (Fig. 12.37).



Fig. 12.37 Vienna University and part of the *Rathaus Park* in about 1900; in the background the *Votivkirche*. Author unknown.

Source: Original image: Photochrom print (color photo lithograph) Reproduction number: LC-DIG-ppmsc-09214 from Library of Congress, Prints and Photographs Division, Photochrom Prints Collection. Copyright: Public domain.

The Campus University

With the founding of the University of Virginia in 1819, Thomas Jefferson (1743–1826) conceptualized a new paradigm contrary to the European university tradition (O’Neal, 1969/1980). The masterplan of the first American university without a theology faculty was conceived by him to be on the green field as an entire entity independent of an urban settlement structure. The architecture of the university is completely neoclassical, related to antiquity and humanism, according to the Anglo-American interpretation with brick façades and white columns. Its main building is the library with its dome-shaped construction modeled on the Pantheon in Rome, though about half its size. Jefferson wanted the architectural language to correspond to the classical-humanist educational ideas. A large, green area forms the central space. It lies on a soft hill ridge and is structured by four slope terraces that are axially oriented to the library on the hilltop (Fig. 12.38).

Other relevant structures, such as faculty buildings and classrooms, are shaped like mansions flanking the central green space. They are connected by a one-story colonnaded pavilion on either side of the central space, which is a reference to an antique forum (Fig. 12.39). However, the space in between is neither a busy square nor a courtyard, but a lawn. Jefferson referred to his university as an *academic village*.

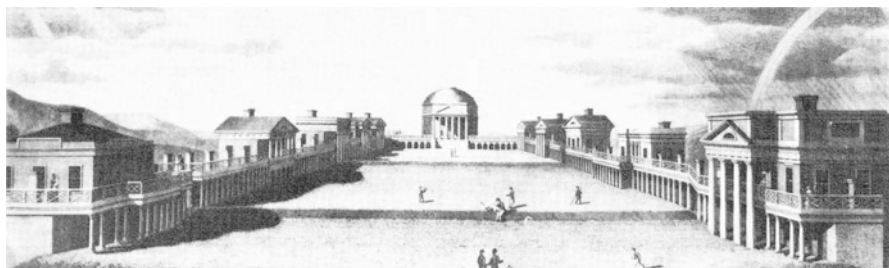


Fig. 12.38 University of Virginia, Charlottesville. Engraving by B. Tanner (1827). Source: O'Neal (1969/1980, p. 10). Reprinted with permission.

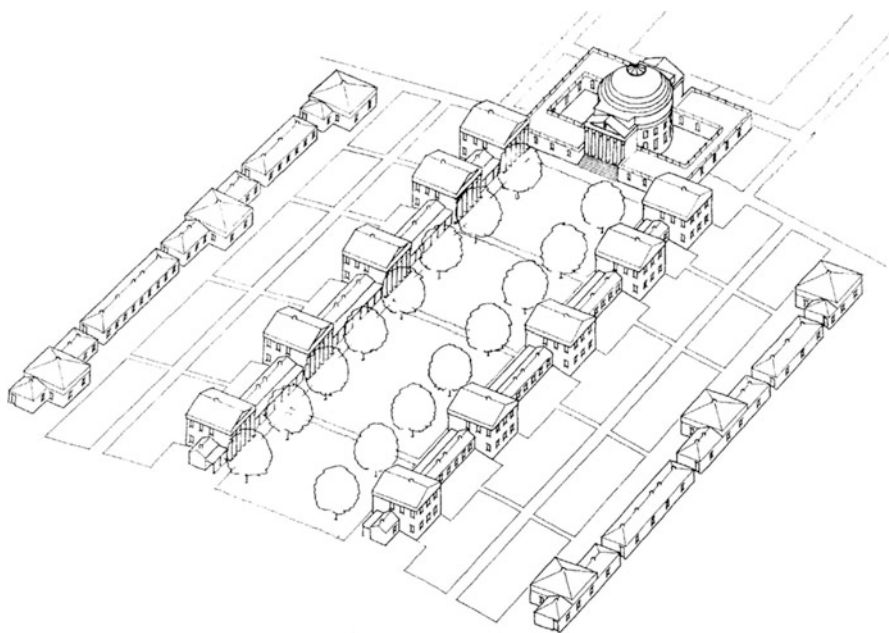


Fig. 12.39 University of Virginia, Charlottesville. Source: Rückbrodt (1977, image 42). Copyright by K. Rückbrodt. Reprinted with permission.

Lawn and *village*, or *yard* at Harvard, and *campus* in general—all these notions have rural connotations and evoke scenic, picturesque associations. As Dober (1992) observed:

The fabled 19th century hill-top colleges that populated the once rural mid-America are fine examples of simple architecture made prominent by a commanding site. Thomas Jefferson's University of Virginia lawn, bricked-in gardens, and buildings (considered by many as an epitome of campus planning and design) is informed by the gentle sloping of Charlottesville's terrain. (p. 31; also cited in Paulus, 2010, p. 506)

The Charlottesville concept has additional references. The young French nobleman and officer Pierre Charles L'Enfant (1754–1825), who joined the American army and became a friend of George Washington, was commissioned by the latter to plan the new capital city of the United States. He applied all elements and principles he knew from Europe, especially from France—a geometric layout of streets, diagonals, and a long axis, as in a European residential town. The most important ceremonial space, however, is the long green axis leading to the capitol (Fig. 12.40). L'Enfant designed an immense ceremonial open green space west of Capitol Hill, *The Mall*. It became the inversion of the relation palace—private park behind a palace. Jefferson applied a similar principle to his Charlottesville university design—albeit on a smaller scale.

In London the *Mall* leads from Trafalgar Square via the Admiralty Arch as a ceremonial space to Buckingham palace, the palace of the United Kingdom's royal family since the early eighteenth century. Initially, the *Mall* had been an open green space outside the city, used as playground to play *pall-mall*, an early modern croquet-like lawn game played by noblemen. The central green space of the Charlottesville campus, leading axially to the main building, which is emphasized by a cupola on a hill, can be seen as a miniature of *The Mall*, an Anglo-Saxon and Anglo-American archetype of a green ceremonial space.

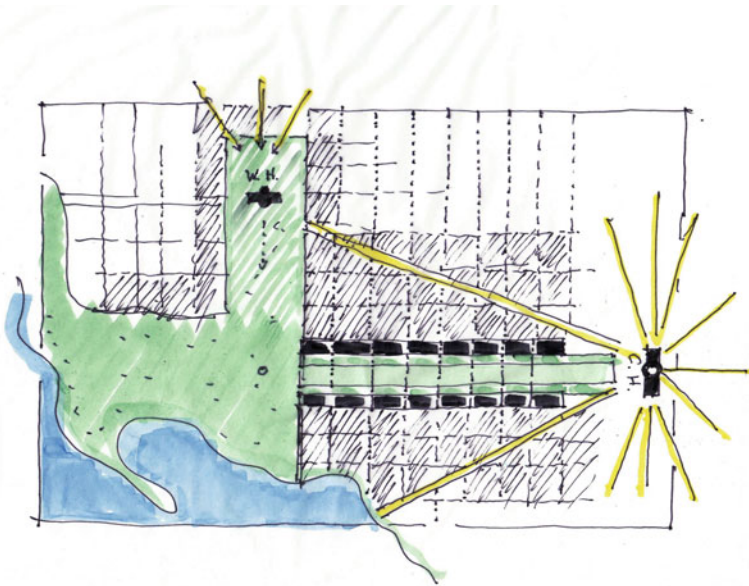


Fig. 12.40 The Mall, an Anglo-American archetype. Interpretation sketch of L'Enfant's design, by H. Bott.

Central and south European universities, however, have mostly grown over centuries inside cities, interwoven with the urban texture, always restricted by shortage of building plots. Thus, they are ensembles of buildings in different style from different ages. By contrast, campus universities have been planned outside cities on larger plots interconnected with the landscape, all according to an overall masterplan.

Another feature of the American campus universities is the stronger interior orientation of the buildings' front façades to the internal green center. True, there are also many North American universities integrated into urban structures. Columbia University in New York, for example, fits exactly into the measuring system of the New York block grid. However, it has the same principle of a strong internal orientation to the central green area, culminating as it usually does in the strict axial symmetry of the main neoclassical building standing in the central axis.

The term of *academic village*, beside its rural connotations, implies a social model of a small community with its own internal life embedding all villagers into the social network far away from urban anonymity. A young student, once integrated into the social network by rituals and a rich village culture of sport, art, and all manner of clubs and friendships during a formative period of life, remains a member of the village community as long as he lives, especially if the village is renowned. The village concept thus paves the way to the creation of a wealthy alumni network, the basis for successful fundraising.

Worldwide Expansion of the University System

By the end of World War I, the United States had gained worldwide importance as an industrial and military power through technical inventions as well as by science and research. The American university system became an equally significant global model, paralleling the European universities and later surpassing them.

Universities were founded in nearly all regions of the world in the late nineteenth and early twentieth century, mostly under colonial influence, initially from Europe, and later by the United States, too. For example, in the late phase of the Qing Dynasty in China, the first modern universities were founded on European-American principles in 1877. The prestigious Beida University, today's Peking University, was set up during a short reform phase of the last dynasty. Tongji University in Shanghai was established in 1904 by German physicians as a medical school and was financially and organizationally supported by the government of the German empire. Tsinghua University in Beijing was launched in 1911 with support from Americans. At some Chinese universities one therefore finds elements of the campus idea combined with traditional architectural concepts dating from the Ming and Qing dynasties.

The British colonial authorities established the University of Cape Town in 1829 and the first Australian university in Sydney 1850. In India they also created the

University of Calcutta in 1857, the University of Bombay in 1858, and three others in the late 1800s.

In Japan during the era of Meiji reform, Tokyo University was founded in 1877 on the basis of on older traditional educational institutions. There was no military intervention or even direct political influence from Europe or the United States in Japan. However, the structures and principles of the university systems from western regions with a longer university tradition were adopted.

The situation was different in Latin America, where the colonial administration established 21 universities from the sixteenth century to the eighteenth century. After the successful wars of independence between 1808 and 1825, the new states at last founded independent, national universities.

A very specific case of the colonial impetus behind the establishment of tertiary educational institutions outside Europe and the United States is found in Indonesia. Its first institute of higher academic education, the Technische Hogeschool (TH), was founded in Bandung by the Dutch authorities in 1920 and later became the Institute of Technology Bandung (ITB).

Universities in the Twentieth Century

Modernity and Traditionalism in the First Half of the Twentieth Century

The Weimar Republic: A short intermediate period in Germany

During the Weimar Republic (1919–1933) only one university, that of Hamburg, was newly established (1919). The University of Cologne, which had existed once before, was refounded in the same year. However, the number of students nationwide soared from 60,000 in 1914 to 120,000 in 1919. This explosion in the student population was only partly due to the war-related postponement of enrollments. In 1933 the student population reached 133,000, compelling the universities to accept considerably more students than in the past. The young democratic state faced serious problems (inflation, economic crises) funding the universities, almost all of them public. Despite these difficulties though, the quality of Germany's universities remained high. A special institution in this academic landscape was the *Bauhaus*, a small art and industrial design school that went on to have profound influence on university architecture and design alike.

Architectural transition phase: Hamburg, Cologne, and the Bauhaus

A comparison of the University of Hamburg and the University of Cologne, both created during the interwar period, delineates the transition phase from traditional European university design to principles of the Modern Movement in architecture.



Fig. 12.41 University of Hamburg in the early 1920s.

Source and copyright: University of Hamburg. Arbeitsstelle für Universitätsgeschichte. Reprinted with permission.

The two institutions still have their main entrance on important streets, forging a strong relation to the urban public space.

The University of Hamburg, designed by Hermann Distel (1875–1945) and Ernst Ludwig Grubitz (1876–1936) and built in 1919, still complies with the traditional building typology of a symmetric main façade on a major street and a portico in front of the entrance hall. It has large inner courtyards, pitched roofs, and a classical façade layout (Fig. 12.41), retaining the characteristics of a nineteenth-century building.

The University of Cologne, planned in the late 1920s and opened in 1934, incorporates some principles of the Modern Movement (Kantner, 1969). The Bauhaus and Congrès internationaux d'architecture modern (International Congresses of Modern Architecture), or CIAM,⁶ had already proclaimed new principles of architecture and urban design. The idea was that space and buildings should no longer be bound to and organized in traditional block figures but rather were to be dissolved into detached, solitaire buildings with flowing space between them. Going somewhat in this direction but still looking back to traditional patterns, the Cologne building, designed by Adolf Abel (1882–1968), is oriented with the main entrance facing an

⁶CIAM was an international group of young modern-movement architects who established principles of town planning starting in 1928. Among other things, they proclaimed the separation of functions.



Fig. 12.42 University of Cologne, main building. Architect Adolf Abel.
Source: Photo Kreyenkamp in the 1930's. Rheinisches Bildarchiv. Reprinted with permission.

important road passing the area, but its back opens toward a park belt (Fig. 12.42). It still forms an entire shaped configuration of linked wings, with courtyard-like interspaces. However, the wings are in the process of becoming detached from the entire figure and moving into the flowing space (Fig. 12.43).

Since 1925 the Bauhaus Design School at Dessau has embodied this concept of the free-standing ensemble, rejecting traditional European principles of streets and blocks, of front façade and backyard (Fig. 12.44). True, it is only on a small scale, but impressive nonetheless and has had massive impact on the further development of architecture and urban design. Its short, but conflictual, history (1919–1932) reflected the swift rise of the Modern Movement in Germany under the Weimar Republic, during which it emanated radical new design ideas for the industrial age internationally. But it was shut down as early as 1932 by Nazi intervention. Its last director, Ludwig Mies van der Rohe (1886–1969), later emigrated to the United States, where he was able to apply Bauhaus ideas to his design of the new campus for the Illinois Institute of Technology in Chicago.

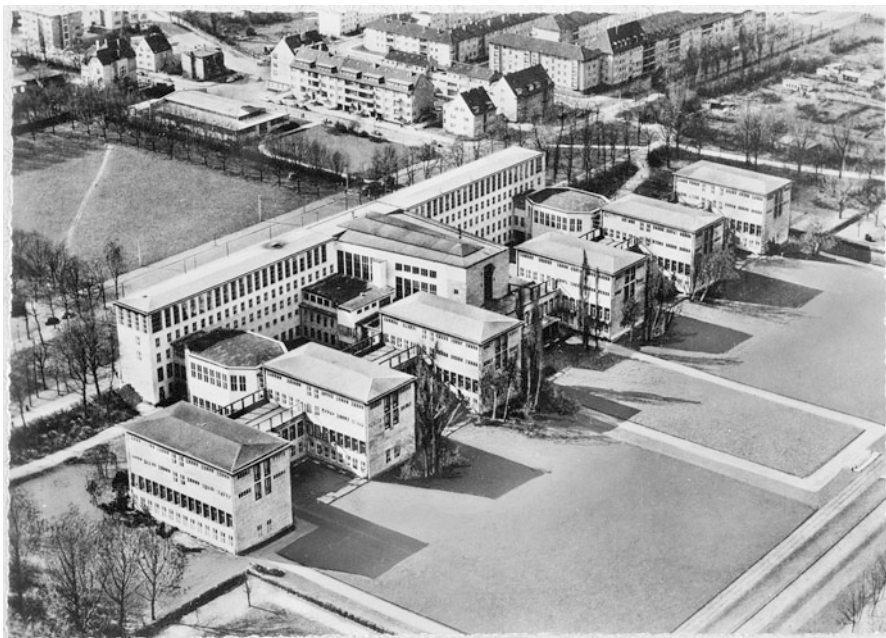


Fig. 12.43 University of Cologne, Main Building, 1929–1934. Architect Adolf Abel. Aerial view. Source: Photograph by Aero-Lux Frankfurt am Main, 1952. Rheinisches Bildarchiv. Reprinted with permission.

Fig. 12.44 Bauhaus Dessau, 2009, Architect: Walter Gropius (1925/1926), south-eastern view. Source and copyright: Stiftung Bauhaus Dessau, Photo: Yvonne Tenschert (2009). Reprinted with permission.



Traditionalism and gigantomania

However, modernism of the first half of the twentieth century was rather an appetizer than the main course, for it seemed to be looking back. Even in Germany, the center of modernism in the 1920s, modernism was not the dominant style as measured by the number of erected buildings. And it was abruptly interrupted after 1933.



Fig. 12.45 Edmund Zintl Institute, built in 1942 at the Technical University Darmstadt. Source and copyright: Hessisches Staatsarchiv Darmstadt, Signatur R 4 Nr. 5020UF. Reprinted with permission.

Fascist states preferred a kind of neoclassic gigantomania combined with traditionalism. Academic humanistic education was just the opposite of Nazi educational ideals, which required soldiers. Few extensions of existing universities were erected, such as the Zintl Institute built at the Technical University of Darmstadt (Fig. 12.45).

The New Sapienza in Rome

Unlike the Modern Movement in Germany, its counterpart in Italy—Futurism and Rationalism—was partly affiliated with the fascist party. One of the great architects of this period, Giuseppe Terragni (1904–1943), was a splendid modernist familiar with the German Modern Movement but was a convinced fascist party member all the same.

The new campus for Sapienza University at Rome became one of the paradigms of fascist architecture (Bodenschatz, 2012). Marcello Piacentini (1881–1960) received the commission to design the New Sapienza in 1932. He mixed a traditional, neoclassic layout of the urban design and giant proportions with a modernist, purist design of façades, construction, and details (Fig. 12.46). He carried out only some of the buildings himself, enough to demonstrate the typical Italian attitude of the Mussolini period. Establishing a rigid urban design guide, he quite successfully



Fig. 12.46 The new campus of the Sapienza University in Rome (1938).

Source: Unknown photographer. Copyright: Public domain. Retrieved from http://wikipedia.org/wiki/Marcello_Piacentini#/media/File:Cittauniversitaria.

directed some colleagues to create an entire ensemble. The spatial concept was not remote from historic urban fabrics in residential towns, whereas the architecture tended to embrace purism. Proportions, however, sometimes morphed into gigantomania, albeit more tolerably than in Germany. Piacentini did not work only in Italy. He also received planning commissions in other countries such as Portugal and Brazil, proving that his ideas were well-known internationally. They met the conservative imagination of that period.

Lomonosov State University, Moscow

During the short Leninist period, the young Soviet Union was an experimental field of art and architecture. In Stalin's time, however, the Soviet Union favored architectural concepts similar to those in the fascist countries. The new Lomonosov State University was an important element of the 1935 masterplan for the urban reconstruction and expansion of Moscow, intended to help make the city a modern capital of the first socialist country (Brumfield, 1993; Huber, 2007; Summerfield, 1998). The idea for the new university was to make it the nucleus of the main southwest development. It was to be the highest and most important of seven new planned high-rise landmarks. The monumental building complex rose west of the Moskva River between 1949 and 1953. Boris Iofan (1891–1976), who delivered the first

draft, fell into political disgrace in 1948 and the design work was handed over to Lew Rudnev (1885–1956).

The widely ramified building system unfolds on a rectangular cross, according to strict hierarchical neoclassical axial planning. It is a giant palace with one main and two lateral forecourts, with dimensions larger than any absolutist palace ever, flanked by, and integrated into a vast geometric park area. The complex system is dominated by a central 36-story triply terraced tower culminating in a spire that holds the Soviet star aloft. This building, designed in what is called *confectioner's style*, is a dictator's showing off, claiming to be in the center of future world communism. Using historical details in a rude manner and transforming them into a giant verticalism, the jagged silhouette is designed to recall historical Russian city shapes. The construction system was a steel skeleton frame filled in with brick, covered with natural stone slabs, and adorned with monumental stone sculptures.

Inside it was equipped with modern Soviet technology of heating and vertical transportation. The high-rise building houses three faculties (geography, geology, and mathematics), their museums, as well as the university museum, the university library, 23 lecture halls, 125 group workrooms, and 700 lab workplaces. The side wings provide living space for 6,000 students and doctoral candidates. The main buildings of the side wings have apartments for 200 professors. The auditorium has 1,500 seats. Lastly, the building complex includes other museums, shopping, and leisure facilities, including an indoor pool (Huber, 2007; Summerfield, 1998).⁷

As previously seen in Rome, universities were accustomed to demonstrating state and party power, visualizing ideological principles, exhibiting architectural positions of a dictatorial power by using giant proportions and putting them into spatial limelight (Fig. 12.47). This was for the time being the end of a central European process to separate universities more and more from their urban neighborhood, emphasizing their importance and make them to crucial state affairs. In the late nineteenth century universities started to be elevated, put on pedestals, lifted above the normal urban level. This kind of conservative neoclassical architecture was used for university planning on a giant scale in many countries of the world (Columbia University in New York, for example), however, European fascist and Stalinist designs topped all.

The Illinois Institute of Technology—An icon of the Modern Movement in architecture

Ludwig Mies van der Rohe (1886–1969), a leading figure of the European Modern Movement in architecture and urban design during the 1920s, came in 1938 to the United States, where he was appointed professor at The Illinois Institute of Technology (IIT) in Chicago. In 1940 he was commissioned to plan the new IIT campus.

⁷This high-rise university type became a model for the former Eastern bloc states during the Stalinist period. A similar building stands in Warsaw.



Fig. 12.47 Lomonosov State University, Moscow.

Source: Max Pixel. Copyright: Public domain. Retrieved from <http://maxpixel.freegreatpicture.com/Lomonosov-Architecture-Stalin-Moscow-University-1378927>.

He brought in his ideas and experience of modernism about how to use industrial methods and modern materials for design and construction. His famous project combined the American university concept with the ideas of European modernism. It became an icon of modernity.

The solitaire, detached buildings form both a free-flowing space and a central interior green open space—the campus university concept. But the cubic buildings themselves had a totally new expression, for they are mostly steel and glass constructions, precise like machines, designed on an underlying technical grid of measures. The campus institutes were built in the following years up to the 1950s. Among them, the Crown Hall, a transparent steel-and-glass construction with its flat roof hanging from mammoth exposed steel frames, became a masterpieces of Mies van der Rohe and the Modern Movement itself (Blaser, 2001). The Crown Hall is still used by the architecture department, in which Mies was the most influential teacher for 20 years. Today, the buildings designed by him still look modern. It seems they are expressing the timeless prosaic modernity of rationality—technology's promise to solve the future problems of the human race forever, dissolving history in rationalism and functionalism. A wrong promise, as it soon turned out. And a joke of history was that one of the master's best scholars at IIT, Helmut Jahn, later became a leading architect of Postmodernism, designing



Fig. 12.48 Mies van der Rohe, Project for the Illinois Institute of Technology campus in Chicago. Final scheme, 1940.

Source: Johnson (1947, p. 135). Copyright: Public domain.

decorative skyscrapers in a kind of art deco style far from Mies's "less is more." History is never dissolved.

The urban design of IIT seems to create a central lawn and a nearly symmetrical figure based on the line of East 33rd Boulevard, which crosses the lawn. All areal outlines are totally integrated into the street lines of the neighboring quarters (Fig. 12.48). At the same time, the design aims to shape a central interior green space following the American tradition as exemplified by Columbia University in order to integrate the campus into its surrounding urban fabric. This idea, however, was rather difficult to achieve because of the streets and railway lines passing by. But looking at the realized building design, one finds no implementation of this concept, for the building's access and orientation counteract rather than enhance the urban fabric. The Crown Hall's main entrance lies at the averted side of the lawn, affording a pleasant view of it but actually showing its back to it (Fig. 12.49). The building is accessible only via small stairs from the main lawn. Nearly all building entrances on the campus are separated from the attached lawns by streets or bushes, a design



Fig. 12.49 Crown Hall at the Illinois Institute of Technology, Chicago, Illinois. Designed by Ludwig Mies van der Rohe; completed 1956.

Source: © Joe Ravi (2011), via Wikimedia Commons. Used under Creative Commons Attribution-ShareAlike 3.0 Unported (CC BY-SA 3.0). Retrieved from https://de.wikipedia.org/wiki/Datci:Crown_Hall_1.jpg.

leaving it bereft of the charming character it could have and making it into a prosaic working sector for white-collar engineers. Mies van der Rohe would surely have considered this statement to be a compliment.

Development of University Planning and Architecture in the Second Half of the Twentieth Century

After World War II, the process of decolonization led to the emergence of many new states in Africa, the Middle East, and Southeast Asia. Practically all new countries founded national universities, which were regarded as a prerequisite of economic and cultural development. Since the 1960s, a network of universities therefore spans the globe, though the knots of this net vary in distance from each other and in quality in different parts of the world.

The Sputnik crisis in 1957 triggered a fundamental discussion about the educational system and research in the western countries. As a result, the United States and most European countries multiplied research budgets and improved schooling. West Germany even declared its educational system to be a catastrophe and began inquiring into it. In the following years and decades, the university system greatly expanded. Growth of the spatial dimensions of universities and the number of enrolled students far surpassed that in the first half of the century. Throughout the



Fig. 12.50 Central library of the National Autonomous University of Mexico on the Mexico City campus (built by Juan O’Gorman).

Source: Régis Lachaume (2006), via Wikipedia. Copyright: Public domain

Retrieved from https://de.wikipedia.org/wiki/Nationale_Autonomie_Universität_von_Mexiko.

world, university planning in many cases became an experimental field of the avant-garde movement in architecture and urban design.

The new campus completed in 1954 for the Universidad Nacional Autónoma de México (UNAM) in Mexico City, for instance, is a striking example of an attempt to combine architecture of the International Modern Movement with traditional Mexican elements of art, which, in turn, were a superimposition of pre-Columbian and Hispanic culture. UNAM’s library, designed by Juan O’Gorman (1905–1982), is a paradigm of this approach. It uses modern construction materials and exhibits the cubic style of the international Modern Movement, but the façades are covered with reliefs in a kind of Aztec style and Mexican wall paintings (Fig. 12.50). The content of the graphics, however, deals with history and science.

A very bold project for a new university was realized by Oscar Niemeyer (1907–2012), who designed most of the official buildings for Brasília, the planned city that became Brazil’s capital in 1960. He designed a curved linear building 700 meters long (nearly half a mile), constructed with prefabricated concrete elements as a radical serial composition, adapting the design concept by Lucio Costa (1902–1998) for the whole town (Fig. 12.51).



Fig. 12.51 Central Institute of Sciences—University of Brasilia, Brazil.

Source: Nossedotti (2011), via Wikipedia. Copyright: Gemeinfrei. Retrieved from https://de.wikipedia.org/wiki/Datei:ICC_UnB.jpg.

In Europe famous architects like Alvar Aalto (1898–1976, masterplan and many buildings for the new campus of Helsinki University of Technology since 1955), Giancarlo di Carlo (1919–2005, masterplan and many institutes and dormitories for the new campus of the University of Urbino since 1965), and Ralph Erskine (1914–2005, buildings for the Frescati campus Stockholm since 1974) designed masterpieces of contemporary architecture for universities. The long list of such architecture grows each year, but this chapter's discussion of the concepts of new campus development for the modern mass university focuses on the West German example illustrating extremely rapid expansion of the university system.

Urban and architectural design of the mass university, Germany's example

Only a few universities were founded immediately after World War II. The French occupation administration created one Mainz in 1946 and another in Saarbrücken in 1948, both initially using abandoned German barracks. In the U.S. sector of West Berlin, the Free University of Berlin was founded, for Humboldt University was under Soviet administration.

Many university towns tried to extend the existing university areal into the city, following the European tradition. Because building plots were exceptionally rare at

their historical sites, most of which were situated in old centers or at the edge of the inner city, the American paradigm of campus universities outshined urban alternatives. Only the outskirts provided enough space for new universities. The discourse about spatial visions and planning sites for rapid, large-scale expansions or new foundings of universities thus soon led to the ideal of the campus university. The United States had become the dominant cultural power, and German scholarship holders, returning from North America, reported enthusiastically about U.S. university life. An important influence on the discourse came from the Central Archive for University Planning (*Zentralarchiv für Hochschulbau*), established in 1963 at the University of Stuttgart and headed by Horst Linde. This institute analyzed American universities and declared the IIT campus to be exemplary. Up to that time, the notion of campus was not common in Germany, for universities had always been a part of urban culture and more or less integrated into the urban fabric and daily life.

Only a few years after the *Sputnikschock* in Germany, several new universities were founded: Bochum (1962), Regensburg (1962), Constance (1966), Bielefeld (1969), Kaiserslautern (1970), Bremen (1971), Kassel (1971), Bayreuth (1972), and Oldenburg (1973). Nearly all are campus universities laid out on large coherent areas on the outskirts according to a masterplan. Most of them were constructed very quickly, many buildings in the same style with the same material—mostly exposed concrete and a high percentage of prefabricated components. Compared to the American archetype of campus, they lack the rural charm of field (campus), yard, or lawn.

The labels used for the spatial elements are proving to be a conceptual confusion. Instead of a green center, for example, there is the idea of a forum, which means precisely the opposite—a central urban space. Hence, Bochum, Constance, and Regensburg have each a stone covered central open space, which looks much more like contemporary pedestrian areas or the satellite shopping centers of the 1960s and early 1970s. Constance reflects these contemporary ideas perfectly (Fig. 12.52). All details inside and outside the buildings are designed affectionately as a total artwork. Architecture, interior design, applied art, and landscaping work together, modeling an enormous sculpture integrated into the gentle moraine landscape of Lake Constance. However, it is hardly a campus in its original meaning but rather an artful “urban” space with closely related landscape. Bochum and Bielefeld have the charm of *learning factories* designed in the late style of classic modernism. Krefeld even has a covered passage like a shopping arcade, called a *communication axis*.⁸

This first generation of universities after World War II. followed neither the old campus model nor the IIT campus design by Mies van der Rohe. Urban design paradigms of the Modern Movement had been moving from solitary ensembles to huge spatial figures since the late 1960s. It seems that the familiar conceptual notions

⁸Nevertheless, the Ruhr-University Bochum is listed as a landmark illustrating a typical comprehensive university (*Volluniversität*) idea in that German era.



Fig. 12.52 The University of Konstanz, Germany, aerial view.

Source: Universität Konstanz (2012), via Wikipedia. Used under Creative Commons License Attribution-Share Alike 4.0 International (CC BY-SA 4.0).

Retrieved from https://de.wikipedia.org/wiki/Universität_Konstanz.

rooted in the urban European heritage of universities could not be abandoned all at once. That legacy continued to glow under modern cubes and surfaces of the machine age, obscured by wrong notions.

In the late 1960s and early 1970s, however, some areas of university expansion and new foundations were planned as campuses, far removed from the historical sites on the city periphery (Würzburg–Hubland Campus; Darmstadt–Lichtwiese, and the University of Bayreuth), with the centers henceforth becoming real green areas (Fig. 12.53). Bayreuth is an evident example of a green center surrounded by faculties and a wide range of facilities. But even at the University of Bayreuth, the front façades of the buildings lack a clear internal orientation to the center. The main access is from a road surrounding the central green space. The campus design is obviously influenced by functional concepts for contemporary district centers of that time—a ring road for cars and supply surrounding the campus, pedestrian areas inside of it. In a nutshell, the American concept had become the beacon of the era but was not really adapted to its spatial concepts. Everybody still uses the label *campus* unthinkingly, even for the historical sites: the urban campus. what an odd contradiction.

The idea of monofunctional university areas in Europe has another root, too. It was wholly in accordance with the ideals of functionalism as set out in the Athens Charter of 1933. Each land use should find its very special place and space, according to its specific requirements (functions). Architecture and urban structures



Fig. 12.53 Campus Lichtwiese, Technical University of Darmstadt, Germany, developed since 1967, status of 2015.

Source and copyright: Nikolaus Heiss. Retrieved from www.tu-darmstadt.de/universitaet/orientierung/anreise/index.de.jsp.

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could thereby be optimized for those special needs: purely residential areas, purely commercial and industrial areas, recreation areas, infrastructure facilities, all separated from each other and connected by the transportation system. Large campus facilities were consistent with these planning concepts. The small-scale European mix of city and university facilities seemed to contradict the contemporary idea of functional organization and optimization of processes in the modern industrial society.

Reurbanization of Universities?

Old European universities such as Bologna, Paris, Cambridge, Oxford, and Montpellier expanded gradually on a smaller scale in different urban areas. Today's Bologna still has all its facilities in the inner city areas. Many of its new university institutions are housed in restored landmarks, such as monasteries or formerly abandoned cinemas. University life there is reminiscent of past European times, with people walking in the well-restored city center; sitting in bars to discuss and prepare for the next lecture or seminar; taking an *aperitivo* after the last lecture;

watching others, especially nice young students, famous writers, hip musicians, or even well-known politicians and beggars passing by, as in novels about earlier European urban life—or at least the way it is imagined to have been.

Other universities set in old city centers built campuses on the outskirts but kept their historic buildings within the city and added new buildings as far as possible. This situation pertains in almost all of the old European university cities, including Heidelberg, Tübingen, Marburg, Prague, Padua, Pavia, Leiden, and Amsterdam, to name only a few. Natural sciences, engineering, and university clinics have mostly moved to outside because of the special needs that their laboratories and machine halls entail, whereas the rector's office, administration, humanities, and social sciences have remained at the historical locations.

Conversion of former military, industrial, and infrastructural areas

The economic changes brought about by globalization have made it necessary to abandon many large industrial areas and infrastructural facilities of the nineteenth century and early twentieth century. Projects to convert and reuse those tracts and buildings spawned new concepts featuring an urban mixture of functions and novel spatial patterns, sometimes integrating university facilities. An early example was the University of Kassel, founded in 1971 in a remote campus area. By the late 1970s, long before the effects of globalization, the architecture faculty was accommodated in what had once been an administration building of a former heavy-industry firm neighboring on the city center. Over the following decade, a new high-density university district with a traditional block structure was built on the adjacent abandoned factory terrain. In Heidelberg, a recent example of this architecture is the *Bahnstadt*, a new district situated on former railyard terrain connected to the main train station. The plan for the space is based on a mixed use concept that will integrate university functions. Even more spectacular is the new *Hafencity* university under construction on the waterfront of a vacated port area in Hamburg. After the new opera house, it has become the second important landmark of the new quarter.

Universities are thus no longer seen as bulky institutions for which it is difficult to find space. Rather, they are used as an initial investment, a driving force behind the urban development of large fallow land and problematic districts. Examples are the University of Milano-Bicocca, built on the site of the former Pirelli factory (Fig. 12.54), and the new University of Torino, both planned by the architectural firm Gregotti Associati. They incorporate abandoned areas and reused, partly historical industrial facilities. The architectural concept follows traditional European urban patterns such as street, square, and block. Some elements of Gregotti Associati's projects recall Piacentini's university town, though on a smaller spatial scale, making university planning an integrated part of urban renewal, the reuse of industrial heritage, and the upgrading of run-down districts.



Fig. 12.54 University of Milan-Bicocca, Italy. View of the Trivulzana Square, 2013.
Source and copyright by Antonella Sgobba. Reprinted with permission from A. Sgobba.

Campus universities captured by city development

Many of the universities built on the outskirts of cities in the 1960s or early 1970s have long since been incorporated into urban or suburban structures. Those campus areas are now regarded as obsolete. Despite their high-rises, their population density is low, and their monofunctionality makes them empty, uninviting districts on evenings and weekends. Both characteristics have been harshly criticized. Moreover, modern requirements for fire protection, escape routes, and energy-saving make it extremely costly to maintain and modernize buildings constructed in the 1960s and early 1970s.

Adopting a concept for densifying the once isolated, monofunctional Höggerberg campus and for reclassifying it for mixed use, the Swiss Federal Institute of Technology (ETH) in Zurich launched a phase of urbanization and urban integration of large, peripheral university facilities in 2004. Since then, nearly all sprawling campus areas on the outskirts have undergone critical analysis, reconsideration, renewal, and remodeling, which in many instances has also improved and expanded the historical university areas.

Even in the United States, the motherland of the originally introverted and remote campus concept, there are trends toward transferring research and teaching facilities to the urban context.

Especially in the United States, universities are now moving away from separating teachers' places of life from those of students and toward selectively interweaving their range of research activities and educational options with the city. In 2010 Google bought a 2,700,000 square-meter former warehouse and administration building in Chelsea, one of New York's hottest neighborhoods, for \$1.8 billion. The main reasons were the opportunities offered by the city, but also the preferences of the employees, who no longer want to live and work in suburbia. Universities also see the advantage of an urban location for the recruitment of leading scientists and paying students. This was not always so. Forty years ago, most of the cities in North America were characterized by emigration, disintegration, crime, and poverty, and universities are still the most important institutional anchors of centers in cities such as Cleveland, Baltimore, and St. Louis. New York, on the other hand, has been growing steadily since the early 1990s, and "NYC" has now become an academic trademark. In 2012, according to the New York State Department of Education, more than half a million students were enrolled in the 102 colleges and universities located in the city, a good 6% of the population—and 11% more than in 2007. (Schindler, 2013, p. 25)

Universities in the Age of Globalization and Digital Information-Processing

International relations and cooperation have steadily increased in recent decades, not only through student and academic exchange, exchange networks, and cooperative bilateral and multilateral research networks but also through the founding of international universities (see chapter by Knight in this volume). Students and scholars are required to be mobile and to enhance international relations, an expectation intended to expand their habitat, contacts, and reference points across many cultures and, analogously, to economic global chains.

Some routine functions of teaching and communication may indisputably be transferred to the Internet, depending on the field of study involved. However, a wide range of practice at working with material (basic engineering and science courses, design, art and architecture, music, and performance) and of internationally renowned research will still need personal contact, face-to-face critique, and discourse in seminars and symposia.

In my opinion, universities have to solve a fundamental predicament that they themselves have created in science and research—the increasing specialization and isolation of research and, even more, the issues of applying research and technical inventions to nature and society. Worldwide academic life requires specialization and focus on ever more detailed topics, as in medicine, and analysis of ever smaller particles of matter and energy, as in physics. Exploring and explaining the complexity of interdependencies of various interventions in nature, the economy, and society is a challenge for researchers, especially because it might provoke conflicts with powerful political and economic interests. Meanwhile, the Anthropocene has begun,

as a growing number of scientists claim, with most technical interventions creating so many side effects on nature, humanity, and culture that research must intensify efforts to develop transdisciplinary research methods as complex as the mounting problems of the real world.

The right place and space of that future kind of complex, multidisciplinary research may be the best universities, if they intend it. It is there that highly qualified professors with superior equipment are internationally and transdisciplinarily networked and open minded to learn from each other. These complex methods of research also need personal contact and creative situations. Excellent universities situated in inspiring towns and sites may provide that creative space and those networks. I am looking forward to university design in the future.

Summary

The architecture typology of university buildings developed in Europe from medieval urban courtyard collegiums to triple-wing palace buildings up to the eighteenth century, became monumental blocks with several courtyards in the late nineteenth century, and was always integrated into urban patterns connected to public streets and squares. In most cases they formed an internal semipublic space and had a main façade overlooking the public space. Beginning in North America in the seventeenth century, however, there arose a new typology featuring ensembles of detached buildings set in pleasant countryside locations outside of towns, no longer centered on enclosures and small courtyards but rather in yards or lawns. Thomas Jefferson even called the wonderful Charlottesville university, founded and designed by himself, an academic village.

The relation to landscape and countryside became a characteristic spatial feature of Anglo-American universities. Whereas urban settings were the framework within which everyday life at continental European universities took place, spatial elements of landscape and rural connotations became a specific feature of life at Anglo-American universities, affecting concepts all over the world. Spatial university concepts thereby acquired rural associations. University lifestyle became related to landscape, park, and nature. Such imagery and notions affected nearly all cultures by the end of World War II, when the United States at last achieved supremacy in the western hemisphere. The campus concept (academic village) with its intensely inward orientation may explain the much stronger lifelong bonds between former students and their alma mater. The word *experience* is *Er-fahr-ung* in German, derived from *fahren* 'to move, to ride'. In past ages many students used to travel from one university to another and never developed ties as strong as those in England or the United States, where alumni networks are an important part of the university organization and, of course, fundraising.

As it appears now, ideas about university life and its spatial manifestations are already shifting again to a kind of reurbanization. The campus today is envisioned more as urban life with its dense array of opportunities and options than as landscape

and rural sceneries. The word is used by a wide variety of organizations dealing with information, knowledge, and technology and has lost its original meanings and associated spatial visions.

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