# Defensive Structures

Bastion ([Wikipedia](#))

A **bastion** is a structure projecting outward from the main enclosure of a fortification, situated in both corners of a straight wall (termed *curtain),* with the shape of a sharp point, facilitating active defense against assaulting troops. It allows the defenders of the fort to cover adjacent bastions and curtains with defensive fire.

The bastion was designed to offer a full range on which to attack oncoming troops. Previous fortifications were of little use within a certain range. The bastion solved this problem. By using cannon to cover the curtain side of the wall, the forward cannon could concentrate on oncoming targets.

Types
Various types of bastions have been used throughout history.

- **Solid bastions** are those that are filled up entirely, and have the ground even with the height of the rampart, without any empty space towards the center.
- **Void** or **hollow bastions** are those that have a rampart, or parapet, only around their flanks and faces, so that a void space is left towards the center. The ground is so low, that if the rampart is taken, no retrenchment can be made in the center, but what will lie under the fire of the besieged.
- A **flat bastion** is one built in the middle of a courtain, or enclosed court, when the court is too large to be defended by the bastions at its extremes. The term is also used of bastions built on a right line.
- A **cut bastion** is that which has a re-entering angle at the point. It was sometimes also called **bastion with a tenaille**. Such bastions were used, when without such a structure, the angle would be too acute. The term **cut bastion** is also used for one that is cut off from the place by some ditch. These are also called **ravelines**.
- A **composed bastion** is when the two sides of the interior polygon are very unequal, which also makes the gorges unequal.
- A **regular bastion** is that which has its due proportion of faces, flanks, and gorges.
- A **deformed** or **irregular bastion** is that which wants one of its demi-gorges; one side of the interior polygon being too short.
- A **demi-bastion** has only one face and flank. To fortify the angle of a place that is too acute, they cut the point, and place two demi-bastions, which make a tenaille, or re-entry angle. Their chief use is before a hornwork or crownwork.
- A **double bastion** is that which on the plain of the great bastion has another bastion built higher, leaving 12 or 18 feet between the parapet of the lower and the base of the higher.
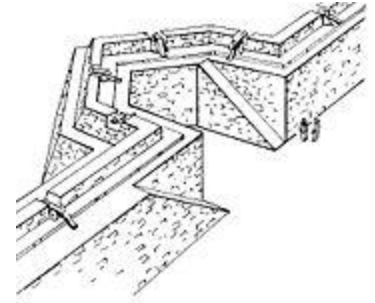
Barbican (Wikipedia)

A **barbican** (from medieval Latin *barbecana*, "outer fortification of a city or castle," a general Romanic word, perhaps from Arabic or Persian cf. bab-khanah "gate-house" and "towered gateway" or from the mediaeval English *burgh-kenning*) is a fortified outpost or gateway, such as an outer defence to a city or castle, or any tower situated over a gate or bridge which was used for defensive purposes. Usually barbicans were situated outside the main line of defences and connected to the city walls with a walled road called *the neck*.

In the 15th century, with the improvement in siege tactics and artillery, barbicans lost their significance. However, several barbicans were built even in the 16th century.
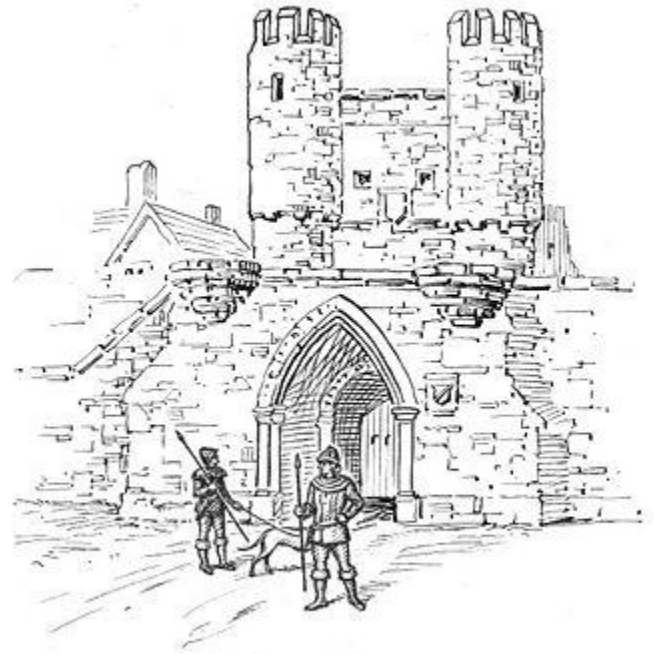
Defensive Walls ([Wikipedia](#))

A **defensive wall** is a fortification used to defend a city or settlement from potential aggressors. In ancient to modern times, they were used to enclose settlements. Generally, these are referred to as **city walls** or **town walls**, although there were also walls, such as the Great Wall of China, Hadrian's Wall, and the metaphorical Atlantic Wall, which extended far beyond the borders of a city and were used to enclose regions or mark territorial boundaries. Beyond their defensive utility many walls also had important symbolic functions — representing the status and independence of the communities they embraced.

Existing ancient walls are almost always masonry structures, although brick and timber-built variants are also known. Depending on the topography of the area surrounding the city or the settlement the wall is intended to protect, elements of the terrain (e.g. rivers or coastlines) may be incorporated in order to make the wall more effective.

Walls may only be crossed by entering the appropriate city gate and are often supplemented with towers. In the Middle Ages, the right of a settlement to build a defensive wall was a privilege, and was usually granted by the so-called "right of crenellation" on a medieval fortification. The practice of building these massive walls, though having its origins in prehistory, was refined during the rise of city-states, and energetic wall-building continued into the medieval period and beyond in certain parts of Europe.

History

From very early history to modern times, walls have been a near necessity for every city. Uruk in ancient Sumer (Mesopotamia) is one of the world's oldest known walled cities. Before that, the city (or rather proto-city) of Jericho in what is now the West Bank had a wall surrounding it as early as the 8th millennium BC.
The Assyrians deployed large labour forces to build new palaces, temples and defensive walls.

Some settlements in the Indus Valley Civilization were also fortified. By about 3500 B.C., hundreds of small farming villages dotted the Indus floodplain. Many of these settlements had fortifications and planned streets. The stone and mud brick houses of Kot Diji were clustered behind massive stone flood dykes and defensive walls, for neighboring communities quarreled constantly about the control of prime agricultural land. Mundigak (c. 2500 B.C.) in present day south-east Afghanistan has defensive walls and square bastions of sun dried bricks.

Exceptions were few — notably, ancient Sparta and ancient Rome did not have walls for a long time, choosing to rely on their militaries for defense instead. Initially, these fortifications were simple constructions of wood and earth, which were later replaced by mixed constructions of stones piled on top of each other without mortar.

In Central Europe, the Celts built large fortified settlements known as oppida, whose walls seem partially influenced by those built in the Mediterranean. The fortifications were continuously expanded and improved.

In ancient Greece, large stone walls had been built in Mycenaean Greece, such as the ancient site of Mycenae (famous for the huge stone blocks of its 'cyclopean' walls). In classical era Greece, the city of Athens built a long set of parallel stone walls called the Long Walls that reached their guarded seaport at Piraeus.

Large tempered earth (ie. rammed earth) walls were built in ancient China since the Shang Dynasty (c. 1600-1050 BC), as the capital at ancient Ao had enormous walls built in this fashion (see siege for more info). Although stone walls were built in China during the Warring States (481-221 BC), mass conversion to stone architecture did not begin in earnest until the Tang Dynasty (618-907 AD). In terms of China's longest and most impressive fortification, the Great Wall had been built since the Qin Dynasty (221-207 BC), although its present form was mostly an engineering feat and remodeling of the Ming Dynasty (1368-1644 AD) during the 15th and 16th centuries. The large walls of Pingyao serve as one example. Likewise, the famous walls of the Forbidden City in Beijing were established in the early 15th century by the Yongle Emperor.

The Romans fortified their cities with massive, mortar-bound stone walls. The most famous of these are the largely extant Aurelian Walls of Rome and the Theodosian Walls of Constantinople, together with partial remains elsewhere. These are mostly city gates, like the Porta Nigra in Trier or Newport Arch in Lincoln.

Apart from these, the early Middle Ages also saw the creation of some towns built around castles. These cities were only rarely protected by simple stone walls and more usually by a combination of both walls and ditches. From the 12th century AD hundreds of settlements of all sizes were founded all across Europe, who very often obtained the right of fortification soon afterwards.

The founding of urban centers was an important means of territorial expansion and many cities, especially in eastern Europe, were founded precisely for this purpose during the period of Eastern Colonisation. These cities are easy to recognise due to their regular layout and large market spaces. The fortifications of these settlements were continuously improved to reflect the current level of military development.

During the reenessence era, the Venetians raised great walls around cities threatened by the Ottoman empire. The finest examples are, among others, in Nicosia (Cyprus) and Chania (Crete), and they still stand, to this day.

Composition

At its most simple, a defensive wall consists of a wall enclosure and its gates. For the most part, the top of the walls were accessible, with the outside of the walls having tall parapets with embrasures or merlons. North of the Alps, this passageway at the top of the walls occasionally had a roof.

In addition to this, many different enhancements were made over the course of the centuries:

- City ditch: a ditch dug in front of the walls, occasionally filled with water.
- Gate tower: a tower built next to, or on top of the city gates to better defend the city gates.
- Wall tower: a tower built on top of a segment of the wall, which usually extended outwards slightly, so as to be able to observe the exterior of the walls on either side. In addition to arrow slits, ballistae, catapults and cannons could be mounted on top for extra defence.
- Pre-wall: wall built outside the wall proper, usually of lesser height — the space in between was usually further subdivided by additional walls.
- Additional obstacles in front of the walls.

The defensive towers of west and south European fortifications in the Middle Ages were often very regularly and uniformly constructed (cf. Ávila, Provins), whereas Central European city walls tend to show a variety of different styles. In these cases, the gate and wall towers often reach up to considerable heights, and gates equipped with two towers on either side are much rarer. Apart from the purely military, defensive purpose, towers also played an important representative and artistic role in the conception of a fortified complex. In many senses, the architecture of the city thus competed with that of the castle of the noblemen and city walls were often a manifestation of the pride of a particular city.

Urban areas outside the city walls, so-called Vorstädte, were often enclosed by their own set of walls and integrated into the defense of the city. These areas were often inhabited by the poorer population and held the "noxious trades". In many cities, a new wall was built once the city had grown outside of the old wall. This can often still be seen in the layout of the city, for example in Nördlingen, and sometimes even a few of the old gate towers are preserved, such as the *white tower* in Nürnberg. Additional constructions prevented the circumvention of the city, through which many important trade routes passed, thus ensuring that tolls were paid when the caravans passed through the city gates, and that the local market was visited by the trade caravans. Furthermore, additional signaling and observation towers were frequently built outside the city, and were sometimes fortified in a castle-like fashion. The border of the area of influence of the city was often partially or fully defended by elaborate ditches, walls and/or hedges. The crossing points were usually guarded by gates or gate houses. These defenses were regularly checked by riders, who often also served as the gate keepers. Long stretches of these defenses can still be seen to this day, and even some gates are still intact. To further protect their territory, rich cities also established castles in their area of influence. A famous example of this practice is the Romanian "Dracula Castle" at Bran/Törzburg, which was intended to protect Kronstadt (today's Braşov).

The city walls were often connected to the fortifications of hill castles via additional walls . Thus the defenses were made up of city and castle fortifications taken together. Several examples of this are preserved, for example in Germany Hirschhorn on the Neckar, Königsberg and Pappenheim, Franken, Burghausen in Oberbayern and many more. A few castles were more directly incorporated into the defensive strategy of the city (e.g Nürnberg, Zons, Carcassonne), or the cities were directly outside the castle as a sort of "pre-castle" (Coucy-le-Chateau, Conwy and others). Larger cities often had multiple stewards — for example Augsburg was divided into a Reichstadt and a bishopal (clerical) city. These different parts were often separated by their own fortifications.

With the development of firearms came the necessity to expand the existing installation, which occurred in multiples stages. Firstly, additional, half-circular towers were added in the interstices between the walls and pre-walls (s.a.) in which a handful of cannons could be placed. Soon after, reinforcing structures — or "bastions" — were added in strategically relevant positions, e.g. at the gates or corners. A well-preserved example of this is the *Spitalbastei* in Rothenburg. However, at this stage the cities were still only protected by relatively thin walls which could offer little resistance to the cannons of the time. Therefore new, star forts with numerous cannons and thick earth walls reinforced by stone were built. These could resist cannon fire for prolonged periods of time. However, these massive fortifications severely limited the growth of the cities, as it was much more difficult to move them as compared to the simple walls previously employed — to make matters worse, it was forbidden to build "outside the city gates" for strategic reasons and the cities became more and more densely populated as a result.

Decline

In the wake of city growth and the ensuing change of defensive strategy, focusing more on the defense of forts around cities, most city walls were demolished. Nowadays, the presence of former city fortifications can often only be deduced from the presence of ditches or parks.

Furthermore, some street names hint at the presence of fortifications in times past, for example when words such as "wall" or "glacis" occur.

In the 19th century, less emphasis was placed on preserving the fortifications for the sake of their architectural or historical value — on the one hand, complete fortifications were restored (Carcassonne), on the other hand many structures were demolished in an effort to modernize the cities. A notable exception in this is the "monument preservation" law by the Bavarian King Ludwig I of Bavaria, which led to the nearly complete preservation of many impressive monuments such as the Rothenburg ob der Tauber, Nördlingen and Dinkelsbühl . The countless small fortified towns in the Franken region were also preserved as a consequence of this edict.

Modern era

Walls and fortified wall structures were built in the modern era, too. They did not, however have the original purpose of being a structure able to resist a prolonged siege or bombardment.

Berlin's city wall from the 1730s to the 1860s was partially made of wood. Its primary purpose was to enable the city to impose tolls on goods and, secondarily, also served to prevent the desertion of soldiers from the garrison in Berlin.

The Berlin wall was a different form of wall, in that it did not exclusively serve the purpose of protection of an enclosed settlement. One of its purposes was to prevent the crossing of the Berlin border between the GDR and the West German exclave of west-Berlin.

Further walls of the 20th century are found in Israel where many exclaves of Jewish settlements are surrounded by fortified walls, as are many parts of Belfast, Northern Ireland by the Belfast Peace Lines.

Additionally, in some countries, different embassies may be grouped together in a single "embassy district," enclosed by a fortified complex with walls and towers — this usually occurs in regions where the embassies run a high risk of being target of attacks.

Most of these "modern" city walls are made of steel and concrete. Vertical concrete plates are put together so as to allow the least space in between them, and are rooted firmly in the ground. The top of the wall is often protruding and beset with barbed wire in order to make climbing them more difficult. These walls are usually built in straight lines and covered by watchtowers at the corners. Double walls, i.e. two walls with an interstitial "zone of fire" (cf. the Berlin wall) are rare.

The only extant city walls in North America are the historic ones in Old Quebec City, Canada.

Gatehouse ([Wikipedia](#))

A **gatehouse** is a feature of European castles, manor houses and mansions. Originally a gatehouse was a fortified structure built over the gateway to a city or castle. In architectural terminology, a gatehouse is a building, enclosing or accompanying a gateway for a castle, manor house, or similar buildings of importance.

Gatehouses made their first appearance in the early Middle Ages when it became necessary to protect the main entrance to a castle or town. Over time, they evolved into very complicated structures with many lines of defense. Strongly fortified gatehouses would normally include a drawbridge, one or more portcullises, machicolations, arrow loops and possibly even murder-holes where stones would be dropped on attackers. In the late Middle Ages, some of these arrow loops might have been converted into gun loops (or gun ports).

Sometimes gatehouses formed part of town fortifications, perhaps defending the passage of a bridge across a river or a moat, as Monnow Bridge in Monmouth. York has four important gatehouses (such as the Micklegate) and known as Bars in its city walls.

The French term for gatehouse is *logis-porche*. This could be a large, complex structure that served both as a gateway and lodging or it could have been composed of a gateway through an enclosing wall. A very large gatehouse might be called a *châtelet* (small castle).

At the end of the Middle Ages, many gatehouses in England and France were converted into beautiful, grand entrance structures to manor houses or estates. Many of them became a separate feature free-standing or attached to the manor or mansion only by an enclosing wall. By this time the gatehouse had lost its defensive purpose and had become more of a monumental structure designed to harmonize with the manor or mansion.

On the continent of Europe, there are numerous examples of surviving gatehouses in France and Germany.
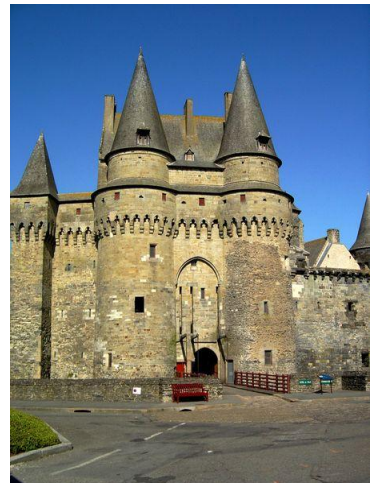
Redoubt ([Wikipedia](#))

A **redoubt** is a fort or fort system usually consisting of an enclosed defensive emplacement outside a larger fort, usually relying on earthworks, though others are constructed of stone or brick. It is meant to protect soldiers outside the main line of defense and can be a permanent structure or a hastily-constructed temporary fortification. Redoubts were a component of the military strategies of most European empires during the colonial era, especially in the outer works of Vauban-style fortresses made popular during the 17th century, although the concept of redoubts has existed since medieval times. A redoubt differs from a redan in that the redan is open in the rear, whereas the redoubt was considered an enclosed work.

The advent of mobile warfare in the 20th Century generally diminished the importance of the defense of static positions and siege warfare, though combat bases and fire bases of the Vietnam War, and Forward Operating Bases of the Iraq War and Afghanistan can be seen as the descendants of this type of fortified position.

Historically important redoubts

Wars of the Three Kingdoms
During the Wars of the Three Kingdoms redoubts were frequently built to protect older fortifications from the more effective artillery of the period. Often close to ancient fortifications there were small hills that overlooked the defences, but in previous centuries these had been too far from the fortifications to be a threat. A small hill close to Worcester was used as an artillery platform by the Parliamentarians when they successfully besieged Worcester in 1646. In 1651 before the Battle of Worcester the hill was turned into a redoubt by the Royalists, (the remains of which can be seen today in Fort Royal Hill Park). During the Battle of Worcester, the Parliamentarians captured this redoubt and turned its guns on Worcester. In so doing they made the defence of the city untenable. This action effectively ended the battle, the last of the English Civil War.

Other important redoubts
See the Battle of Poltava (1709), the Battle of Yorktown (1781) where Alexander Hamilton led his only military command against a British redoubt, the Battle of Bunker Hill (1775), the Lines of Torres Vedras of the Peninsular War (1809–1810), the Battle of Borodino (1812), the Charge of the Light Brigade (1854), the Railroad Redoubt of the Battle of Vicksburg (1863), and during World War I the "National Redoubt of Antwerp" (1914) as well as the Hawthorn Ridge Redoubt (1916) are examples where redoubts played a crucial role in military history.

Tower (Castle / Tower House – Wikipedia)

CASTLE

A **castle** is a defensive structure seen as one of the main symbols of the Middle Ages. The term has a history of scholarly debate surrounding its exact meaning, but it is usually regarded as being distinct from the general terms fort or fortress in that it describes a residence of a monarch or noble and commands a specific defensive territory.

Roman forts and hill forts were the main antecedents of castles in Europe, which emerged in the 9th century in the Carolingian Empire. The advent of cannon and gunpowder changed the needs of warfare in Europe, limiting the effectiveness of the castle and leading to the rise of the fort.

Similar constructions in Russia (*Kremlin*) and feudal Japan (*Shiro*) are also considered castles.

TOWER HOUSE

A **tower house** is a particular type of stone structure, built for defensive purposes as well as habitation. Such buildings were constructed in the wilder parts of Great Britain, particularly in Scotland, and throughout Ireland, beginning in the High Middle Ages and continuing at least up to the 17th century. The remains of such structures are dotted around the Irish and Scottish countryside, with a particular concentration in the Scottish Borders where they include peel towers and bastle houses. Some are still intact and even inhabited today, while others stand as ruined shells.

Tower houses are often called castles, and despite their characteristic compact footprint size, they are formidable habitations and there is no clear distinction between a castle and a tower house. In Scotland a classification system has been widely accepted based on ground plan, such as the L Plan Castle style, one example being the original layout (prior to enlargement) of Muchalls Castle in Scotland.