

RENAISSANCE ARCHITECTURE

The term Renaissance is used to refer to the cultural and artistic period in history in which people rediscovered the importance of Greek and Roman culture. Gothic style, which preceded Renaissance culture, denied the importance of **classical paradigm: order, symmetry, balance, proportion**. Renaissance buildings were conceived to be **harmonious** and centred on the concept of **linearity**: stories were planned to create certain stratification; each level had to display the same number of identical windows and structural vertical elements. The materials used in construction were poor and represented neat shapes. Such buildings were labelled as beautiful if they were featured with succession of **ordered and mirrored elements**.

- Renaissance architecture developed in Florence in the early 15th century.
- The classical knowledge comes from the observation of the ruins of ancient Roman constructions and from the reading of *Vitruvius*' rediscovered writings.
- Vitruvius was a Roman architecture who lived in the 1st century BC.
- The Classic elements revived were classical order columns, round arches and domes.
- The key factor of beauty was geometry.
- *Brunelleschi* and *Alberti* were two Italian pioneers of Renaissance architecture who spread throughout Europe the constructions' standards.
- *Inigo Jones* is remembered because of his works like the Banqueting House in London and the Queen's House in Greenwich.

PALAZZO RUCELLAI



Rucellai is a well-known name in Florence because it reminds of a family of rich merchants. Rucellai Palace was designed to recall the structure of Roman Colosseum. It consists of two intersecting principles: **juxtaposition**, determines the overlapping of horizontal elements and **alignment**, which determines the presence of continuous succession of vertical elements. Capitals in Rucellai Palace are an original interpretation of Greek orders. The capital marking the ground floor is a Roman version of the Doric order; the capital of the first floor is a blend of Ionic and Corinthian orders (**composite**); the capital of the second floor is a Roman inspired interpretation of Corinthian capitals since it recalls decoration typical of Corinthian style but associating it with the simplicity of empty round circles/arches.

SPEDALE DEGLI INNOCENTI

What is known as “Lo Spedale degli Innocenti” is situated in Florence and it is considered as one of the first examples of Renaissance architecture. The building was constructed at the beginning of the 15th century following the project by *Filippo Brunelleschi*. Brunelleschi is the first representative of Renaissance architecture because he made classical style in architecture develop all over the world by introducing the concept of **perspective**. Before Brunelleschi technical drawings only consisted of two dimensions: length and height. By means of perspective, technical drawings were integrated with the concept of depth. The function of the building was that of accepting babies being abandoned in front of the entrance door. Those children were offered



food, a shelter but, above all they were granted protection and care to be introduced in the external world and reaching the age. From the structural point of view, the building is excellent in order, **symmetry** and **harmony**.

- The facade consisted of modular round arches carried by slender columns recalling the “**composite style**” (capitals were featured with both the volutes of the Ionic order and a rich foliage typical of the Corinthian order).
- The **entrance porch** is lifted by a series of steps acting as a **stepped podium**.
- The material used for the construction were simple and intended to produce a shade contrast: the grey stone called “**pietra serena**” contrast with the **white washed plaster**.
- The space between the arches is filled with an interesting and evocative decorative element: an **oculus** light blue in the background containing a carving representing a baby enveloped in a blanket.
- The upper level, added to the original project, rests on a simple entablature and consists of a series of **pedimented windows** (rectangular windows topped with triangular pediment) created just and precisely at the middle of the arches in the lower level, in other windows marking the apex of each arch.

PALAZZO FARNESE



The building was originally conceived as a private residence commissioned by a member of the family of Farnese. Today it is a state building whose property is attributed to Italy but it's rented to the state of France (which had bought the buildings in 1911). Currently, it's used as the palace hosting the French Embassy. From the architectural point of view, the building is **squared** in plan and displays three levels basically reminding to the same style but showing certain variations:

- The ground floor is to be associated with the characteristics decorative pattern we call “**rustication**”. Windows are rectangular in shape and screened by means of imposing grids;
- The first floor, less rustic in look, consists of **modular windows** accurately aligned to the windows on lower and the upper levels, which are alternatively topped with triangular and curved pediments;
- The second floor displays a series of **arched windows** framed with a triangular cornice.

BASILICA DI SANTA MARIA DELLE CARCERI

The Basilica of Santa Maria delle Carceri is an unparalleled example of Renaissance church **cubical** in shape because its plan reproduces a **Greek cross**. The core of this little church is the altar corresponding to the circular central portion of the building mirroring the overhanging dome. That dome is structurally carried by **4 portals** placed at the 4 sides of the construction. As a matter of fact, the church represents the Renaissance effort in producing forms trying to overlap **circles** and **squared** figures (as the Roman architect Vitruvius had stated centuries before). The outer walls of the church show that it was left unfinished: some areas of the portals lack a finishing touch since a backbone structure made of brick and stone is still visible. The completed sections show the use of stone of different colours intended to create a colour contrast and perfect geometric forms.





BANQUETING HOUSE

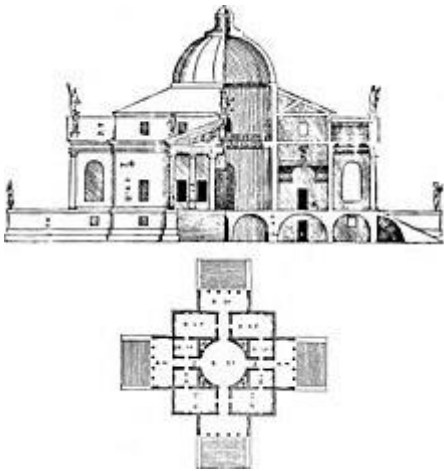
The Banqueting House is located in **London**. It was planned by *Inigo Jones* for the King as a state dining house and completed in 1622. The Banqueting House was built in stone. The building is on three levels of different height, a **rusticated basement** with small square windows, a **piano nobile** marked by large pedimented windows alternating **triangular** and **segmental** shapes. On the second floor the windows have a flat pediment and are topped by a garland. The roof is hidden behind a **balustrade**. Vertically the building is marked by pilaster and columns of different classical orders. The palace is a composition of alternating vertical modules.

PALLADIO & PALLADIANISM

Andrea Palladio (1508-1580) is probably the most influential architect in the entire history of architecture. His **contribution to the global vision on classical style** may probably be represented by the fact that he inspired the birth and the development of the so-called Palladianism. When talking about Palladio and his works, we are requested to use the passive case or the adjective Palladian (Palladio's Villa or Palladian Villa). Palladianism is instead to refer to the wide range of buildings constructed by other architects all over the world "imitating" Palladio.

Palladianism is the term employed to refer to **the trend in architecture to replicate Palladio's buildings** based on the concept of proportional sections, symmetrical elements, ordered scales, and mirroring atmosphere. **During the 18th century** architects all over the world, deeply affected by the accuracy and revolutionary legacy of Palladio started to apply his style to majestic buildings.

VILLA LA ROTONDA



Villa La Rotonda is recognised as the most representative work by Palladio.

The building was built as a private construction intended to attract people as for magnificence and impact. Looking at the plan, the structure consists of a circular core admitting to the four edges of the building. To say it differently, **the plan recalls Vitruvius' idea of integrating the square and the circle to achieve geometrical perfection.**

The outer walls of the building are featured with four identical and mirroring porticoes based on Greek orders: a row of 6 columns were used to reproduce a **Ionic colonnade**. Differently from Greek Ionic style, columns are not fluted in Villa La Rotonda; the superstructure carried by those 6 columns is quite simple and unadorned, the gable roof framing the pediment is marked by a **Greek pattern** but the tympanum is almost empty, since bearing exclusively **two round oculi** and the **araldic logo of the family** owning the property of the building.



People accessing the building are soon introduced in a circular space representing an **impressive entrance** leading to the different sections and levels of the buildings. The upper story was the one devoted to **family life** and **public reunions**. The basement is instead the space where the **kitchens** and the **service rooms** were placed; even that level is based on the central core visible at the entrance for it allowed a large and accessible space to **store water** for any purposes.

Villa La Rotonda was commissioned by a noble priest, **Paolo Almerico**, to Andrea Palladio in the **mid-16th century** because he was longing for a quiet residence in which to relax on his retirement. After Almerico's death, **his son sold the building to a family, the Capras who** in turn **asked** another architect, **Vincenzo Camozzi**, to **finish the structure** (which had been left unfinished after Palladio's death).

The building was conceived to convey **strength** and **prestige** since Almerico, the first owner, was considered a powerful figure (he had spent all his life in Rome as refendary under Papes Pius IV and V). the construction was erected on a hill to **recall a temple** overlooking the surrounding countryside. The project by Palladio consisted of a cube-shaped edifice **merging geometry** but also the **sky**, the **villa** and the **earth**. The edges of the cube curtain a wide room flanked by a smaller one on both sides to create precise alignment of openings overlooking the surroundings.

TEATRO OLIMPICO

The Teatro Olimpico is one of the most recognised designs by Palladio, since it represents an unparalleled example of **stage with a permanent scenario as the background**.



The building, quite anonymous from the outside, consists of **a series of chambers and corridors** anticipating the more theatre hall. **Inscriptions** all over the interior space witness the presence and genius of Andrea Palladio as the technicians entitled with its construction, being part of the **Accademia Olimpica** financing the building of the entire structure. We know that Palladio couldn't finish the construction of the theatre, which was later handled to his son, **Silla**.

The theatre is a small room in which a series of tiered **steps act as seats** for the public. The closest area to the stage itself is destined to marble chairs which can also be employed to increase the capacity of the

room. In other cases that space may be occupied by an orchestra playing for a concert or to create an underscore.

The scenery realised as background of the apron stage is meticulously conceived as an entrance portal to **a medieval city reproduced in details**. The portal, made out of marble, bears columns displaying a **Corinthian capital** and carrying an upper structure made of **Greek** linear and continuous decorative **patterns** as well as numerous **statues** (recalling classical figures) framed by **pedimented openings**. Looking through the two open passages introducing to what lies beyond the portal we can see building, statues, street, squares or city walls with their roofs, their possible buttresses, they projecting decorative elements, their cornices.

The peculiar aspect of such a stage is that Palladio succeeded in showing his ability in **mastering scale and proportions**: the city created in the background is seen prospectively, that is in depth. The farther you go with your own eyes, the smaller the buildings became. Another consideration is that reproducing something in scale is quite easy when come to scale up. On the other hand, it is quite demanding to use proportions and symmetry when ratios are to be diminished.

BASILICA DI SAN GIORGIO



The Basilica of San Giorgio in Venice is a recognised example of Palladio's style applied to **religious building**. The construction was commissioned to Palladio in the mid-16th century as for the façade which was conceived as a **counterpart of Basilica di San Marco** on the other bank of the lagoon intended to attract people and to create a different suggestive view on the other side of the water canal. The facade of this building is characterised by:

- The **white stone** quarried locally which was chosen to give the entire structure an elegant though simple look;
- The existence of **three sections of gable roof** outlining the main nave and the two side naves by means of upper and lower covering portions;
- The presence of **recessed columns** carried by **huge bases** and reproducing the **composite style** (a Roman version of Greek orders blending the Ionic and Corinthian capital). Such a choice may be justified by the fact that columns obviously recall classical style in architecture but they also suggest that they can be used as decorative elements when they are not built to sustain a superstructure;
- The existence of two edge sections added to the core portion of the building which were constructed as mirroring to each other;
- Decoration is only demanded to the use of **Greek lines** to outline the pediments and the presence of statues to enrich the simplicity of the overall view;
- The use of **arch forms to frame the openings** housing the different statues;
- The employment of **triangular pediments** to top other openings filled with statues;

- A very simple **tympanum** either in the case of the upper pediment or in the lower one: we notice a **small round oculus** enriching the principal tympanum and a **squared frame containing an inscription** to embellish the lower tympanum;
- The **carving works** visible beside the columns capitals and the existence of sacred figures used to evoke the religious atmosphere of the building don't compare to the richness of the facade to be seen on the other bank of the canal, therefore it is reasonable to claim that Palladio's interpretation of churches features is to be read as a more decorative synthesis of simple, symmetrical, ordered and proportioned elements of classical architectural style.

CHIESA DEL SANTISSIMO REDENTORE

This church represent, together with Chiesa di San Giorgio, the other example of Palladio's austere design for religious buildings. It's located on the other bank of the canal and acts as a **counterpart for Basilica di San Marco**. Palladio planned a facade possibly simpler than the one he conceived for Chiesa di San Giorgio Maggiore because in this case the emphasis is given to the huge and attractive dome overlooking the canal.



Chiesa del Santissimo Redentore is featured with columns supporting a plain superstructure and unadorned pediments (just in case of Greek temples) and it doesn't develop in length since it's **taller** than Chiesa di San Giorgio Maggiore. Comparing the two churches is evident that in both cases the columns were used to **recall the austerity of Greek temples** but they don't serve any structural purpose; both churches have 2 pediments but in Chiesa del Santissimo Redentore **the upper pediment is bigger than the lower one** (in Chiesa di San Giorgio Maggiore we see the exact opposite); the facade of Chiesa del Santissimo Redentore is as white as the facade of Chiesa di San Giorgio Maggiore but the former may appear **less decorated** than the latter; statues are employed in both cases to stress the religious taste of the two building even though Chiesa del Santissimo Redentore **only has two statues on either sides** of the building differently from the other church, displaying more statues and carving works; both churches make use of Greek decorative patterns to outline the pediment; Chiesa del Santissimo Redentore is **lacking the inscription** which Chiesa di San Giorgio Maggiore shows in the square frame contained in the lower pediment. The two examples of religious buildings are both highlighted by the presence of **fine and accurate domes**: the original covering sections of the two buildings was magnified by Palladio's project, focusing on the **Roman-inspired** dome as the core of the structure and the section underlining the presence of God because corresponding to the crossing of the transept to the nave.

VILLA GODI



Palladio's construction of the villa for the brothers Girolamo, Pietro and Marcantonio Godi began in 1537 and finished in 1542.

Here it is evident Palladio's desire to interweave themes from local building tradition with those newly and gradually discovered. The outcome is **a severe building** from which all the precious decorations typical of the Quattrocento tradition have been banned. Clearly **symmetrical**, the building is arranged around precisely defined volumes, an arrangement

obtained by recessing the central part of the facade which become a "**loggia**" with three **open arches**.

The same strong symmetry characterises the building's plan, organised around the **long central axis**, hierarchically flanked by two apartments of four rooms each.

The villa is a UNESCO world heritage site and it is open to the public for guided tours as well as being used as convention centre and event location.

VILLA GAZZOTTI GRIMANI CURTI



Andrea Palladio designed the villa for Taddeo Gazzotti between 1542 and 1543. Taddeo was not of aristocratic birth, but was a cultivated man, passionate for music, and connected with the local nobility. Unfortunately, an ill-advised speculation led Gazzotti to ruin and in 1550 he was forced to sell his villa, still in construction, to Girolamo Grimani, who completed it within the space of a few years.

In designing the villa, Palladio had primarily to come to terms with the necessity of **absorbing a pre-existing tower-house** within an up-to-date and coherent ensemble. Palladio created two symmetrical apartments of three rooms each, connected by **a barrel-vaulted loggia** to the great cross-vaulted stair.

The building, which is rather **long than deep**, is bound by a full-height composite order and highlights the cross-shaped hall. It now would require substantial restoration works, but it is a UNESCO world heritage site.

VILLA PISANI BONETTI



The execution of the Villa Pisani, from 1542 onwards, would constitute a true turning point in Palladio's career. Palladio's goal was an ambitious one: to realise a **country residence** catering to the owners' refined tastes and at the same time capable of providing a **concrete, rational and organised** focus for the entire complex of agricultural premises. Palladio succeeded in blending the manorial block, stables, barchesse and dovecotes into a unified desing.

He gave coherence to all the elements which had previously been arranged randomly and without any functional or formal purposes.

Like a Roman temple, the villa rises on a **high basement**, which emphasises the building and screens the service areas. The great **T-shaped, central hall** is barrel-vaulted, richly decorated and illuminated by a wide thermal window. The building also has **pictorial decorations** in fresco inside; the loggia is **bracketed by two small towers** and the central portion is featured with **boss masonry**.

VILLA SARACENO



At the end of 1540s Andrea Palladio was called upon by Biagio Saraceno to **redesign an existing agricultural farm** at Finale di Agugliaro, an ancient property of his family.

Palladio's intervention was confined to the manorial block. The building displays an extraordinary, almost ascetic, **simplicity** and it is a pure volume realised in **brick** and **plaster** from which decorative elements have been banned.

The sparing use of carved **stone** is limited to the most significant architectural elements (like the windows and the portals) and the structural parts.

It is only the design itself which infuses the building with magnificence, despite its reduced dimensions, as it derives its proper elements from the ancient Rome temple: the piano nobile is elevated from the earth and sits on a **podium**; the facade **loggia** is crowned by a **triangular pediment**. Small windows light the attic where the grain was normally stored. Even in plan the villa is of disarming simplicity: two minor spaces designed to accommodate the stairs result in the T-shape of the central hall, to whose sides twin coupled rooms are set and interlinked by proportional consonances.

VILLA POJANA



The villa was commissioned to Palladio by the Bonifacio Pojana, belonging to a family faithful to the Republic of Venice which, from the Middle Ages, had exercised a type of feudal jurisdiction over the territories which bore their name. The Pojanas, in fact, were gifted some territories in return for their loyalty to the Republic of Venice.

Set far from the road, within a deep court, and flanked by gardens, the villa rises over the basement designed for its various service rooms. The principal floor is dominated by a great **rectangular hall covered by a barrel vault**, on whose sides the minor chambers are symmetrically arranged, all covered with differing vaulting.

The great cornice describes a sort of an interrupted pediment on the facade.

Palladio maybe drew inspiration from **ancient thermal architecture** based on the language of forms. Devoid of capitals and entablature, the order is only suggested by the essential articulation of the pillar bases. **Poor materials** and **irrelevant decoration** are the basic features of a building intended to celebrate war rigour (since the family had always been involved into war initiatives on behalf of the Republic).

VILLA FOSCARI



The villa, which Palladio executed for the brothers Nicolò and Alvise Foscari about the end of the 1550s, rises in an isolated block with no agricultural annexes, on the edge of the lagoon and the banks of the river Brenta.

The building is a sort of **villa suburbana** rapidly reached by boat from the centre of Venice.

The family were one of the most powerful in the area that's why their residence has a **majestic and royal look**, which was an unusual feature in Palladian private villas.

The villa rises on a high **basement**, which separates the piano nobile from the damp terrain and gives magnificence to the whole building, raised up on a podium like an ancient temple.

As in Venice, the main facade turns towards the water; the majestic, twin access ramps imposed a sort of ceremonial route on visiting guests.

Materials are very poor, essentially **brick** and **plaster**. As we may now see quite clearly due to the overall degradation of the surfaces, the entire villa is built out of brick, the columns included.

The back facade is one of the most prized creations in Palladio's works, with a system of windows which make the internal arrangement identifiable.

WHITE HOUSE

One of the most famous building drawing inspiration from Palladio's style in architecture is the White House in the USA. Looking at the exteriors of the construction, we can see that the building consists of **two different façades**, each giving a precise look to the structure.



The **north** façade is the one displaying a **portico** recalling Greek temples made up of four columns on the three sides of the portico itself featured with Ionic capitals. The superstructure shows three bands equally unadorned forming the entablature: the architrave, the frieze and the cornice are plain and neat in look. The **pitched roof** representing the pediment is linearly outlined by a regular pattern which acts as a simple decorative element. The façade also shows the perfect **alignment** between the openings on the upper and lower levels. The windows of the first floor (which appears to be the ground floor) are pedimented to replicate Renaissance taste for majestic windows. The shapes of those **pedimented frames** are triangular and round.

The **south** façade is instead characterised by a projecting **bow** lightened by a series of **bay windows**. In this case the bow is outlined by six bearing **columns** and two columns shapes on the opposite sides. The number and the shape of the windows on the edges of the buildings is perfectly reproduced on both sides. The structure is covered by means of a **flat roof** bordered with a continuous balustrade; the section of the building acts as a further level destined to recreative activities, among which there is room for a **solarium**.

AMERICAN CAPITOL – THE CONGRESS



Differently from the White House, the residence for the President of the USA and his/her family (but also the place where the President in charge is asked to collaborate with all the offices he manages and coordinates), the American Capitol is the site housing the two chambers of American Parliament (the Congress).

It is **majestic** and profoundly **impressing** since it is a huge building consisting of several levels and being represented by **utter simplicity** and a series of **classical architectural elements**: the stairs are intended to elevate the building just as Palladio thought when he planned Villa La Rotonda; the entire façade is scattered with a continuous succession of columns and arches; the imposing dome is a perfect section replicating the Roman Renaissance domes. Such a dome is a prestige to the American people who claim it is the unique example in the world to a massive **dome** to cover a state building intended to represent the entire nation.

BAROQUE ARCHITECTURE



Starting from the early 17th century, architecture found a new rhetorical language which expressed **grandeur, magnificence, opulence, exaggeration, theatrical emotions, and scenographic movement**. In Italy Baroque was linked to the Counter-Reformation, and later become the expression of absolutist monarchic power of popes and kings. Churches had an **oval plan** and were topped by an imposing **dome**, on a circular polygonal wall (**drum**) with windows. The main façade displaying **undulating walls and twisting elements**. The interior were **richly decorated** with large-scale ceilings **frescoes**, opulent elements (dramatic statues and gilded puttos) and **distorted shapes**.

Globally the Baroque made use of sensuous curves with the result of great fluidity and dynamism. The Baroque reached its zenith at the court of *King Louis XIV* in France, and was an extraordinarily prolific style in that many royal places throughout Europe were built in this style, including Versailles Palace, with its extraordinary gardens.

In Rome the principal architects of the time were *Gian Lorenzo Bernini* and *Francesco Borromini*. Baroque architecture, whose influence was so powerful in mid-17th century, made little impact in England. It was introduced by *Christopher Wren* and was a sort of compromise with the classical tradition. It was less exuberant than in the continent and is called **Restrained Baroque**.

MODERNISM: ANTONI GAUDÌ

Antoni Gaudì belonged to Catalan Modernisme. His first works followed the Gothic and traditional Spanish architecture, but he soon developed his own distinct style with original sculpture designs. His masterpiece is probably **Sagrada Família**, a huge church in Barcelona whose construction began in 1882 and has not been finished yet. This majestic cathedral, represents an unparalleled example of imposing religious building planned to celebrate the importance of the holy family for a faithful citizen. Gaudì spent most of his life on the project because during its execution the work proved demanding as for the volume of buildings materials to employ and for the commitment of workers and designers. The building is to be associated with the elevation efforts characterising the Gothic style added with a new perspective in architecture: Gaudì wanted to introduce the concept of **organic architecture**. This interpretation of architecture implies the use of building construction applied to nature. It is an example of architecture intended to reduce its impact on the natural environment and, rather, to blend human action with natural balance.



The structure was originally conceived to have three accessing portals suggesting an imaginary tour:

1. The **Portal of the Nativity** (Birth Portal) was designed to reproduce scenes depicting the birth of Jesus;
2. The **Portal of the Passion** of Jesus Christ, representing the death of the Saviour;
3. The **Portal of the Glory**, in other words, a façade celebrating the gift of Resurrection and the subsequent immortality of the Saviour.

Once inside, visitors may experience the sense of incredible height together with certain dismay caused by the sensation of being within a forest. Said puzzleness is also provoked by a striking succession of giant stained windows intended to recall sunrise (cold colours) at the entrance of the cathedral and sunset (hot/bright colours) at the end of the tour.

MODERNIST (MODERN) ARCHITECTURE

Modernist architecture refers to movements that emerged in the early 20th century in response to **large-scale changes in both technology and society**. Modernism dominated the whole century and was characterised by a strictly analytic approach; it includes Futurism, Constructivism, De Stijl and Bauhaus. By concentrating on the function of the building, architects designed pure forms and eliminated any decorations. A common aphorism was "*forms follow functions*", meaning that design derives directly from the construction's use.

Modernist style is characterised by: **asymmetrical compositions, parallelepiped or cubic shapes, open-plan interiors, flat roofs, large windows, minimal or no ornament, a tendency for white or cream**. The preferred construction method was **steel and frame**, with structural elements that were often quite visible. Glass, steel and reinforced concrete were the preferred materials.

WALTER GROPIUS & BAUHAUS SCHOOL

The term refers to **an important school of art and design** founded in **Germany** in **1919** by **Walter Gropius**. Gropius had taken part in the First World War and resulted deeply shocked by the number of buildings completely destroyed during the war and, considering himself as a miracle survivor of the war, he started to conceive the necessity of adopting a **new prospective** to start the needed reconstruction. The result of that new prospective was to found a school grouping all people interesting in proposing new concepts about buildings.



Over time the Bauhaus conveyed the idea that structures had to be planned to make *form follow functions*. From this point of view they started building constructions lacking a traditional façade and which move beyond the conventional ideas on classic forms. Shapes had to be altered and redefined and the aesthetical appeal of buildings lay on the concept of innovation and freedom. The new approach actually introduced a *Modernist vision* in which structures might be realised having **flat roofs, inconsistent walls** also due to the presence of large and imposing windows, **unpredictable conceded foundation anchorages**.

It is important to stress that the school founded by Gropius soon became the symbol of a new life feature with optimism and a research for unprecedented paths. Gropius wanted people coming from all Germany to contribute to innovation; the remarkable volume of people applying for the school made Nationalist Germany realise that young people were looking for something radically new. Provided that the school was originally located in **Weimar** determined a clash between innovation and tradition because local people soon proved unable to understand the new vision and government funds to run the school were soon denied.

When Gropius got that his approach was not prized by Weimar local population and Federal government, he decided to move elsewhere, more precisely to **Dessau**. The little town north way from Weimar provided him to construct a new building for the school at the same time making he dependent on local authorities (basically the Mayor). The school retained his original approach and offered a series of different courses to both men and women who shared their time experiencing things together. Rumours about progressist views on life and non-decent lifestyle behaviour among students and teachers and students damaged Gropius's reputation until the founder decided to quit and appoint certain **Meyer** as

the director of the school. The new leader has radical left-wing ideas and the school was afterwards identified as a centre for communist ideas. The Nazi party saw in the school the tangible danger of spreading political ideas contrary to the authorities in power, that's why they decided to break into the building to drive all the occupants away. Dessau Mayor eventually closed the structure banning every kind of activities here.

The last phase of development of the Bauhaus school is to be associated with **Berlin**. Meyer was replaced to another influential figure of the Modernist movement: **Ludwig Mies Van Der Rohe**. Once in charge, Mies proved interested in identifying all the people in the school who were active in political involvement/debate in order to ask them to leave. Mies was considered an excellent architect: his skills in drawing were judged as rare; despite this, after a little time, the Nazi party made up people's mind that the school has to be definitely closed. Mies is somewhat overlapping the idea of modernist buildings to plan differently from the past that Gropius had in sense introduced and spread. Like Gropius, Mies conveyed the necessity of buildings lifted from the ground, lightened by large continuous windows, represented by cubical shapes in certain degree contrary to the concept of accumulation (levels).

LUDWIG MIES VAN DER ROHE

The name of this influential architect is commonly associated with the founding of the revolutionary Bauhaus in Germany but it also connects with a series of visionary works the man built all over the world spreading his idea of Modernism. Mies Van Der Rohe is known for a set of building conceptions embodying his motto: **less is more**.

1. Buildings have to be simple in look, sometimes they show an essential **industrial appearance** because abundance was not a synonym for beauty to him;
2. **Creamy colours** of materials employed in construction were prized to recall simplicity and to make the building “breathe”;
3. Black colour, which was often used together with white, was intended to highlight the rustic look of **galvanised metal** and to emphasize **glass transparency** and **bright environment**;
4. Buildings are inevitably carried by metal **pillars** driven deep into the ground which granted stability to the construction but also lifted the structure making it “float”;
5. His buildings were conceived to **integrate** with the surrounding landscape since they were the output of a process aiming at establishing an interaction between the building and the receiving land, between the inside and the outside of the building;
6. **Glass** is ever-present because it replaced conventional walls made of concrete or other screening materials. Walls were actually denied by the presence of huge frame windows devoted to filter light and produce continuity with the other world;
7. Interior space was distributed to create the so-called **open space plan**: such a kind of plan consist of a unique space devoid to any walls allowing designers and occupants to arrange furniture pieces without limits. Mies Van Der Rohe’s buildings actually displayed vertical bearing pillars within the floor and the rest of the space was empty to be filled;
8. The roof of Mies’s structures was always **flat** since he intended construction as functional and for this reason he didn’t want to build sections in a house non directly associated wit a specific use. Gables in a roof are space eaters and cannot be actually used.



Villa Tugendhat (1930, Czech Republic) is a revolutionary construction consisting of a **steel framework, no load-bearing walls, and a large open free space**. It is situated on a slope terrain and it looks one-storey from the street, but it is 3 storey from the garden side. Large glass walls substitute the usual masonry walls and give the villa a magnificent view on the valley below, which is an integral part of the house. There are no decorative items inside the villa, but the interior is not austere thanks to the use of natural patterned precious materials such as an onyx wall and a tropical wood screen.

LE CORBUSIER

Le Corbusier was one of the most influential architects of the 20th century. He devoted himself to both domestic architecture and urban planning, always applying the concept of the “*machine for living*”, meaning **architecture has to be an efficient tool to provide for the necessities of life and no more**. He produced lots of ideas on large-scale housing projects to overcome the post-war urban housing crisis, aiming at creating low-cost functional and comfortable living spaces for common people.



Villa Savoye, is probably Le Corbusier's best known building. Located near Paris, it is a weekend family house, planned according to the **Five Points of Architecture**, Le Corbusier's famous architectonic principles:

1. **Pilotis**, to elevate the building off the ground;
2. An **open floor plan**, rather than rooms and partition walls;
3. A **free façade**, serving only as skin of the construction;
4. **Ribbon windows**, to illuminate spaces equally;
5. A **roof garden**, to give back the land covered by the house to nature.

The main part of the house is located on the first floor, while the ground floor is occupied by an entrance hall, service rooms and a garage. The roof is typically flat and consists of a series of sculpted spaces that form a solarium and a roof garden.

FRANK LLOYD WRIGHT

Wright was one of the greatest architects in of all times, and devoted much of his career to building family houses. He transformed the America home when he developed the **Prairie Style**, characterized by **low sloping roofs, suppressed chimneys, overhangs, terraces and open interior spaces**. According to Wright, the horizontal line was truly American, in that it reminded the low horizons of Midwest prairies. It was a line of repose and shelter, consistent with a house whose heart was a fireplace, the spiritual centre around which the other rooms were arranged.

Later, Wright evolved the idea of **Organic architecture**, meaning that **architecture had to blend into the natural surroundings and look as if they grown out of the ground**. His purpose in building Fallingwater House was to build **a structure in harmony with the natural landscape around**. Wright actually did something different from anything known, he went further the mere request of the owner of the property. His house was built venturing closer into the waterfall. The building is unconventional because it doesn't show a symmetrical plan: it doesn't represent a cube, a square or anything traditional. The skeleton of the house is represented by a heavy and load bearing section made in stone carrying the weight of protruding cantilever terraces. A cantilever section in a building is a suspended part which seems free from vertical supports.



Each cantilever section requires certain measures:

- It's to be anchored to the framework of the building acting as a bearing skeleton;
- It requires a counteracting section serving as levelling of the forces acting on the suspending part;
- It has to be planned to reduce the suspended part in order to make the barycentre inside and anchored to the skeleton.

Fallingwater house consist of different **cantilevers sections** interconnected and interjoined relying on a web supporting vertical piers. The house is surprisingly captured by the water since the downwards staircase ends up into the stream produced by the waterfalls and it creates spaces literally leading to water. Today, the house belongs to a state organization intended to preserve it and to produce touristic tours indoors and outdoors. Inside the structure we may appreciate on overall look of simplicity and rustic quality. Furniture is essential to give way to the imposing built sections displaying stone and wood. Walls are somewhat absent since they are replaced by large and continuous frame windows connecting the interiors to the surrounding view.

URBAN PLANNING

PGT and Master Plan are two terms apparently different, but they are similar images to refer to the same thing. Plan is the word corresponding to letter P in the Italian acronym. Such a plan is actually a document. Letter G in the Italian acronym basically reminds of the term Master used in English: Master is employed to identify somebody or something representing the highest level of expertise in something; letter G stands for “governo”. Governing an area of and or a group of people is an action entitled to experts.

Master Plan is a document that shows a community as it is and how it should grow in 10 to 20 years. It is a flexible guideline that allows for changes and adaptations over the years.

Urban Planning is the label used to refer to the accurate planning of the urban space.

Urban planners regulate urban elements in order to meet everyone’s needs, and provide an ordered, healthy environment.

Zoning means dividing a town into separate districts within which only some uses are permitted. They provide a clear definition of the types of activities allowed in each zone, and a definition of building density, height and more.

DESCRIBING MAPS

This map/chart/graph/index **deals with** the interventions to carry out in order to better public transport efficiency in Sheffield. **By means of** pink/violet **continuous** lines we are shown the existing supertram routes which clearly serve the central part of the city only. The **dashed** violet line shows that Sheffield local authorities want to extend the area served by the supertram moving **outwards**, to the **outskirts**. The map also **stressed that** those local authorities judge impossible or not advisable to improve the service offered by the main bus. On the other hand they propose the introduction of a freebie area together with an extension. The dashed blue line is intended to identify the central portion of Sheffield to serve with a freebie service/facilities. Freebie is a specific term used to refer to free means of transport destined to students or anyone interested in reaching short-distance places for work or study purposes. Since Sheffield is an university campus local authorities **are interested in** creating a further interchange station highlighted by a black star thought to provide people with a central and crucial station offering trains bound to all directions.

This map **clearly shows that** local authorities of Sheffield are interested in expanding the public spaces and breathing spaces within the **urban perimeter**. **Public spaces** are the ones destined to all the citizens as gathering spots: for instance, squares and central halls in general are to be considered as public sites in which to enjoy one’s free time or in which people can develop their social contacts.

Breathing spaces are, on the contrary, spots conceived to provide people with green areas in which people could profit from fresh air and healthy environment. Examples of breathing spaces are gardens, parks, flower beds, greenways and so on. This Master Plan displays that local authorities aim at improving the quality and accessibility of both kinds of spaces by creating further gathering spots in the centre of the city and planning the creation of green areas on the external perimeter of the settlement. Light pink colour is used in the map to **highlight** the improvements of public spaces to add to the existing ones emphasised by means of yellow. Breathing spaces, instead, are mostly bettered as for their accessibility; green and blue colour lines are to be analysed together with discontinuous, dotted lines in the same colours showing that existing green spaces are to be expanded to make people move further.

The Plan VIII of Sheffield Master Plan witness the concerns of local authorities about the quality of the air within the city which overlaps the necessity of providing people with the opportunity to enjoy the urban space walking or cycling around. This map contains a series of **spots** highlighted by means of pink colour: all these spots represent the proposal for improvement for cyclist and pedestrians. The continuous pink line is to be bettered realising the interventions **displayed by means of** dotted pink line, but the most interesting interventions are the ones shown through the pink-filled square (referring to the crossing areas for cyclist and pedestrians) together with pink-bordered circles (referring to areas in which cyclists may take/leave the bikes they intend use). The entire map **aims at** three different purposes:

1. Making the urban space an ordered one providing areas to park ecological vehicles without leaving them unattended;
2. Designing routes allowing the local authorities to offer the urban space to citizens who do not want to make use of parking areas for cars; this is a way to provide an alternative to constructions of new parking;
3. Enabling local authorities to achieve a more sustainable city living without the presence of too many motor vehicles.

URBAN PLANNING: the activity of designing and organising the urban space;

URBAN PLANNERS: people involved in urban planning.

The difference between the labels urban planning and Master Plan is that the former is the goal/purpose/the activity achieving a result, the latter is the tool to be used to reach that goal. It is incorrect to state that urban planning refers to large cities or that it has to do with a series of citizens considered as a whole. The term is applied to the organization of every urban settlement whether either large or small. The Master Plan is the document to write to guide the organization. The figures involved in writing the Master Plan are:

1. **Local authorities** administering a settlement who are expected to know the urban territory and the needs of their community;
2. **Surveyors, architects, engineers** who are hired to give technical advice and remarks;
3. **Geologist** entitled with the analysis of the land housing a community: they are expected to give information about the different areas of the land and their features;
4. **Sociologist** who are asked to investigate the community to identify their needs and purpose certain interventions instead of others;
5. **Private/public investor** who may finance the development of city investing sums of money;
6. Any other figure having interest in proposing a precise goal for the community.

GUIDING THE CITY'S DEVELOPMENT IMPLIES INTERVENING ON THESE ISSUES:

EMPLOYMENT:

- Building factories thus identifying an area to be used as industrial;
- Investing in funds to support the activity of existing factories;
- Encouraging the creation of different commercial activities providing people with a wide range of services in the same area (restauration activities, shops, sort facilities, recreational activities, and so on).

POVERTY:

- Building lots of council housing;
- Offering people a wide range of educational courses training to a skilled profession. In this casa enrolling expenses may be quantified according to the different economical means to favour those in need;
- Sensitising citizens on charity;
- Creating recreational activities intended to be gathering spots welcoming all the citizens and preventing some of them from committing crimes or joining criminal bands;
- Providing people with job opportunities by encouraging commercial activities;
- Granting free or affordable access to basic facilities to everyone. Public transport may grant advantageous fees to those in need to make them reach whatever place without imposing the possession of a private vehicle.

CRIME PREVENTION:

- Planning intervention to qualify degrading slums where criminals tend to live and work. Brownfields are places in which buildings are decaying and where illegal people or criminals are more likely to escape the local or state control. Upgrading the standars of living in slums is a way to check all the activities performed on that area and contrasting evil actions;
- Offering job opportunities is a way to grant a wage to everybody and, as a result, impeding criminal bands to approach unlucky citizens with their huge volumes of money;
- Supervising open spaces, parks and gathering places to identify all the people grouping and the activities done;
- Installing systems of video control in deprived areas or in remote parts of our municipality.

EDUCATION:

- Constructing new and well-equipped schools/university campuses;
- Providing job training courses to manual workers;
- Planning the construction of public libraries granting access to everybody;
- Proposing cultural events destined to all the community (meetings, lectures, public debates, and so on).

TRAFFIC CONGESTION:

- Constructing underground facilities or improving those existing;
- Making public transport means more efficient (this implies expanding the area served by those means and narrowing between time span in the service);
- Offering affordable fees to access public means;
- Improving cycling lanes or pedestrianised areas;
- Planting trees in congested areas of the settlement or enlarging parks/green areas;
- Creating further parking areas, even scattering them over the outskirts;

- Proposing rental means of transport favouring those lacking a private vehicle as well as those caring about the environment;

BIODIVERSITY:

- Contrasting urban sprawl and preserving natural habitats in wild places to make animal and vegetal species survive;
- Looking after parks and green areas to protect flora and fauna; designing new parks/green areas;
- Managing rubbish and contrasting illegal landfills to discourage contamination on the urban perimeter;

ENVIRONMENTAL PROTECTION:

- Improving/enlarging/caring about parks/green areas;
- Sensitising people on the necessity to employ public transport means instead of private ones;
- Offering rental means which are ecological and touristically preferable enjoy the city;
- Pedestrianising the most visited parts of the settlement;
- Planting trees anywhere as possible;
- Giving incentives for green vehicles;
- Promoting the use and development of sustainable energy sources;
- Encouraging the use of energy-saving measures;
- Recycling rubbish;
- Contrasting illegal landfills.

SOCIAL HOUSING:

- Constructing council housing solutions;
- Intervening on decaying buildings all over the city, especially in slums;
- Adapting abandoned structures into new uses, even to help people momentarily lacking a house or approaching our municipality in case of emergency.

SUSTAINABLE CITIES

Sustainable cities are often mistaken of citizens in which people are granted profitable living standards with reference to environmental measures. As a matter of facts, sustainable cities are settlements in which people enjoy their lives as for **social**, **economical** and **political** reasons together with the **environmental** measures. In other words, **sustainable cities are settlements in which citizens feel satisfied and happy to live.**

Here are the four key aspects:

1. ENVIRONMENT pillar: the ecological footprint, the consumption of resources and the pollution produced;
2. ECONOMIC pillar: the ability of the city to provide job opportunities and attract investments which can generate wealth and prosperity for its inhabitants;
3. SOCIAL pillar: about the citizen's quality of life, public health, security, social integration, mechanisms to tackle deprivation and inequality, and the creation of an attractive community to live in;
4. INSTITUTIONAL pillar: which concerns democratic institutions, people's participation, and transparent decision-making processes.

Honestly, sustainable cities **represent an ambitious goal**: local authorities are often asked to set priorities to tackle all the matters regarding the urban space and it is not always possible to employ funds and expertise to make an urban space sustainable.

It is often thought that the term sustainability is associated with the shared concern for the environment, but it is not true. A person declaring living in a sustainable city basically means that his city provides him/her with everything needed from the economical, social and political points of view together with an environmental sensitivity.

GREEN CITIES

This settlements are particularly concerned with all the environmental problems. They are **planned focused on a series of measures to adopt in order to contrast human impact onto the environment.**

Apart from attaching great importance to **parks, gardens, open spaces** in general and favouring the presence of **ecological means of transport** within the borders of the city, local authorities aiming at green cities want to tackle some problems:

1. **Heat island effect**: this effect refers to the heat perceived in urban centres where the average temperature is higher than in the rest of the city because of the concentration of different activities. Human activities are the ones producing sensible quantities of **carbon dioxide** and other **toxic gases** which trap heat and provoke **scorching heat**. This effect is named after people's perception of living on a hot island surrounded by other temperatures. To contrast such an effect, green cities are planned providing people with lots of **tree-lined streets** especially in the city centre.
2. Introducing **rubbish recycling schemes** because waste left in **landfills** releases **disposal gases** which are likely to contaminate the soil and **underground water**. Recycling means that rubbish is treated to be employed for something else and to act as a raw material to produce useful items (or to produce energy).

3. Green cities are also expected to find a solution to solve the problem of **water pollution**. Water basins are polluted by human beings in different ways:
- **people may throw rubbish away considering water as a bin;**
 - citizens in urban settlements are responsible for the **production of dirty water flushing down the toilets or water pipes** in every house (such a dirty water derives from the use of soaps, detergents and biological waste, but in many cases water is even contaminated with a series of hygienical tools people use at home such as cotton sticks, ladies wipes, plasters which are eventually released into water basins and eaten by fish). Local authorities are profoundly interested in coping with such a situation and generally imposed strict rules to manage rubbish;
 - **rainwater** is properly treated to be used either for farming purposes or household goals. Rainwater needs restoring procedures because it is acidic. Rain is neutral when its PH equals 5.6 but, due to the fact that it comes into contact with polluted air, all the toxic substances contaminating air are absorbed by water particles in rain and its PH level decreases. For this reasons water dropping from the sky requires to be treated before being employed for various uses;
 - green cities are also interested in solving the problem of **thermal pollution**. Such a pollution is caused by factories which need to cool machinery and use water basin to release machines heat. An operation like this implies that water temperature in basins rises, which in turn produces a decrease in the quantity of oxygen available, which in turn determines the death of water fauna. Local authorities In green cities are possibly able to contrast such a phenomenon imposing compulsory rules/instructions to factories and firms.

SMART CITIES

A smart city is a municipality that uses information and communication technologies to increase operational efficiency, share information with the public, and improve both the quality of governments services and citizens welfare.

Examples of technology applications are **traffic management, e-services, gas and water lake detection, video crime monitoring, and telemedicine.**

The goal of smart city is respond to the challenges posed by increasingly complex urban areas and a growing population; the problem is that most cities don't have much money to invest.

Some criticisms have been made about possible negative effects on human health and privacy.

GREENWICH MILLENIUM VILLAGE (GMV)

An example of urban renewal. It is located on the River Thames in a brownfield that used to be a gas works. GMV is a nationwide project of exemplary sustainable community with the goal of reducing car dependency. GMV includes three main roads, except for them, the village is car-free with propriety given to cyclist and pedestrians. Safety is enhanced through monitoring of cycle routes and pedestrian areas by Closed Circuit Television. Residents enjoy being part of this special community.

KRONSBURG

Located in Germany, is an example of sustainable town with high ecological standards, energy-efficient buildings and many green open spaces. The town has a rectangular grid layout and is cut by straight roads. Kronsberg expands along the local public rail line and the stops are located so that nobody has to walk more than 600 meters to catch a train. At the mid point there is concentration of community services. The most important energy source is three wind turbines which provide electricity. There's also a solar heating system which provides central heating, distributed through a pipeline. Almost 3000 jobs are located in the immediate vicinity of the city. There's an exceptional mixture of social classes.

SONDERBORG

A little-known Danish town almost surrounded by water. His ProjectZero plan aims to enable Sonderborg to become zero carbon by 2029. For this reason, the existing district heating is to be expanded. They convert to many renewables including geothermal, solar, photovoltaic and waste from farming. House owners have been supported in energy retrofitting.

EP = extended plan

In the middle = al centro

Top left = in alto a sinistra

Top right = in alto a destra

Bottom left = in basso a sinistra

Bottom right = in basso a destra

Close to the = vicino a

Downwards = verso il basso

Upwards = verso l'alto

In the foreground = in primo piano

In the background = sullo sfondo

PUBLIC WORKS

With the expression “public works” we usually refer to a series of works made to better the Lifestyle of people. In other words, examples of public works are bridges, roads, airports, schools, motorways, town pavements, state or town buildings, sewers, libraries...

BRIDGES

Thanks to the properties of its materials, a bridge can withstand and oppose the forces to which it is subject to. These forces have three main origins:

- the dead load, that is the bridge' s own weight;
- the live load, that is the traffic passing over the bridge;
- external environmental loads, such as wind, earthquake or water.

The actual nature of the forces can always be reduced to four types, acting singly or combined. Two of these forces are opposites: tension (which pulls apart) and compression (which pushes together). The others are shear (which breaks under a pressure) and torsion (which twists, modifying the original shape). The ability of a material to cope with these forces is called its strength (which can be tensile, compressive, shearing, and torsional).

BEAM BRIDGE

A beam bridge consists of a straight, horizontal deck placed on two vertical supporting piers. In a beam bridge the central portion of the structure is subject to compression while the edge sections of the beam are under tension. These two opposite types of pressure keep in balance on the horizontal beam and the loads produced are then discharged downwards through the vertical piers (abutments).

ARCH BRIDGE

In an arch bridge the span is supported by a curved structure joining the span and the lower part of the entire construction. The pressure exerted on the span is discharged on the bending slopes of the arch which help the load be released onto the bottom of the structure. The different loads acting on this type of bridge are discharged both downwards and outwards through the supporting piers.

CANTILEVER BRIDGE

In a cantilever bridge the deck is supported by horizontal beams stacked one on top of the other and leaving some portions suspended. The result is that the entire structure is firmly secured at one end which acts as the bearing part of the bridge and the suspended portions (which must be short or interconnected with other securing elements) are the extension of the basic axis. The loads acting on the structure are discharged by the beams supporting the span both downwards and outwards through the vertical supporting piers.

SUSPENSION BRIDGE

In a suspension bridge the central span is suspended because it does not rest on anything. It can withstand because the bridge is supported by two elements:

- Two vertical towers (driven downwards into the ground and resting on solid bedsoil)
- A series of cables (acting effectively to make the bridge oppose bending or collapse)

The two towers contribute to the withstanding of the central span portion and make the loads be discharged downwards onto the bedsoil.

The cables can be divided into two types:

- a) the main cable which runs freely onto the towers spanning the entire bridge;
- b) the secondary cables (also called hangers, stringers or suspenders) departing from the main cable and attached to deck.

The main cable is firmly anchored at each end of the bridge and stretches the entire structure making it resist to bending or other types of forces producing collapse; hangers connect the span to the main cable and help bearing it. The pressure exerted on the central portion of the bridge is released both downwards through the towers and outwards onto the river banks through the main cable which is secured to the anchorages thus pulling the bridge tight.

CABLE-STAYED BRIDGE

In a cable stayed bridge straight cables departing from pylons support the platform of the bridge without vertical suspenders. Comparing a suspension bridge and a cable-stayed one underlines both differences and similarities.

Similarities

- Both a suspension bridge and a cable-stayed bridge are structures having a suspended deck;
- They have cables making the structure withstand.

Differences

- In a suspension bridge the cables are not directly connected with the vertical towers and are secured to the anchorages at the two ends of the structure;
- In a cable-stayed bridge the cables are directly connected to the vertical towers, in fact they depart from them and anchor to the span;
- A suspension bridge is generally longer than a cable-stayed bridge;
- The towers of a suspension bridge do not have to be as tall as in the case of a cable-stayed bridge.

DRAWBRIDGE

During the Middle Ages, drawbridges were not only a regular feature of castles, but a defensive rising section was frequently built into multi-span river bridges. Drawbridges were fitted with counterweights, which enabled the bascule to be raised and lowered. Nowadays, drawbridges normally have two decks which can be lifted and lowered to let ships and cruise ships pass across. A fine example of drawbridge is Tower Bridge, which has become a symbol of the City of London.

DAMS

Dams have been built since old times to store water for agriculture, to control flooding and, in more recent times, to generate electricity.

There are four types of dams:

- arch dams (dighe ad arco)
- buttress dams (dighe con contrafforti)
- embankment dams (dighe ad argine)
- gravity dams (dighe a gravità)

An **arch dam** consists of a structure made of horizontal arches with their curved tops facing upstream. It is generally built in narrow, steep-sided valleys. The arch shape is strong to resist to the hydrostatic force of water which pushes horizontally and towards the downstream side because it balances pressure and makes the load be discharged vertically through the vertical wall of the structure.

A **buttress dam** consists of a straight wall pushed against the upstream side which is supported by a series of triangular-shaped walls, called buttresses. The hydrostatic force of the water pushes horizontally towards the downstream side, whereas the buttresses push horizontally towards the upstream side. The load is eventually discharged downwards through the vertical side of the wall.

An **embankment dam** is usually chosen for sites with wide valleys and can be built on hard rock or softer soils, as it does not exert too much pressure on its foundations. This type of dam is made mainly from natural materials since it is built up by compacting successive layers of earth, using the most impervious materials to form a core and placing more permeable substances on the upstream and downstream sides. A facing of crushed stone prevents erosion by wind or rain, and an ample spillway, usually of concrete, protects against catastrophic washout should the water overtop the dam. The load is discharged vertically through the wide bottom of the structure.

A **gravity dam** is a solid structure, made of concrete or masonry, constructed across a river to create a reservoir on its upstream. The section of the gravity dam is approximately triangular in shape, with its apex at its top and maximum width at bottom. The section is so proportioned that it resists the various forces acting on it by its own weight. Gravity dams are particularly suited across gorges with very steep side slopes where earth dams might slip. Where good foundations are available, gravity dams can be built up to any height. Gravity dams are also usually cheaper than earth dams if suitable soils are not available for the construction of earth dams. This type of dam is the most permanent one, and requires little maintenance. The load is discharged downwards vertically through the wide bottom section which holds the dam firmly to the ground and spreads its weight.

RETAINING WALLS

Retaining walls can be divided into rigid and flexible, according to the way they deform under pressure. Rigid walls are unlikely to deform but, rather, they rotate rigidly along one point of their base. On the other hand, flexible walls tend to deform even if a series of factors determine this process: the nature of ground, the presence and number of anchors, and the depth of pile-driving.

To talk about **rigid walls**:

- **gravity** walls derive their capacity to resist lateral loads through dead weight of the wall. A gravity wall gets its name because it uses the force of gravity to remain upright;
- **semi-gravity** walls are similar to gravity walls, except they are less wide than gravity walls. They basically consist of some metal reinforcement enabling them not to be so that massive;
- **gravity cantilevered retaining** walls (also called cantilever walls) are made of reinforced concrete that consists of a thin stem and a base slab.

Flexible walls are also called sheet pile walls.

Examples of sheet pile walls are:

- **non-gravity** (sheet pile) cantilevered walls, that is sheet pile walls which derive their support exclusively through interaction with the surrounding soil;
- **anchored** walls are sheet pile walls which derive their support from a combination of interaction with the surrounding soil and one or more anchors connecting the wall to the ground.

GARDEN DESIGNS

Gardens are **open spaces** to be designed considering three dimensions:

- **Overhead** plane
- **Vertical** plane
- **Horizontal** plane

Raised edges = spigoli rialzati

Designing gardens is very demanding and this is the reason why most of the technicians choose not to specialise into the branch.

First of all it is important to underline that gardens are spaces to be enjoyed with other people. This implies that differently from indoor space, gardens **are destined to groups of people** summoned to do the same things at the same time.

Gardens also requires **creativity** and a **sense of balance**. Creativity makes professionals find attractive solutions which may be prized by the property owner(s) as well as his/their guests. Creativity also refers to certain taste for colours, smells, amazing sights and textures. Sense of balance is a personal quality which connects with the sensible options professionals are required to select/choose in order to make a garden something agreeable to see and safe to live. People lacking sense of balance are not apt to become garden designers because open spaces are to be planned considering some limits and other risks.

Another important skill required to garden designers is the ability of **diplomacy**: being good at finding solutions by means of compromise proves to be relevant in order to adopt some measures instead of undesirable/non sensible/not profitable ones.

Great garden designers are also called to consider that planning spaces in an open space inevitably implies to **scale up**. This happens because gardens are destined to communal life and to leisure activities. This means that terraces, paths, flower beds, pools, steps must be planned to enable more than one person to gather around. For instance, terraces are required to be wide enough to make users enjoy the space without any inconvenience.

On the other hand, gardens imply a careful project since designers mustn't only care about the aesthetical look of the different sections in the garden itself, but they must absolutely pay attention to safety as well. Risks are to be signalled and dangerous areas must be kept out of reach. Don't forget that gardens, either public or private, may be attended by disabled people or children.

Examples of devices referring to the horizontal plane: **terraces, paths, fountains, pools, ponds, flower beds, flower pots, steps, sitting/lounge areas**.

Pergola = pergola

Varco per piante rampicanti = arbo(u)r

Divisorio per piante rampicanti = trellis(s)

The elements of the vertical plane are generally useful in a garden because they represent screening devices to:

1. **mark the boundaries** of my garden (this is important to show the borders of my property and the presence of other lots or to distance my garden from the rest of the surrounding allotments)
2. **create a peculiar atmosphere** in my garden and to seclude my open space from the rest of the world.

With reference to the way in which a garden is exposed to the people's intruding eyes, we can distinguish two types of gardens:

1. **introvert** garden: it is a solution for people who want to enclose their open space in order to screen it completely and avoid intruding eyes. This happens not only when owners don't want to be invaded by unwanted eyes, but also when they seek to isolate their property because the surrounding areas are deprived or unvaluable.
2. **extrovert** garden: it is an open space planned to integrate with the surrounding landscape for two basic reasons:
 - to improve the sense of space when a garden is too small and choking;
 - to gain higher market values because of the presence of a landscape prized area.

Examples of elements referring to the vertical planes are: **gates, hedges (siepi), fence, pergolas, arbors, trellises, dry walls, pleached trees (alberi potati a siepe).**

The overhead plane is connected with the necessity to create roofs in a garden to make people comfortable when outside in a sunny, hot or rainy day.

Alberi a ombrello = **umbrella trees**

Tettoia = **canopy**