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Book Author(s): THOMAS FISCHER

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IV THE BUILDINGS OF THE ROMAN ARMY

1. Introduction

Like no other army in antiquity, the Roman army of the Imperial period erected large-scale buildings of all kinds and left them in the form of archaeological remains. These included short-lived installations connected with sieges or campaigns. However, it is the more durable buildings for the accommodation of troops, for infrastructure, and for frontier protection, which are the legacy of the Roman army. These include camps, forts, roads and complex border protection systems along river and land frontiers (*ripae* and *limites*).

In many cases, these Roman military buildings still characterize the landscape in the former frontier provinces of the empire, since remains of these facilities around the Mediterranean, the Rhine and the Danube, and in the UK have survived to this day (Breeze 2011). All of these buildings were planned, built, and used by the military itself. However, the civilian infrastructure of the provinces has also benefited from military building activity, as with the Roman road network, originally military, which soon became the backbone of trade and civilian traffic.

As a distinctive speciality of the Roman military, in addition to the planned camps and forts, the frontier protection systems of the *ripae* and *limites*, hundreds of

kilometres long, are one of the defining structures of the Roman army. Their closest parallel is the Great Wall of China.¹

From early on, the striking remnants of Roman frontier installations fascinated later generations and invited explanation. Thus, in the Middle Ages, there was initially an inclination to look upon the enigmatic trail of the Upper German-Raetian Limes as a work of the devil ('Teufelsmauer' or 'Devil's Wall'), before serious research began in the Renaissance. With the intensification and systematization of research into Hadrian's Wall, the Upper German-Raetian Limes, or in the Augustan military base at Haltern, a special area of research developed from this Roman military archaeology: Roman provincial archeology (Fischer 2010).

The preserved material, which has been excavated by archaeologists, exhibits a clear temporal focus: there are a large number of camps and fortresses from the early and middle Imperial periods, but only a few from the Republican period. The historical reasons for this are easily understandable: Roman troops in the Republic were only on active campaign for longer periods during the summer and wintered at home or in cities. Thus the bulk of the Republican camps are marching camps or short-term winter quarters, which have left only a few, barely recognisable traces in the

ground. At that time, Roman camps were occupied for a longer periods (and extended accordingly) only during sieges or wars which lasted a long time. However, even these more permanent Roman military installations only consisted of perishable material: wood or wood-and-earth constructions, dry (unmortared) stones, or unfired bricks. Only city fortifications or Hellenistic fortresses occupied by the Romans were built in solid stone construction with mortared stone or solid masonry.

It is therefore unsurprising that, with the exception of the only very briefly used – but systematically explored – camps and siege works around Alesia, there is little or no knowledge of the many camps of the Gallic Wars of C. Julius Caesar, even though their position has often been precisely described. This is also true of the numerous camps and sieges of the civil wars between Caesar and his internal political opponents attested in the literature, or the clashes between the armies of Caesar and Octavian or Octavian and Marc Antony up to the battle of Actium in 31 BC.

It was only from the Augustan period onwards, when a standing professional army began to occupy long-term camps with permanent buildings in the frontier regions, that the number of Roman camps known to researchers increases. Many of them can still be seen clearly in the landscape today, especially if they have been built in stone. In addition to the erection of camps, forts, and frontier installations of all kinds, infrastructure, such as roads and canals, as well as special buildings, like military baths, were among the responsibilities of the Roman army.

There are differences in the preservation of forts and legionary bases: in regions occupied only briefly by the Romans, for example in Germany between the Rhine and the Elbe, in Britain beyond Hadrian's Wall, in the Upper German-Raetian Limes, or in Transdanubian Dacia single-phase or short-term sites are found, which provide clear ideas about Roman fortification in well-defined periods. In the lower Danube region and in the East (including Egypt), sites of the early and middle imperial period which can easily be assessed are much rarer, because they have often been modified and fundamentally changed from the Late Roman period, through the Byzantine era, to the Islamic Middle Ages.

2. Roman camps and forts

When the Romans enter enemy territory, they do not join battle before they have set up a permanent camp; but they do not erect it at random and without fixed order (Flavius Josephus, *Bell. Jud.* 3.76)

The quotation from Flavius Josephus from the end of the 1st century AD exemplifies that, out of all of the peoples who waged war in ancient times, the Romans distinguished

themselves through the construction of planned camps. There were already military camps among the ancient peoples of the East, namely the Persians, the Greeks, the Hellenistic empires, and the Carthaginians. However, none applied the principle of establishing them on the march, in sieges, and in peaceful areas, on a strictly prescribed scheme, as rigorously as the Romans. Following the motto 'sweat saves blood', it was always and consistently ensured that there was a fortified camp available on the march in enemy territory, before battles and sieges, even if only for a single night.

The origin of this custom of establishing camps with a street grid of roads on a fixed pattern is unknown. However, *coloniae maritimae* were known from the 4th century BC in central Italy, which, in their regular configuration of the defences, streets, and internal buildings, can be compared to Roman military camps known from later times. These first Roman 'filial' towns with their armed Roman settlers with their families secured the first conquests in Italy and gave access to the coast: Ostia, Tarracina, Minturnae, Puteoli, and Pyrgi. They all have a basic square or rectangular shape and a regular road network with streets that cross each other at right angles. H. von Hesberg, who catalogued these *coloniae maritimae*,² argues that there are no Italian influences here, but more likely from the Greek cities of southern Italy and Sicily.

However, this does not help with the question of the origin of the Roman camps: did the Romans build early military camps on the model of Greek cities and then convert them into stone as cities in their *coloniae maritimae*, or did they found their first colonies directly according to the Greek model and then adopt these as models for their camps?

For as far as we can look back, Roman camps were carefully planned. This is also the case for marching camps, which Roman armies erected every evening, including ramparts and ditches. In practical terms, it worked like this: an advance guard, which included a team of surveyors, laid out a camp site according to a fixed, rectangular plan and corresponding to the exact number of troops. Without really having to think about it, the soldiers occupied the camp according to the familiar layout, and erected their leather tents in the usual arrangement on the usual camp streets, while others constructed walls and ditches and secured it with the palisade stakes they carried with them.

These camps were always laid out in the same pattern, without regard for the terrain. The first literary reference can be found in Polybius (6.26–32) in the 2nd century BC. He described a camp for two legions in detail: it was rectangular, protected by ramparts and ditches, with a breastwork of palisade stakes on the rampart. The rampart enclosed regularly set out tents (Fig. 377).

In the course of the expansion of Rome, wars shifted to territories outside Italy, to the extent that the necessity

arose to erect camps for longer periods of time. A consequence of the Punic Wars in Spain, for example, was that armies had to remain in the same place for several years during sieges. This also had consequences for the shape and amenities of the camp. When, after the establishment of a standing professional army in the early days of the empire, permanent frontiers were established on the Rhine, Danube, and the Euphrates – for the most part riverine frontiers – camp construction proceeded apace. Now the permanent bases for the legions and their auxiliary troops became standard, in which the armies would over-winter, while in the summer they were often on campaign.

With the ultimate introduction of linear frontier defences from the middle of the 1st century AD onwards, legionary camps were built in stone. Auxiliary units, which had previously been closely connected with the legions, increasingly became self-sufficient units, taking over their own auxiliary forts and the frontiers, while the legions were ready for major operations.

On the basis of selected examples, the development of the different types of fortification will be reviewed in this section, so far as they are known archaeologically. However, the conditions for their survival are not equally favourable everywhere, and research has likewise not been uniformly intensive. For example, Republican camps are almost exclusively known from Spain, although they must also have been present in Italy, the Balkans, Greece, and Asia Minor.

One thing that these camps and fortifications of the Republic and early and middle Imperial periods have in common, however, is their purpose: they were not intended as fortresses, in which a numerically inferior force of troops can resist a greater number of opponents. Rather, they served only as relatively weakly fortified barracks, from which the troops could operate offensively and dynamically, at best as a precaution against surprise attacks and as protection for the baggage and the supplies of the troops. H. von Petrikovits has, for good reason, applied an expression from the former Austrian military terminology to Roman camps: they were not fortresses, but 'fortified barracks'.³

Camp and fort defences

Most of the elements of Roman fortification were not genuinely Roman inventions. In many cases, the Romans used individual elements from the highly developed system of Greco-Hellenistic fortification, but these elements were often rearranged, so that something uniquely Roman evolved. In particular, the consistent use of camp construction is typically Roman – in an extreme case the daily construction of a marching camp.

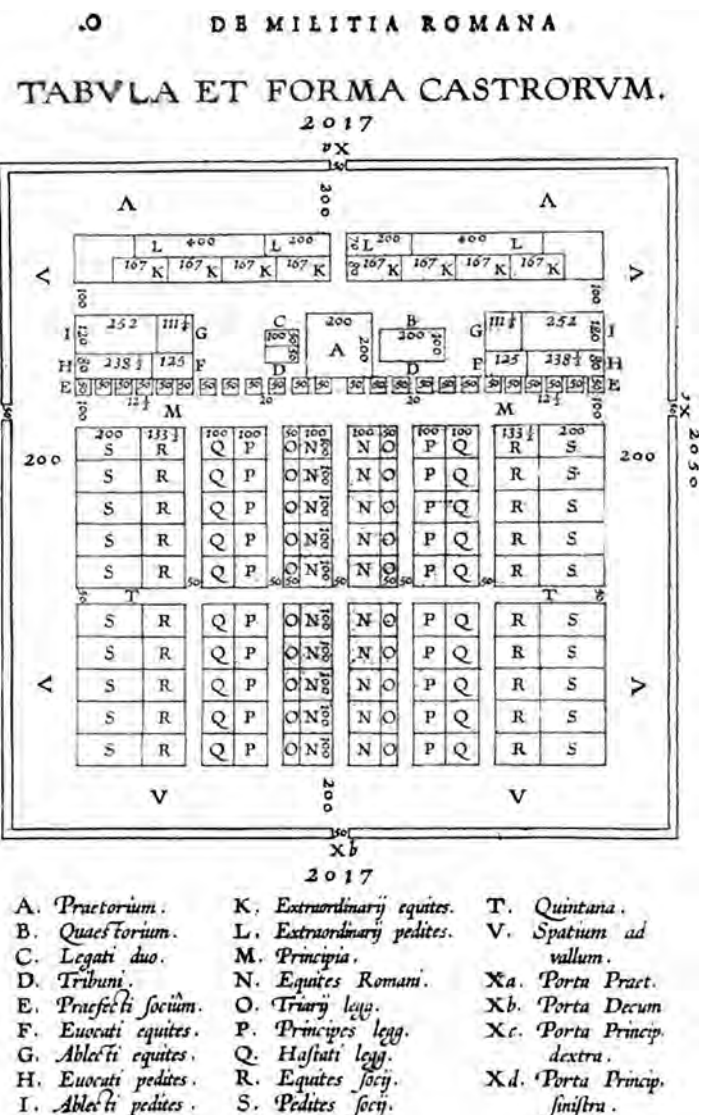


Figure 377 Plan of a Roman marching camp from the time of the Republic, as described by Polybius (after Lipsius 1598)

Timber and earth defences

MARCHING CAMPS

In the case of marching and field camps, the simplest form of defence was used. It consisted of a ditch and an earthen rampart. That is, a V-sectioned ditch was dug and the spoil was tipped into the body of the rampart. Experience from experimental archaeology indicates that in regions where this was possible from the natural vegetation, the front side of the rampart and the edges of the V-sectioned ditches were covered with turf so that attacking enemies would slip. The palisade stakes that had been brought along were planted on the ramparts, and these could be connected by lacing. While the enemy could easily tear down this kind of 'fortification', he would lose time and thus the advantage of surprise. The perimeter of a marching camp

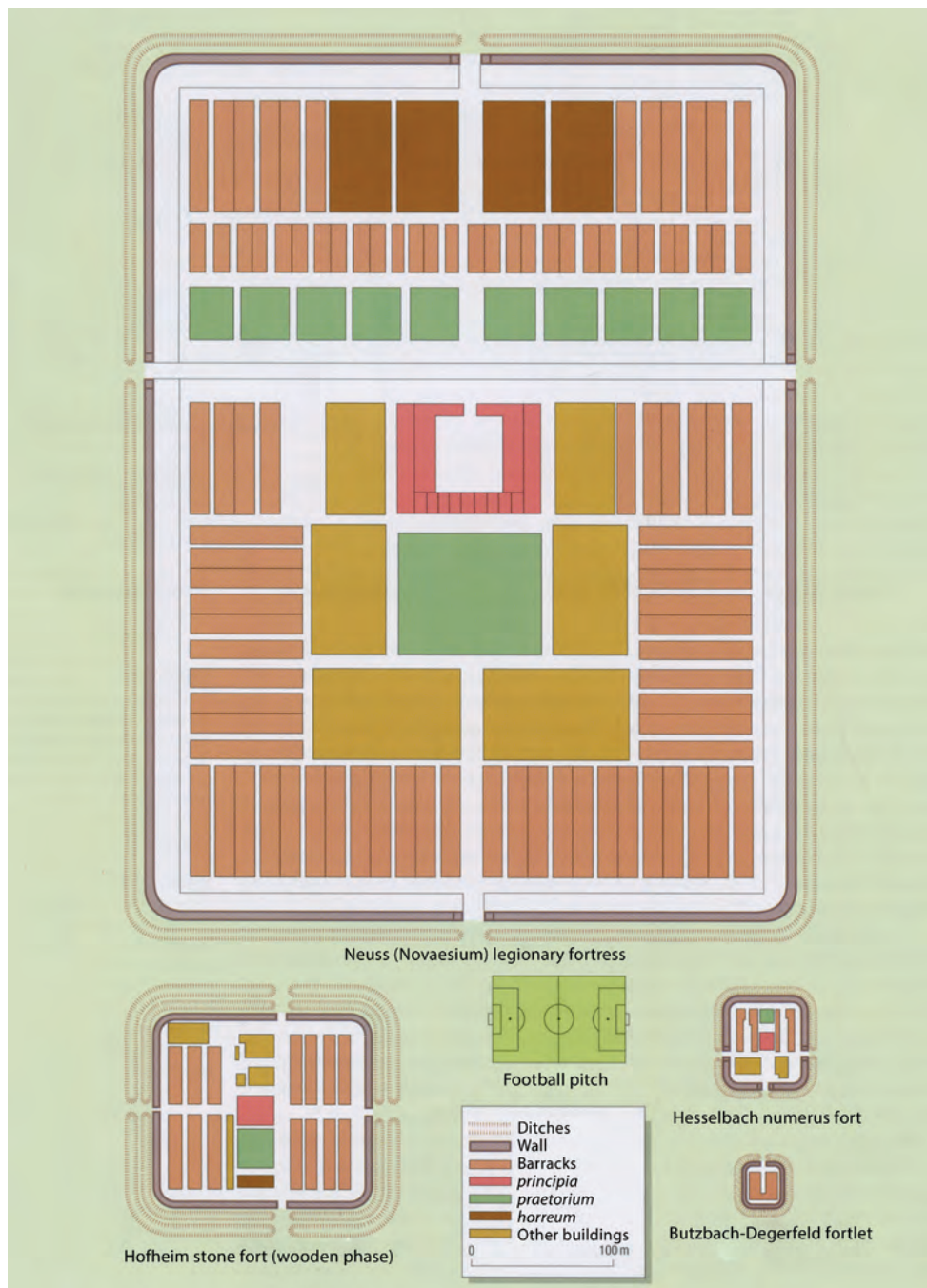


Figure 378 Comparison of areas of Roman military installations (after to Campbell 2009). Drawing: A. Smadi, Arch. Institute University of Cologne

was probably divided into work stints by predetermined distances, each of which was supervised by senior ranks, such as centurions. While they were being built, other soldiers erected the leather tents inside the camp. The fact that camp construction was carried out according to well-defined regulations comes from the written sources (e.g. pseudo-Hyginus). That the system was also systematically practised is proved by the numerous practice camps.

Of course, such a defensive circuit can hardly be regarded as a fortification. Nevertheless, it protected from a sudden incursion by cavalry and surprise attacks by infantry. Such an obstacle hindered any attempt to form a closed shield wall.

As a rule, the basic shape of Roman marching camps corresponded to the usual forms of contemporary long-term camps when constructed. There are both polygonal shapes, adapted to the terrain, as well as long, rectangular

installations with rounded corners (so-called 'playing-card shape'). The rounded corners, Hyginus explained, was related to the integrity of stone camps, in order that it would be difficult to remove stones from their fabric.⁴

LONGER-TERM CAMPS AND FORTS

In the construction of camps and siege fortifications occupied for longer periods as summer or winter quarters or even as a permanent base, this system was further refined. In addition to substantial fortifications with gates and towers, permanent internal buildings were now provided in place of leather tents. The sites of fixed fortresses and forts were carefully selected, with traffic connections, access to water, wood, grain, fodder, and other supplies, as well as a tactically favourable location.⁵ The chosen site was then carefully prepared and, if necessary, cleared and levelled.⁶ The construction sites for the defences and the interior were carefully surveyed by specialists (*agrimensores*), apparently using manuals for the correct size of the installation in relation to the intended garrison.⁷ In the case of legionary bases, the *praefectus castrorum* was responsible for site management; while for auxiliary forts this could be done by members of the unit, but also attached specialists, such as legionary centurions.⁸

BASIC SHAPE

There were quite different designs for the basic shape of Roman fortresses and forts, which were always – with exceptions – related to their date. During the late Republic and the early Imperial period, polygonal forms, which were adapted to the terrain, predominated. On the other hand, however, there were already quite rectangular structures, but with right-angled corners (e.g. Cáceres el Viejo). The first known camp in the playing card scheme, i.e. in the shape of a rectangle with rounded corners, is the Augustan base at Obrezje in Slovenia (Mason 2003; Sašel-Kos 2011). Undoubtedly, the Praetorian camp built by Tiberius in the shape of a playing card in the years AD 21–3 also had an important influence on military bases in the frontier provinces.⁹ At the latest, this form was established from the time of Nero. However, there could also be variants: square camps and forts or rhomboid bases. Camps could also be diamond-shaped or playing card-shaped, but adapted to the terrain at a particular point.

DITCHES

Broader and deeper V-sectioned ditches, sometimes several of them, were dug around fortresses and forts occupied for a longer period of time.¹⁰ It was important to take care that the distance from the rampart and the angle of slope of the ditches were such that no blind spots were created (Fig. 379), which would protect an enemy concealed in the ditch from shots from the defensive wall. According to Hyginus (*Mun. Castr.* 49), and also confirmed

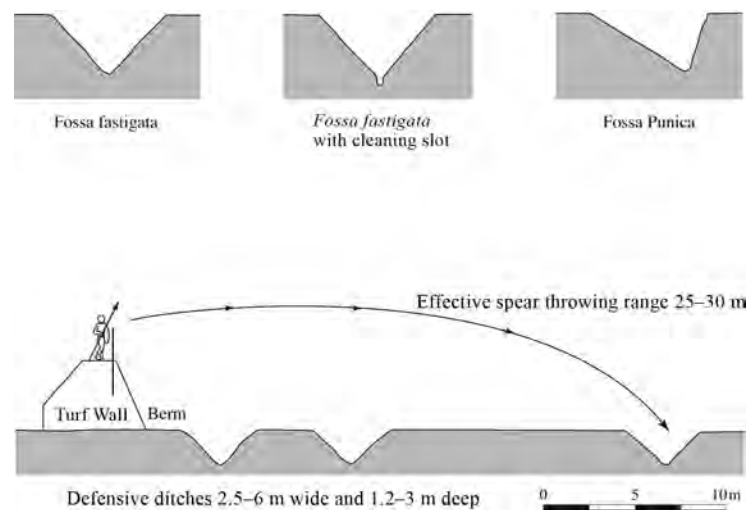


Figure 379 Various forms of Roman camp ditches and reconstruction of the defences of a camp with a turf rampart (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

by the archaeological evidence, there were two forms of ditch, the *fossa fastigata* with the symmetrical V-sectioned profile, and the *fossa Punica* with an asymmetrical profile: on the shallow face, opposite to the defensive wall, they were easier to enter, but on the steeper face next to the wall they were more difficult to get out of, especially when encumbered by heavy equipment with armour and a shield.

In the north-western provinces, the *fossa fastigata* often has a small slot, which was apparently used for drainage, for, contrary to a widespread view, the ditches around Roman camps, forts, and towns were not moats, but always kept as dry obstacles.

Ditches occur in widely varying numbers, depending on topography and period, and in the early Imperial period one or two ditches were usually used. On the other hand, more stringent rules were sometimes observed locally: Claudian fortresses on the Rhine and Danube, for example, had two ditches. When reconstructed under Vespasian, after the destruction of the civil war and the Batavian uprising, they only had one ditch.

In case of a particular threat or unfavourable topography, fortifications were often reinforced with several ditches, e.g. in Britain or in the Upper German-Raetian Limes, where sometimes five ditches or more are to be found. However, it is often necessary to check whether they were really all in contemporary use or come from different phases. There are frequently different numbers of ditches on all sides of a fort, and they are completely missing on steep slopes.

In the gate area, short lengths of rampart and ditch (*clavicula* and *titulum*) could offer additional protection (Fig. 380). This fortification detail is found from the Republic up to the 3rd century. There were also isolated, rather unusual, offset basic layouts for ditches and ramparts,

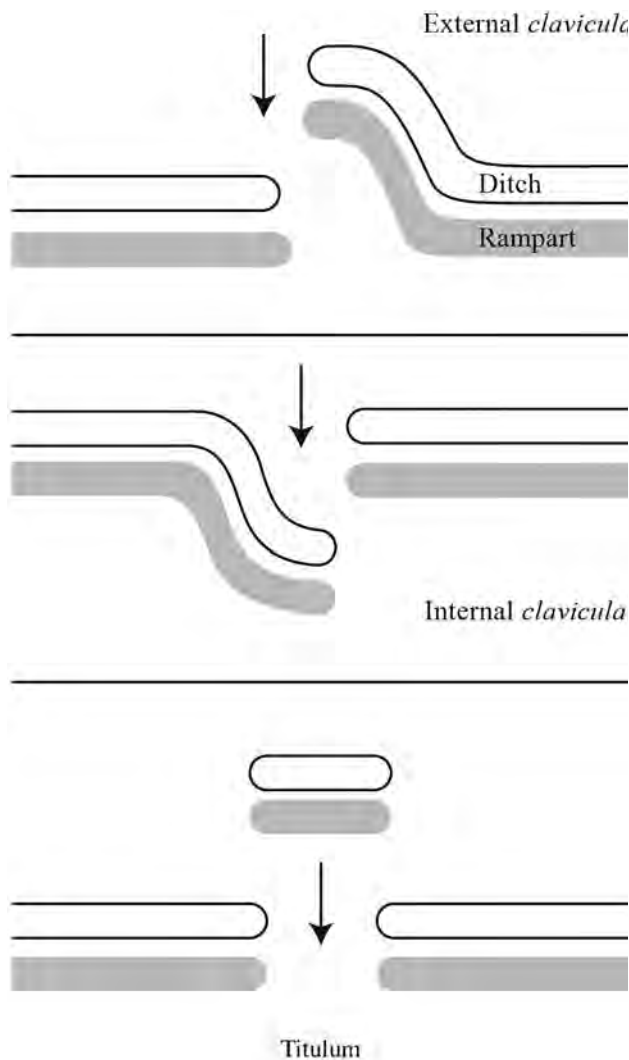


Figure 380 Tituli and claviculae (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

as at Altenstadt, Period 4 on the Wetteraulimes¹¹ or in the late Flavian phase of Newstead (Fig. 381) in Scotland.¹²

In the case of siege- and permanent camps, there were further obstacles in front of or even in the ditches, such as the spiked entanglement (an equivalent to modern barbed wire!), pitfalls and man traps.

RAMPARTS

For longer-term use, timber-and-earth camps were not confined to simple earthen ramparts and a loose breastwork of palisade stakes, but rather were constructed more substantially. For example, one- or two-sided turf ramparts were erected, especially in Britain, which in wetter areas were often protected from the damp ground by a timber corduroy placed on the surface, and sometimes by broken, unmortared cobblestones. The outer faces consisted of turf blocks stacked like bricks, mostly battered at an angle, but there were also vertical faces (Fig. 382). Inside, they were

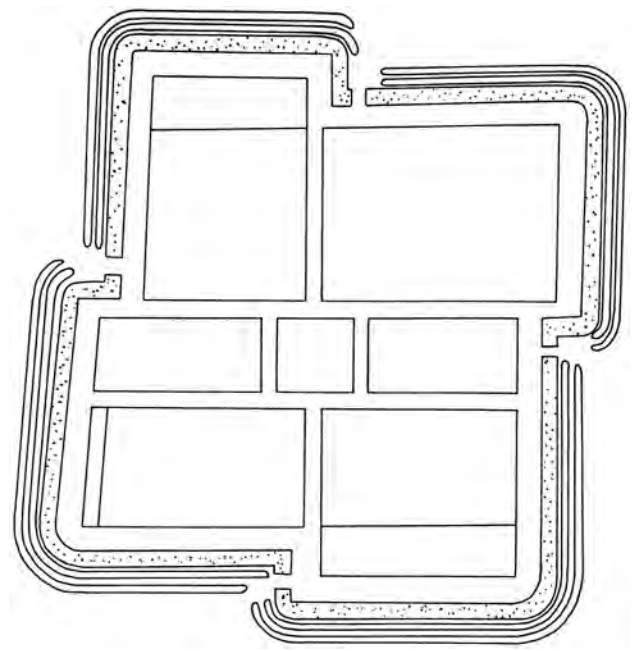


Figure 381 Newstead fort in its primary phase, around AD 80 (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

filled with soil from the excavation of the ditches, often reinforced by a stabilising timber structure.¹³

In one excavation in Tulln/*Commagenis*,¹⁴ on the Danube frontier in Noricum, unfired mud bricks have also been discovered as a building material for walls, in this case with wooden fixtures. This type of construction (without wooden fittings) was often used for camps and forts in the Mediterranean and the East, where it originated.

Since turf ramparts and defences made of unfired clay bricks were more vulnerable in the wetter climate of the north-western provinces, one could reasonably debate whether they were roofed. However, this has not yet been demonstrated.¹⁵ In the Mediterranean, dry walls consisting of broken, unmortared stone are often found in temporary camps. In the north-western provinces, on the other hand, this type of construction has only been identified, for instance, in the earlier stages of the Saalburg fort or Zugmantel.¹⁶ In addition, there are various timber-and-earth constructions of defensive walls in the north-western provinces,¹⁷ especially in the early Imperial period. There are simple wooden faces, made of vertically secured beams and transverse timbers, with an earthen fill upon which the walkway sat. However, even more complicated, earth-filled, box constructions with wooden tie beams could be used for the defences. All these walls of perishable material also had a wooden breastwork with battlements, which, together with the defences, have usually been simply reconstructed as open to the elements. The walkway may also have been covered (see above). With the breastwork, these walls would have reached a maximum height of 4–5 m. To the

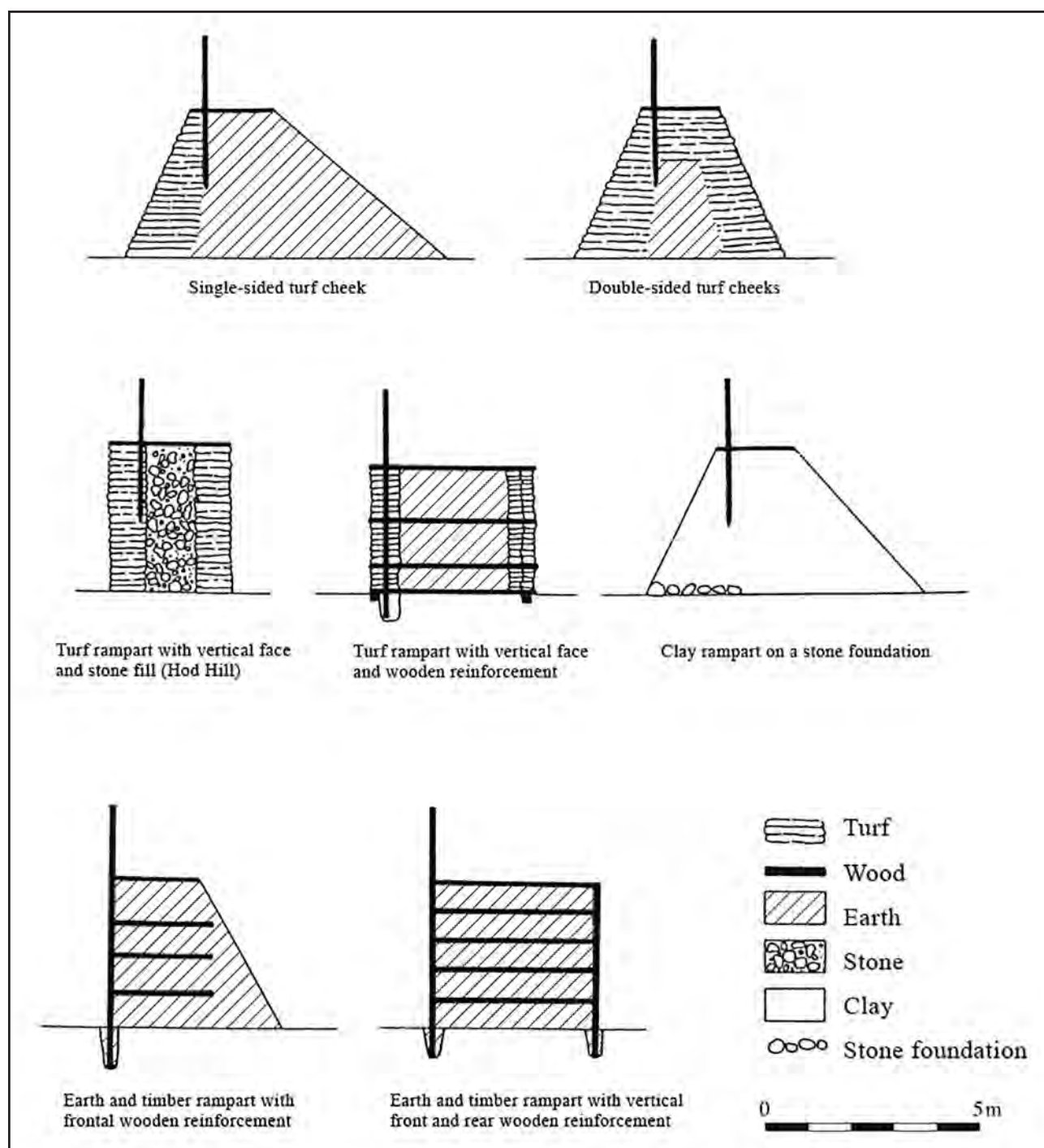


Figure 382 Turf and earth-and-timber ramparts (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

rear, ramps or wooden staircases were installed at several points, in order to allow for rapid manning of the walls in the case of an alarm.

TOWERS

Towers were often used, with corner and interval towers on the different types of rampart construction,¹⁸ of which

only the postholes for the upright posts are recorded during excavation (four in the case of interval towers, five to six in the case of corner towers). Wooden towers were always embedded in the wall, that is, they never project in front of the wall. Their height is to be assumed to have been at least three storeys. According to depictions on Trajan's Column, they were often constructed as an

open scaffolding with open, crenelated platforms. This was certainly not the case for most long-term bases. For defensive reasons, and in view of the climatic conditions in the north-western provinces, closed towers (boarded or wattle-and-daub) with pent or gabled roofs have to be reckoned with.

GATES

Most of the fortresses and forts had four gates flanked by towers. In the centre of the narrow front side facing the enemy was the *porta praetoria*; opposite that was the *porta decumana*. The two gates on the longer sides were mostly not central, but offset a bit towards the *porta praetoria*. These lateral gateways were called the *porta principalis dextra* and *porta principalis sinistra*. On Hadrian's Wall, there are special cases: where forts with the front part, including the *portae principales*, projected over the Wall into enemy territory, there were occasionally other gates in the *retentura*, the *porta quintana dextra* and/or *sinistra*.

There are various wooden structures at the gateways, all of which have in common that their outer face did not project far from the front of the defensive wall. In the openings through the defensive circuit, there were pairs of single or double four- and six-post structures, which can be reconstructed into flanking gate towers. Between these towers were bridges with walkway and breastwork. In the earlier Imperial period, on the basis of Republican precursors, gateways with recessed gates were used, which, like the so-called pincer gates (*Zangentore*) of late La Tène *oppida*, formed an enclosed gate courtyard that could be shut from both sides. If an opponent broke through the outer gate, he then fell into the trap at the inner gate and could be shot at from all sides. The gateways had either one or two passageways. Here, too, reconstructions of the gate towers should assume them to be closed structures with a pent or gabled roof.

Stone construction

Defences of drystone walling, mud bricks, or timber-and-earth constructions could be erected quickly and needed no special infrastructure. On the other hand they were of limited durability and not as stable as stone buildings. However, a certain infrastructure was necessary for the construction of these buildings in the north-western provinces, where there had been no pre-Roman stone buildings. This was only available after a certain period of consolidation of Roman culture, infrastructure, and economy. One only needs to think of quarries, lime kilns, and extended transport routes. Therefore, it took some time for military buildings to be constructed with mortared stone walls. While, for example, in the area of military and civilian centres in the Rhineland (Mainz, Cologne), there were occasional stone buildings in the Augustan period, stone construction was only adopted for military

architecture in the Neronian period with the double-legion base of Vetera I.

DEFENSIVE WALLS

The earliest curtain wall and interior buildings of a military camp in solid stone construction are found in the Praetorian Camp in Rome, built under Tiberius in the years AD 21–3.¹⁹ Here, bricks were used for the outer face of the defensive circuit constructed in *opus caementitium*, and the Praetorian Camp was the very first (archaeologically proven) brick-built structure in Rome.²⁰ In its first phase, the defensive walls were only about 5 m high (with battlements).²¹ In the northern border provinces, locally available material was used, and brick walls were unknown there. In the case of the double-legion base of Vetera I in Xanten, for example, the tuff and greywacke stone was imported from a more southerly range of hills, and stone construction was then gradually established as standard for permanent legionary bases (Fig. 383a). From the Flavian period onwards, stone defences appeared for auxiliary forts as well, all of which had been built using timber and earth before that. There were also cases where a stone-faced masonry wall was inserted in front of a still standing timber-and-earth rampart, as at Kastell Urspring,²² in the region of Lonsee in Baden-Württemberg. This process of upgrading to stone proceeded slowly: it was not until the middle of the 2nd century, under Antoninus Pius (AD 138–61), that most forts had stone curtain walls, gates, and towers (Fig. 383b).

The curtain walls consisted mostly of masonry walls with a stone breastwork and battlement, behind which an earthen bank (*agger*) was located to carry the walkway. However, there are also examples of walls without *aggeres* which had wooden structures, often supported by buttresses, for the walkway.²³ Masonry walls were generally plastered and painted white with red dummy joints, simulating ashlar masonry.²⁴ Only rarely were there truly substantial ashlar walls, as at *Reginum*/Regensburg, the base of *legio III Italica*.²⁵ Ashlar facing for concrete is also occasionally found, at least in the case of gates and towers. Similarly, for stone walls, there were numerous stairways (*ascensus*), mostly integrated into the *agger*.

A moulded cornice along the exterior of the defensive walls, at the height of the wallwalk, seems to have been compulsory. Pieces of it are therefore frequently found at forts in the north-western provinces. This cornice, consisting of four layers of brick, is still preserved *in situ* on the early Imperial wall of the Praetorian Camp in Rome, which was incorporated into the Aurelian city wall.²⁶ Elsewhere, this cornice can also be seen, for example, in the well-preserved fortification of Gheriat el-Garbia in Libya, or in the collapsed fort wall at Wörth am Main.²⁷ The battlements, which were broader in antiquity than in the Middle Ages, had semicircular-sectioned caps of worked

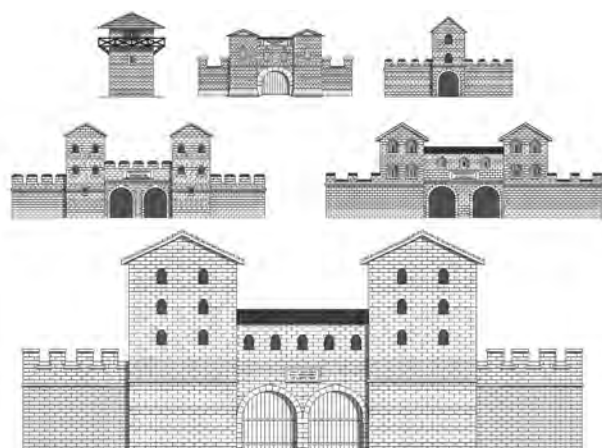


Figure 384 Comparison of gates of Roman military installations, design T. Fischer. Left to right: limes tower, numerus fort, fortlet, cohort fort, ala fort, legionary fortress. Drawing: A. Smadi, Arch. Institute University of Cologne

towers are very common. Camp and fort gateways often formed barbicans or outer courtyards with two gates, in which opponents who had passed the outer gate were then caught before the inner gate.

Occasionally the basic forms of gateways of legionary fortresses were adopted by auxiliary forts of the same province, such as the *porta praetoria* of Regensburg and the north gate of the *ala* fort of Kastell Weißenburg.³⁴ The *portae principales* of Lambaesis,³⁵ with its bevelled corners on the outer faces of the flanking gate towers, were imitated in the forts of Bu Njem and Gheriat el-Garbia, in which vexillations of *legio III Augusta* from Lambaesis were stationed.³⁶

Auxiliary forts could have gateways with either single or double passageways. There is no definite rule here, but rather a tendency: forts with cavalry, that is, installations in which *alae* or *cohortes equitatae* were stationed, frequently have gates with two passages, especially at the *portae praetoriae*.³⁷ It has repeatedly been observed that, in the later building phases, gateways with two passageways had one of them subsequently closed, in order to be able to control and defend the fort more easily during periods of crisis. Stone inscriptions, partly lettered with bronze, were built into the wall at all four gates of legionary camps and forts. In England, wooden building inscriptions are also attested at timber-and-earth forts.³⁸

Internal buildings of legionary camps and auxiliary forts

In short-term camps of the early and middle Imperial period, buildings made of drystone walling, mud bricks, or half-timbered structures were preferred, depending on the region. In the case of long-standing fortresses and forts in the north-western and northern provinces, timber-

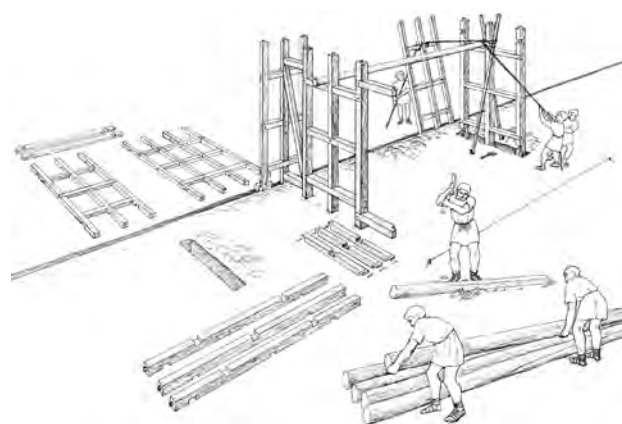


Figure 385 Erecting the basic framework of a half-timbered building. Design by T. Fischer (after Scholz 2009). Drawing: A. Smadi, Arch. Institute University of Cologne

framed structures were predominant in the beginning (Fig. 385). These were then gradually replaced by stone walls, complemented by architectural decoration in worked stone such as cornices and columns. Up to the 3rd century AD, some buildings, for example barracks, were built half-timbered on masonry footings.

The framework of half-timbered buildings was not intended to be seen, but plastered in white. Occasionally red-painted dados in the lower part of the walls have also been found on these half-timbered structures.³⁹ However, in the case of half-timbered barrack buildings on stone footings, the officers' quarters with baths and hypocaust heating were built entirely of substantial stone masonry.

Streets

Inside, a continuous road ran behind the defences, the *via sagularis*. A street grid divided the interior. The principal axis was the *via principalis*, which connected the *porta principalis dextra* and the *porta principalis sinistra*. This divided bases into two areas, usually unequal in size: the smaller front part was the *praetentura*, the larger rear the *retentura*. The *via principalis* met the *via praetoria* in front of the main entrance of the central building. However, there are also forts with a 'transverse' internal layout, whereby the *retentura* is absent and the *principia* has the *via sagularis* or the defences immediately to the rear: Valkenburg (Fig. 386) in the Netherlands or Eining/*Abusina* in Bavaria are examples of this. Neither a spatially nor temporally meaningful pattern is discernible in the distribution of these exceptional installations in the frontier provinces at present.⁴⁰ The road leading from the rear gate, the *porta decumana*, to the inside of the camp was called the *via decumana*. Apart from these main streets, there were also lesser streets in fortresses and forts. The water and sewage pipes of wood and stone were buried within the gravelled and cobbled streets.

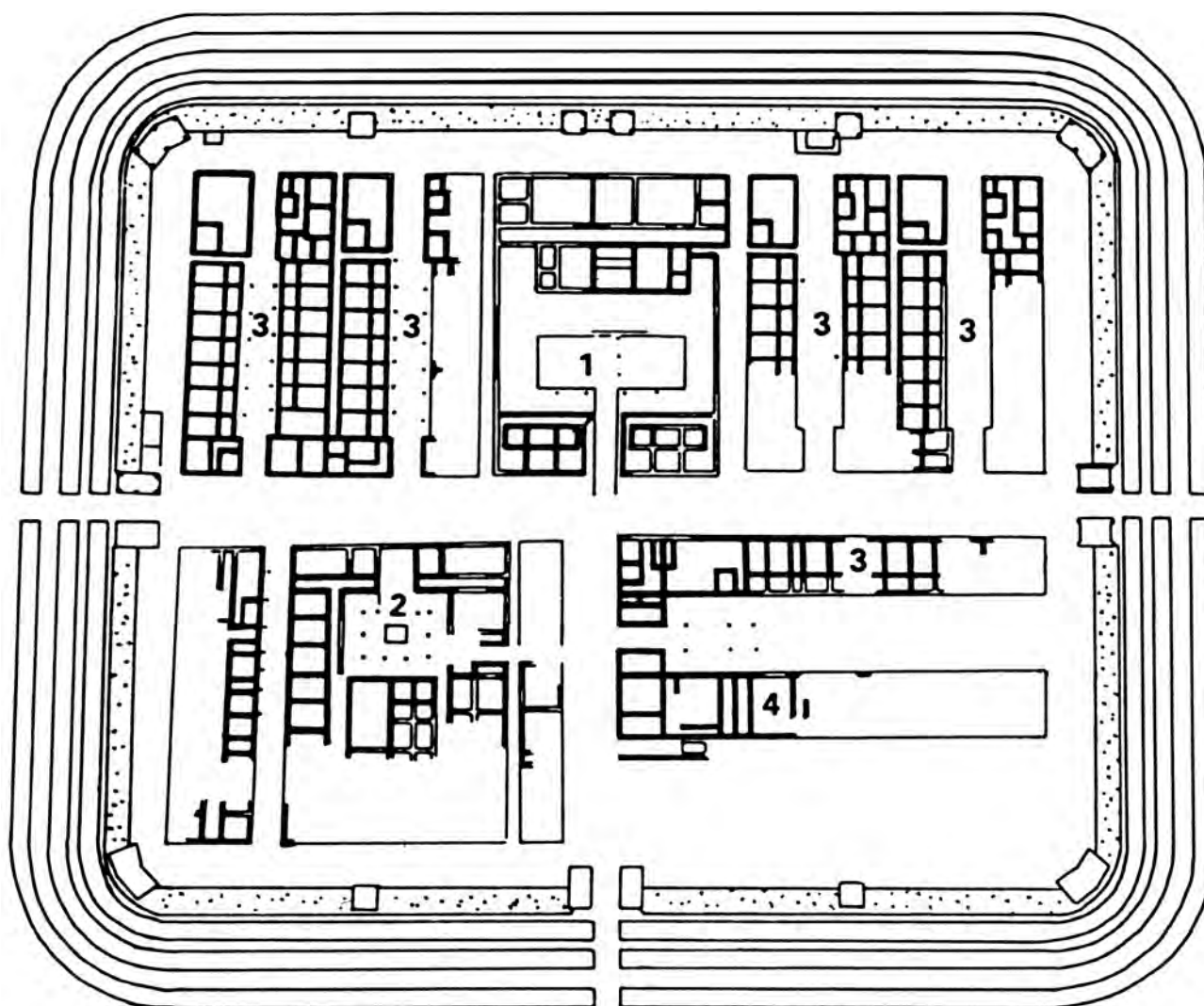


Figure 386 Valkenburg fort (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

Principia

Under the Republic, the general's tent, called the *praetorium*, was erected in the centre of the camp. Before its main entrance lay the *groma*, the main surveying location for the camp. The standards were also planted there. In front of the *praetorium*, commanders used to give their speeches to the troops and offer sacrifices. The general lived and performed his duties in the *praetorium*.

In temporary and permanent bases of the early Imperial period, the accommodation of the commander and the rooms where he performed his duties were separated. Archaeological discoveries in bases reveal a spatial separation into two different buildings, the *praetorium* and the *principia*, for the first time in the Augustan period. When exactly this division of the former general's tent into *praetorium* and *principia* took place is currently unclear. In the case of the central structures of the Scipionian siege camps in Numantia

in Spain, built with drystone walls and dating to the year 134/133 BC, such a division did not yet exist, and we know nothing of the interior of Caesarean camps.

From the Augustan period onwards, the *principia*, a large building complex around an inner courtyard, lay at the centre of the camps, fortresses, and forts.⁴¹ Its origins in the forum of a civilian city are undeniable. According to building inscriptions and literary testimony, this building was called the *principia*, linguistically a *plurale tantum*. The term 'camp forum', proposed by H. von Petrikovits,⁴² for the *principia* has not been used by researchers for a good reason: no other name should be introduced for an ancient structure where the ancient designation is known for certain (Fig. 387).

This central structure retained its basic form throughout the Imperial period, but underwent a certain development in the course of time.⁴³ The main entrance of the *principia* was on the *via praetoria* in the area of the *groma*. The

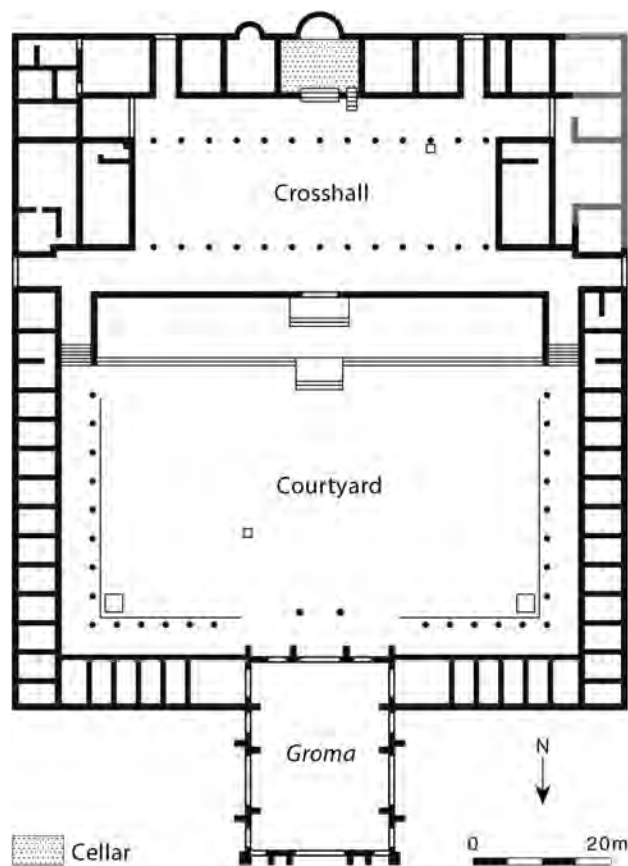


Figure 387 Lambaesis principia (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

entrance to the *principia* was architecturally emphasized in various ways; in the legionary camps of *Lambaesis* and *Budapest/Aquincum*, for example, *tetrapyla* are known, four-sided arched monuments above the camp *groma* on the *via principalis*. This type of architecture also finds parallels in urban architecture (see Kader 1996).

The rear portion of the *principia* consisted of a row of rooms with a transverse hall (*basilica*) in front. Similar to the *basilica* of *fora*, there was also a *tribunal* or speaker's platform inside, as well as altars, and emperor statues. The middle room of the rear range of rooms in the *principia* underwent a particularly interesting development:

In Augustan camps, there was always a passage to the *praetorium* at this point, which was separated from the *principia* by a street. Obviously, in this phase, the *praetorium* still had the character of an official administrative building, and the standards were probably still kept there. At least this can be inferred from the fact that the passage through the back of the *principia* was replaced by the *sacellum*, the shrine of the standards, in the post-Augustan period.

Depending on the method of construction of the whole building, a wooden or stone cellar could be found in this shrine of the standards, used as an *aerarium* or strongroom for the unit funds. From the Flavian period onwards, the

shrine of the standards was emphasized architecturally in comparison to the rear facade of the *principia*, whether as a rectangular structure or as a semicircular apse in legionary bases, as well as vexillation fortresses and auxiliary forts. Altars and other inscriptions, as well as sculptures of gods and emperors, were also concentrated at the rear of the *principia*. O. Stoll has catalogued these for the auxiliary forts of the Upper German and Raetian Limes (Stoll 1992).

The rooms adjoining the shrine of the standards can be identified as libraries, archives, or other administrative areas, and from the 2nd century AD onwards often were also heated. Then, from the second half of the 1st century AD, a series of rooms was found to the side, behind the porticos, some of which were identifiable by inscriptions or by pertinent finds as *armamentaria* or armouries. In the side ranges, additional office and archive rooms of the military administration might also be found. The *officia* of the legionary legate, the senatorial and equestrian military tribunes, and the *praefectus castrorum* are, for example, epigraphically recorded in the legionary base at *Lambaesis* in Algeria from the area of the *principia*. *Scholae*, that is, assembly and cult spaces for certain grades or ranks of service, are recorded in inscriptions from the *principia* in Imperial legionary bases, without it being possible to identify specific rooms. In the case of auxiliary forts, the *principia* in the *latera praetorii*, as a rule, housed the most important functional structures, such as the *praetorium*, *horrea*, *fabricae*, or *valetudinarium*.

Praetorium

In the Imperial period up to the 3rd century, the *praetoria* of legionary camps were reserved for legionary legates, who came from the top echelon of the nobility, from the senatorial order. Accordingly, a level of residential comfort can be expected in their quarters – at least in well-built, multi-year permanent bases – which did not differ very much from what this group of people was accustomed to in their home country. Indeed, R. Förtsch (Förtsch 1995) has shown for the *praetoria* of the great early Imperial-era bases with legionary garrisons, that these buildings followed the basic concepts of sophisticated architecture according to Italian models. As a plausible reason for this, he pointed out that generals such as Drusus or Tiberius were lodged in these palaces, who, as high-ranking members of the Julian-Claudian imperial family, did not want to give up a certain level of comfort even when in the field. *Praetoria*, located beside or behind the *principia*,⁴⁴ had an abundance of rooms and several courtyards; dining rooms (*triclinia*) and bathing facilities can be identified. Their decoration (architectural ornamentation, wall paintings, and so on) also demonstrates expensive taste. This can even be seen in the much more modest facilities of the auxiliary forts (Fig. 388). A discovery at Ladenburg also shows that the *praetoria* in auxiliary forts were significantly higher than had been imagined so far: the fallen wall of a half-timbered

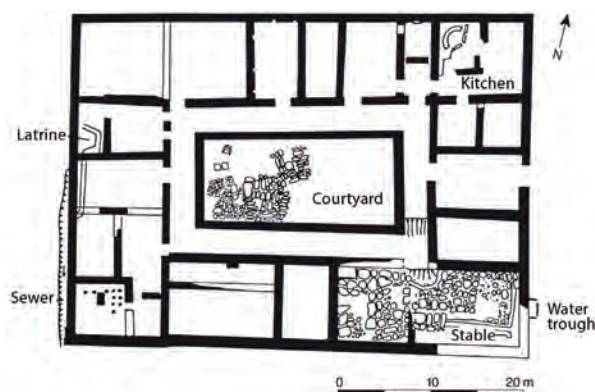


Figure 388 Housesteads praetorium (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

building with rich painting and high-set windows allowed for a room height of at least 5.5 m high. This suggests that this was a particularly representative unit of rooms.⁴⁵ The findings could also indicate that those parts of the building that served for less official purposes were two-storeyed.

Tribunes' houses

The houses of the military tribunes, the senatorial *tribunus laticlavus*, the five or six equestrian *tribuni angusticlavii*, and probably also the *praefectus castrorum*, represent, albeit in a much more modest form, modifications of the Italian town-house.⁴⁶ These tribunes' houses were traditionally located in the *scamnum tribunorum* in the *praetentura* on the *via principalis*, where the tents of the tribunes in fact stood in the marching and field camps of the Republic.

The form and position of the tribunes' houses are most obvious in the Scottish legionary base at Inchtuthil, from the time of Domitian.⁴⁷ Apart from their location in the *scamnum tribunorum*, these are also clearly identifiable by their construction as buildings with an inner courtyard and several ranges of rooms. So far there is no other legionary camp in which the tribunes' houses can be seen quite so clearly in relation to each other, as at Inchtuthil. Occasionally, special buildings also occur, such as a *mithraeum* being found in a tribune's house at Budapest/Aquincum.⁴⁸

Barracks

A legion consisted of 10 cohorts, which – probably only from the Flavian period – comprised the first cohort (*prima cohors*) of about 1000 men and the *cohortes* 2–10 of about 500 men. Each of cohorts 2–10 consisted of six *centuriae*, each of 80 men, commanded by a centurion. These *centuriae* were again divided into ten *contubernia* (sub-units of 8 men each), which were housed together in quarters in the barracks. The *prima cohors* consisted of five *centuriae* each of 160 men. To these infantry units were added 120 legionary cavalrymen. The centurions were ranked according to the *centuria* commanded by them, and the

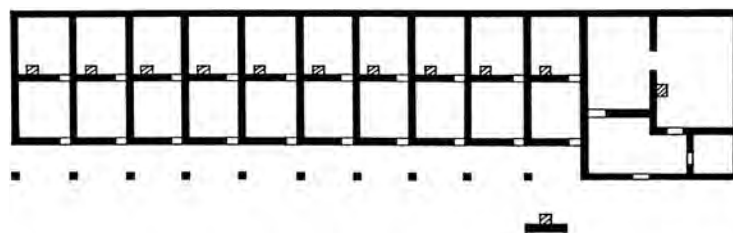


Figure 389 Idealized reconstruction of a barrack building (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

highest rank that could be given to a non-commissioned officer below the level of the senators and *equites*, was that of the *primus pilus*, i. e. the centurion of the first *centuria* of the first cohort. These hierarchies were also reflected in the accommodations of men and centurions: this can best be understood at Inchtuthil.⁴⁹

The soldiers in legionary camps and auxiliary forts were housed in elongated barracks buildings (*centuria*) with porticos to the front, which had developed from the tents in Republican marching camps and field camps (Fig. 389). They have no precursor in civilian architecture.⁵⁰

In the infantry barracks, each *contubernium* had two rooms available, the rear sleeping and living room with four bunk beds (?) and a hearth. This dwelling was called the *papilio*, in front of which was a storage room for weapons and equipment, which was called the *arma*. These terms were derived from the Republican tradition, inasmuch as *papilio* actually means tent, and the *arma* was originally the forecourt in front of the tent, where weapons and baggage were deposited. In the *papiliones*, hearths and fire-places are found, which are moreover regularly absent from *armae*. It is assumed that the smoke was carried away from a clay and wood fireplace with a clay chimney in the roof.

Up to a few years ago, researchers were unsure whether the horses of cavalry units were housed in separate stables or not.⁵¹ Recent excavations, like those at Ladenburg, Wallsend on Hadrian's Wall, or at Heidenheim,⁵² have clearly shown that cavalry units lived under the same roofs as their horses, so the accommodation of the men was arranged differently here. There was a (heated) living room for three riders and next to it a stable for three horses. The reserve horses were probably placed outside the forts,⁵³ the *calones* ('stable lads') presumably in an upper storey above the stables.⁵⁴

Depending upon the period, about 25 to 40 m² were available for a *contubernium* in an Imperial legionary base, and about 10 to 40 m² were available in an auxiliary fort (Davison 1989 *passim*). These calculations include cavalry barracks and assume the premise that Roman barracks only had residential and utility areas on the ground floor. However, there are indications that two-storey structures existed (e.g. the Praetorian Camp in Rome⁵⁵). Currently the limited discoveries in the north-western provinces, where most camps have been excavated, usually do not provide an answer to the question of whether or not the

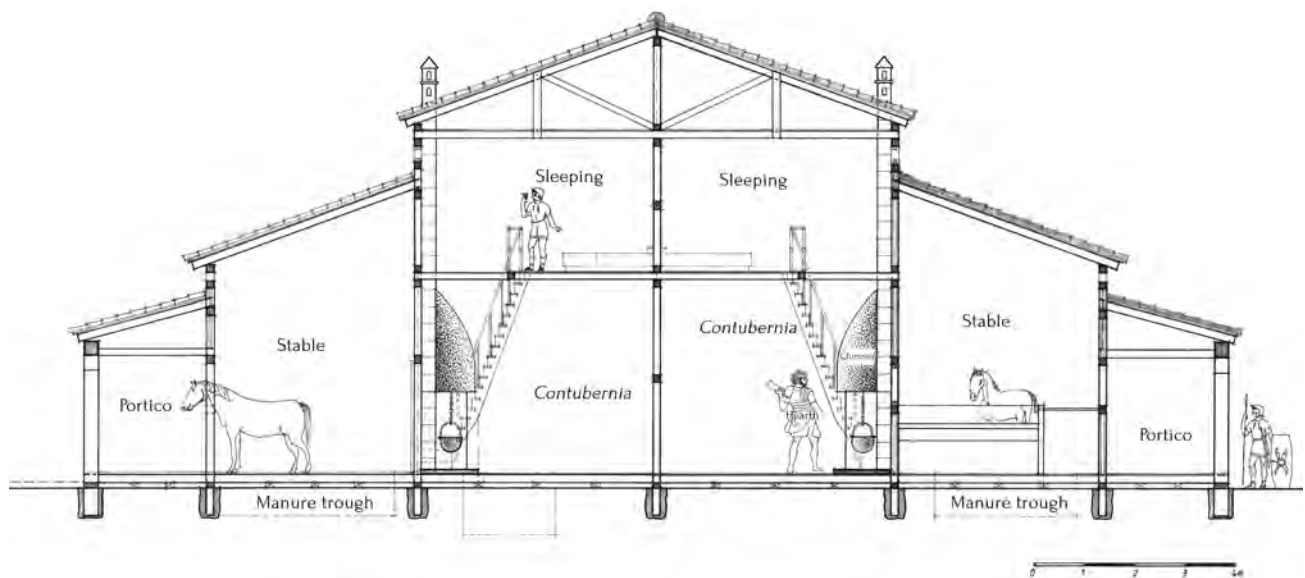


Figure 390 Reconstruction of a two-storey cavalry barrack from Heidenheim (after Scholz 2009). Drawing: A. Smadi, Arch. Institute University of Cologne

barracks were single-storied or two-storied one way or the other. In Heidenheim, however, the discoveries from the double barracks are extremely suggestive of a two-storey arrangement,⁵⁶ which might possibly also apply to other fortresses and forts (Fig. 390). The likely two-storey nature of the *praetorium* at Ladenburg can also be cited as a supporting argument.

The centurions inhabited the so-called officers' quarters at the end of the barracks, which offered a much higher level of comfort. Here, for example, baths, underfloor heating, or wall paintings, as well as several living and sleeping rooms were often situated. In some camps and forts, there were also larger areas at the other end of the barrack. These buildings may have housed the junior officers – the *optio*, as well as the *tesserarius* and the *signifer*. They also contained offices.

From the Augustan period onwards, it is noticeable that centurions' quarters were constructed in a very different way from the rest of the barracks. Thus, the officers' quarters were built as more substantial wooden or stone buildings, contrasting with the lightweight design of the *contubernia*, which for instance were built in half-timbered construction.

The officers' quarters were usually placed at that end of the accommodation for each of cohorts 2–10, which lay next to the defences, and thus closest to the enemy. In the event of an alarm, the centurions were apparently responsible for their centuries manning the section of the defensive walls or other emergency stations assigned to them. In the first cohort, the centurions' quarters fronted on to the *via principalis* and lay next to the *principia*. As a sort of bodyguard for the legionary commander, they were obviously responsible for his security, or constituted a tactical reserve under his direct command. This distinction can again best be observed in Inchtuthil. Here the centurion's

houses of the first cohort not only stand out because they differ from those of the other centurions in their location: they are also much larger and more comfortably built, but are still smaller than the tribunes' houses. However, there were also clear differences within the first cohort: the house of the *primus pilus*, with its pillared courtyard, was the largest and most beautiful of all five.⁵⁷

As seen above, the structure of the accommodation of Roman legionary soldiers in their barracks can be seen with unique clarity in the base at Inchtuthil. Nevertheless, things are generally not quite as clear as they might seem. There are still some details under discussion: here, as in many other camps, the barrack blocks have 14 or more *contubernia* instead of the allegedly standard 10. On closer inspection, however, there also seem to be hardly any of these alleged 'standard barracks' in other bases, most barracks offering rooms for 11–14 *contubernia*. However, this not only means that more soldiers, such as troops in transit, could be accommodated, but that they might also be considered to have been additional storage rooms, office space, or workshops. Likewise uncertain, for example, is where the legionary cavalry were quartered or where the accommodation for the *immunes* were situated, if these were not also housed within the *centuria*.

Tabernae

Along the main roads of the legionary fortresses, as was the case at Inchtuthil for instance,⁵⁸ lay rows of simple buildings, which are probably the *tabernae* of the literary and epigraphic sources.⁵⁹ These were probably the accommodation for the baggage train, stable lads, muleteers, and the carters for the transport wagons. However, they also provided orderly offices, and stables

for draft and pack animals, as well as sheds for wagons and the artillery. A letter from Vindonissa shows that the *tabernae* were numbered – that is, easy to find – and that in one of them a woman of indigenous origin ran a tavern.⁶⁰ However, such *tabernae* have not been identified in every base, the state of research possibly having a role in that, as well as the fact that less substantial timber structures have not always been recognized consistently in excavations. At Inchtuthil, 141 *tabernae* have been found, while at Novaesium, there were probably 106 *tabernae*.

Baths

Even in the early Imperial period, it can be assumed that soldiers from the Mediterranean area did not renounce their customary hot bath in the field. However, heated bath buildings are inevitably connected with stone architecture, so they are missing in the early timber-and-earth camps. However, it must be assumed that there were bathing possibilities in tubs and vats of wood and metal in buildings, which have not been identified from their floor plans as bath-houses. Military bath buildings in camps are constructed from the Neronian period onwards, as soon as camps were built in stone.⁶¹ Their position within the camp at first varies quite a lot, but then a regular location in the *praetentura* on the right is adopted.

In contrast to the fort baths of auxiliary units, nearly all of which are of the same sequential type (*Reihentyp*), there is no standardized design for legionary baths. They have individual ground plans that were derived from urban baths.

From the Flavian period onwards, bath buildings were also indispensable for auxiliary forts. The baths of auxiliary units are only in exceptional cases within the fort (e.g. Niederbieber). As a rule, they are located outside in the fort *vicus*.⁶² Fort baths were usually laid out according to the *Reihentyp* form, with the rooms for the most important bathing activities arranged sequentially: *frigidarium* (cold bath), *tepidarium* (warm bath) and *caldarium* (hot bath). They do not quite reach the level of urban bath buildings, but wall paintings and locally produced statues are sometimes attested. As stone and brick buildings, there are often abundant finds of stamped brick, indicating that the legions frequently supplied the forts situated in their field of operations and jurisdiction with building materials. Moreover, building inscriptions often record specialists, such as centurions detached from legions, who were deployed as leaders of building parties in order to build such technically demanding buildings as baths.

The size and also the quality of the facilities of fort baths depended on the size of the units near whose fort they lay; the size and importance of the fort *vici* seem also to have played a role. In the 3rd century AD, it can occasionally be noted that baths on the Upper German-Raetian Limes were reduced during reconstruction work, which allows corresponding conclusions to be drawn about

the dwindling strength of the troops on this sector of the frontier – at Rainau-Buch fort on the western Raetian Limes, for example.⁶³ In Britain parts of the *vici* have been preserved with important structures, such as the bath buildings, in the form of the so-called annexe fortifications, which connect directly to the defences of the fort.⁶⁴

Exercise halls

Exercise halls, where cavalrymen and infantrymen could practise fencing and shooting in the dry, are testified for legionary bases in literary sources, but are largely absent among archaeological discoveries.⁶⁵ At Inchtuthil, such a building was suggested to the left of the *praetentura*, but it is more likely to be a commercial building.⁶⁶ With the exception of Birdoswald on Hadrian's Wall (Wilmott 1997 and 1997a), no exercise hall has as yet been recognized for an auxiliary fort.

Grain storage (horrea)

One of the most important tasks for military logistics is the provision of sufficient food for soldiers. As the ancient sources show, the food given to the legionary soldiers of Rome was, above all, in the form of unground wheat, which had to be ground by the soldiers themselves with a hand mill. From this, each received at least 650 grams per day (Kehne 2004). In addition, there were bacon, cheese, vegetables, oil, and sour wine, which when mixed with water was the standard drink of the legionaries, *posca*. Other food, especially beverages, had to be purchased by the soldiers with their own money from the retailers (Junkelmann 2006). Central camp or field kitchens were unknown, meals being prepared by the soldiers themselves in the *contubernia*. Discoveries of hand mills with inscriptions from *contubernia* prove this.⁶⁷ In addition to bread, the main foods were cereal (*puls*) with various ingredients (Junkelmann 2006).

It is clear from all of this that the main task of military logistics in Roman times was to provide large quantities of grain in the bases. If we learn that, as was the case for Britain, for example, the annual consumption of a force was kept in stock in the camp (this corresponds to about 2,000 tonnes in the case of a legionary base), it is not surprising that there were numerous *horrea* (grain stores) in legionary camps and auxiliary forts.⁶⁸ Since the grain was obviously not stored in sacks, but rather as bulk material on floor boards, these *horrea* have a very distinctive method of construction. The floors were raised and thus set above ventilated spaces, which ensured a continuously dry storage.⁶⁹ In the case of wooden structures, *horrea* are recognisable from closely placed sill beam construction (Fig. 391, 392) for the foundations of these structures, while for stone buildings they were designed as pillars or closely placed parallel lengths of walling. On the short sides of the *horrea*, there

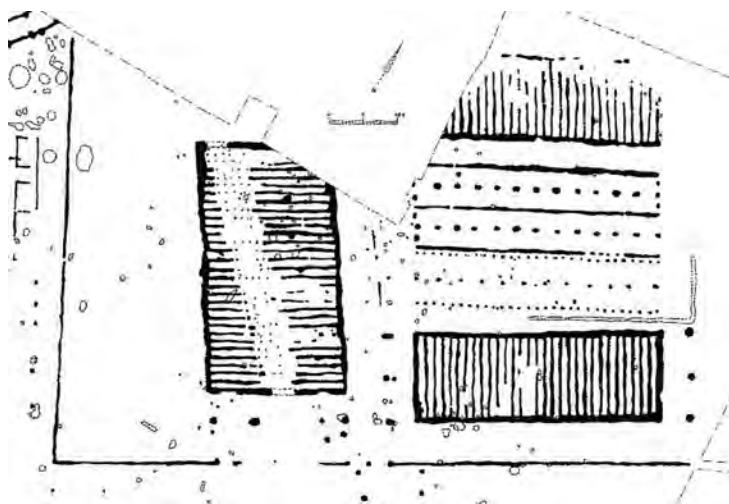


Figure 391 Anreppen Augustan base, eastern area with horrea (after Fischer 2009a). Drawing: A. Smadi, Arch. Institute University of Cologne

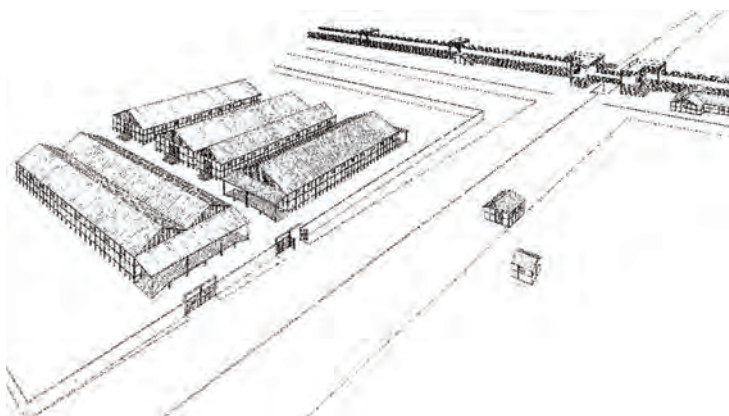


Figure 392 Anreppen Augustan base, reconstruction drawings of horrea (after Fischer 2009a). Drawing: A. Smadi, Arch. Institute University of Cologne

were loading platforms. In the case of stone buildings, buttresses were always attached to the walls which bore the thrust against the outer walls from the grain. Corresponding supports may also have existed for the wooden buildings, but they cannot normally be identified from ground plans.

Horrea were always constructed near the camp gates, in order to provide short distances for transport by wagon. A special form of *horrea* was found in the late Augustan base camp at Marktbreit, never used, which was intended for the logistics of the short-term campaign against the Bohemian Marcomannic kingdom of Maroboduus in the year AD 6. Here, a grain-drying kiln was placed in the vicinity of a *horreum* to protect the grain, which had become damp during transportation, from being destroyed during storage.⁷⁰

Hospitals (valetudinaria)

According to E. Künzl's studies, *valetudinaria* were an invention of the Augustan period, which were not derived from civilian models of hospital buildings in the Mediterranean

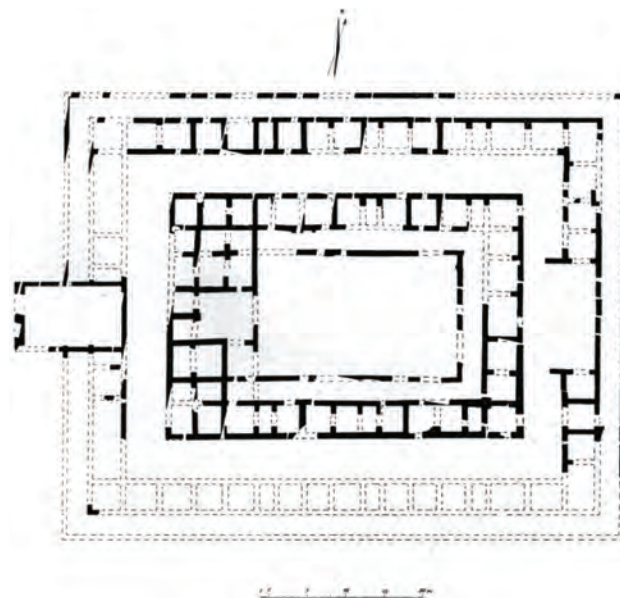


Figure 393 Vetera I valetudinarium (after v. Petrikovits 1975). Drawing: A. Smadi, Arch. Institute University of Cologne

area. They are evidently based on the invention of a brilliant military architect who had to take account of the fact that the climate of the north-western provinces and fighting with the Germans led to a higher incidence of sick and wounded.⁷¹ Thus, in legionary camps, a four-sided building complex was built around a peristyle courtyard with a garden (Fig. 393), which was in the Mediterranean tradition in a more general sense. One side served as an entrance area and contained operating rooms, storage rooms, possibly also kitchens or rooms with other function, the other three wings having corridors opening on to small wards on both sides, as well as rooms for nursing staff. All in all these *valetudinaria* are surprisingly modern. It might almost be thought that they were the model for modern hospital buildings. However, there is no indication of continuity, examples of *valetudinaria* of the form just described no longer being found even in the Late Roman period.

Hospital buildings are assumed for auxiliary forts as well, but the problem is that these have not yet been identified as clearly.⁷² Buildings in the *latera praetorii*, mostly corridor buildings, which are certainly not *fabricae*, are often referred to as *valetudinaria*. This is especially the case when there is a second, similar construction, which can safely be identified as a *fabrica* because of furnaces, finds of slag, or the like. In none of these postulated *valetudinaria* in an auxiliary fort, have inscriptions, surgical instruments, or other finds been found up to now which would confirm such an assertion.

Workshops (fabricae)

Further building complexes consisting of smaller units of rooms grouped around a courtyard or corridor are often

encountered in legionary fortresses and auxiliary forts. They frequently contain water tanks or ovens of various types and sizes. Slags, moulds, and semi-finished products sometimes make it clear that these are *fabricae* or workshop buildings, mainly for metal processing.⁷³ These *fabricae* were mainly found during the early occupation of an area, and as soon as a civilian economic infrastructure was formed, much of the supply for the troops shifted to the private sector. Therefore the evidence for the production and repair of weapons and military equipment accumulated in the *canabae legionis* and the fort *vici*.

Storage and other rooms

In addition to the *horrea* and *tabernae*, a whole range of buildings of different forms are found in camps and forts, the function of which is unclear. They are often referred to as storage and store rooms, but it is not impossible that these were smaller, specialized workshops.⁷⁴ Armouries (*armamentaria*) are recorded in legionary camps and auxiliary forts in the side ranges of the *principia*, but also in separate buildings, as for example at Carnuntum and Rainau-Buch.⁷⁵ In the case of the fort at Künzing, it was possible to prove that it contained not so much the fighting arms of the soldiers as old stocks, reserve and surplus weapons, parade armour and tools for the pioneers (Fischer 1991). *Armamentaria* have also been proved to have existed in cities (Eck 1990).

Ovens

Occasionally, ovens are found built into the *agger* (rampart) of a fortification, on the edge of the *via sagularis*. At the Saalburg, in particular, entire kiln batteries have been excavated which, of course, were not all in use at the same time, but were replaced over time.⁷⁶

Water supply and latrines

The supply of fresh water and provision for sewerage were a matter of course for legionary camps and auxiliary forts of a more permanent nature. Accordingly, camps and forts seldom had wells, except for a well in the *principia*.⁷⁷ Water tanks (for fire-fighting water), baking ovens, or latrines were frequently integrated into the rear of the earthen ramparts of the defensive circuit, on the *via sagularis*.⁷⁸

Infrastructure and facilities

Exercise and training sites (campus)

An exercise ground (*campus*) should be expected to have existed at every camp and fort too, but in fact such sites are rather rare. At Hardknott Castle fort in northern England, a *campus* of about 1.3 ha is recognisable in the landscape, for example, but they are also known from altars dedicated to the *campestres*, the tutelary deities

of the *campus*. A *campus* has now also been identified near the cavalry fort at Heidenheim.⁷⁹ Round pens or enclosures, such as those found in the *vici* of some forts, like Virunum in Noricum,⁸⁰ were also used for the training of horses and for cavalry games. Just such a 'gyrus' was laid out within the Neronian fort of The Lunt at Baginton in southern England.⁸¹

Civilian settlements in the area

A civilian settlement grew near every Roman garrison of troops that had existed for a while. In the case of legionary camps, the term *canabae legionis* has survived (von Petrikovits 1981). These *canabae* were under military control and had no administration of their own, although they could resemble a town.

Civilian settlements around auxiliary forts were considerably smaller, although they were equipped with temples, *fora*, amphitheatres, and bath buildings (Sommer 1988; Moneta 2010). The latest survey results on Hadrian's Wall or on the Upper German and Raetian Limes clearly show that most of the fort *vici* have been underestimated in terms of their size and facilities (Mischka *et al.* 2010). Fort *vici* were planned together with the fort by specialists from among the troops and laid out according to the same system of measurement, the resulting regular parcels on the planned streets and squares then being developed by civilians who had followed the troops.⁸² Among these were craftsmen, innkeepers, prostitutes, and traders, as well as the families of the soldiers.

The distinctive quality of the fort site, its favourable road traffic, and later a densely populated hinterland, were the reasons why most of the *vici* in the north-western provinces continued to exist after the relocation of garrison and the complete withdrawal of the troops. They not only remained as settlements, but sometimes blossomed into impressive towns in the wake of economic development.

3. The most important types of camps and forts

In a proper marching camp the soldiers are safe day and night, even if the enemy is at the gates. It is as if they were in a mobile fortress, which they carry with them everywhere (Vegetius, *Epitoma rei militaris* 1.21).

Marching camps without internal buildings

The term 'marching camp' means very short-term fortifications, often occupied only overnight. The Roman military, at least on the march through enemy territory, built one every evening. Defences of a turf wall with earthen rampart and ditches were built around the camp, reinforced by the palisade stakes carried by the

troops. Inside, there were the customary leather tents to house the soldiers and baggage of the Roman army, not permanent buildings. Such installations are normally only indicated archaeologically by their ditches. In the interior, baking ovens, waste pits, or latrines can be found as archaeological features. As a rule, finds are scarce or even non-existent, which is not exactly conducive to more precise dating.

Republican marching camps

The best evidence for the emergence of marching camps, as they are so appropriately characterized by Vegetius, is based on literary, not archaeological sources. At the very beginning, there is the description of a marching camp (Fig. 394) by Polybius (6.26–32): this camp was designed for two legions and auxiliary troops, a total of 16,800 infantry and 1,800 cavalry. It was a square with each side 2,017 Roman feet (around 600 m) long. The surveying team first marked out a cruciform axis, the intersection of which was called the *groma* after the surveying device placed there. Behind the *groma*, the site for the *praetorium* was marked with a white flag. From this cruciform axis, the whole camp interior was now set out and the places for the individual units and functional areas marked with coloured flags.

In front of the *praetorium*, but still within the *retentura*, the tents were set up for the 12 legionary tribunes, six for each legion. In front of these tents was the principal camp road, the *via principalis*, which connected the *porta principalis dextra* with the *porta principalis sinistra*. Its centre was called the *principia*, a designation which was to

be passed on to the headquarters building in the Imperial period. Another transverse road, the *via quintana*, ran across the storage area in front of the *praetorium*, in the *praetentura*. The *via sagularis* usually extended right round the defences. In specific cases, this area, the *intervallum*, could be particularly broad to accommodate cattle and booty and to keep the tents out of reach of enemy missiles. The road from the *praetorium* to the gate facing it, the *porta praetoria*, was called the *via praetoria*, the rear gate the *porta decumana*.

In the *praetentura*, on either side of the *via praetoria*, lay one legion, along with the accompanying cavalry, which was formed from allies. In the 2nd century BC, the legions were still divided into different parts from those after the Marian army reforms: the *maniple*, consisting of two centuries, was still the smallest tactical unit of the legion, each legion having 30 maniples. It was only with the reform of the army that the *centuria* became the smallest tactical unit, the legion thus being more flexible to lead. These maniples were arranged in battle in three equally strong ranks: in front were the light-armed troops (*hastati*), then fully armed men (*principes*), and then the veterans, the *triarii*. The soldiers of the legion also occupied their tents within the camp in this formation. The *equites*, the cavalry, were situated directly on the *via praetoria*, so that they could leave the camp as quickly as possible, the auxiliary infantry being located at the sides, facing the encirclement. On the side of the *praetorium* were the *quaestorium*, the camp treasury, and the *forum*. These were, in turn, flanked by the bodyguard of the general, in this case one of the two consuls, the *pedites* and *equites extraordinarii*. Behind these were other *extraordinarii* as well as other allied troops.

Imperial-period marching camps

Marching camps from the Republic are extremely scarce as archaeological monuments, while those of the Imperial period are still being discovered with relative frequency. Research into these is particularly good in Britain, since the onset of aerial photography in the 1920s enabled the discovery of many of these installations. So far, more than 200 marching camps are known in the UK, with several camps often being found in one place. It is also often the case that in a place where marching camps were concentrated during the occupation phase, permanent bases were later built (Welfare and Swan 1995). Usually only the backfilled ditches are known from these marching camps, or, in rare cases, the remains of the rampart. Traces of interior buildings are, of course, hardly ever present, because they consisted only of tents.

In recent years, since aerial archaeology has become possible in the former Eastern Bloc countries following the fall of the Iron Curtain, numerous marching camps of

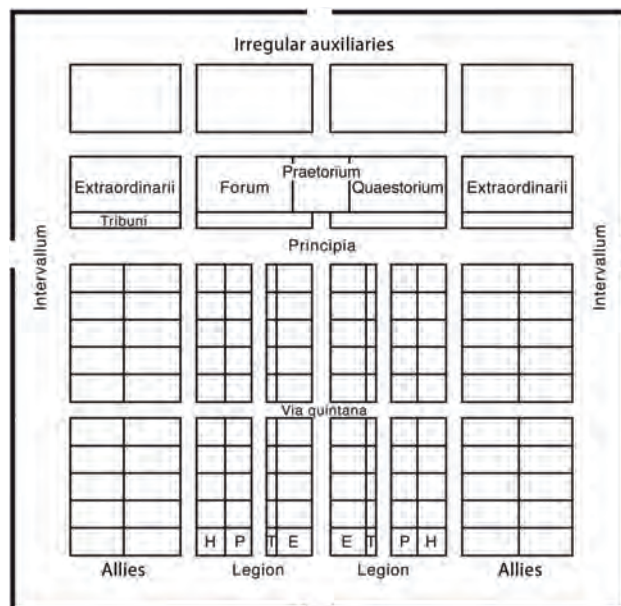


Figure 394 Plan of a Roman marching camp from the time of the Republic, as described by Polybius (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

various sizes have become known in the area north of the Danube frontier in Pannonia. They are usually from the Marcomannic Wars of the second half of the 2nd century AD (Komoróczy 2009). As examples of marching camps, only a few more recently studied examples are mentioned here, connected with the German campaigns under Augustus (Fig. 395).

HEDEMÜNDE IM WERRATAL (GERMANY)

At Hedemünden, in the region of Göttingen in Lower Saxony, a number of Roman camps were discovered in the valley of the Werra, which here in fact forms the upper course of the Weser.⁸³ It is an oval camp of 2 ha, probably occupied on a long-term basis, as well as two other facilities, probably marching camps, located at a ford on the Werra (Fig. 396). The material published to date belongs to the Oberaden Horizon.

HOLSTERHAUSEN (GERMANY)

In Dorsten-Holsterhausen, eight Augustan marching camps have been discovered and excavated since 1952 (Fig. 397). The larger camp of two is situated on the north bank of the Lippe, occupying an area of about 900 × 500 m and, at 50 ha, is only slightly smaller than the base at Oberaden (54 ha). The defences consisted of a V-sectioned ditch approximately 4 m wide and 2.5 m deep, as well as a turf rampart with no wooden buildings. Gateways were located on three sides. There were no permanent internal timber buildings, with only a few waste pits and ovens set into the ground being found. More recent investigations about 200 m west of this camp were carried out and over an area of 15 ha, the ditches of five other marching camps being discovered (Ebel-Zepezauer 2003; Ebel-Zepezauer *et al.* 2009). The eight camps known so far from Holsterhausen are more likely to belong to the time of Drusus' offensive, as is evident from the sparse small finds, with occupation in the time of the Haltern Horizon also being indicated.

Practice camps

Sometimes, aerial archaeology in the vicinity of legionary camps, such as at Xanten and Bonn, repeatedly results in the discovery of large concentrations of camp ditches of different sizes, which lack internal structures and do not really seem explicable as marching camps. Many of them have just lengths of ditch or corners, but not complete enclosures. One has to assume these are practice camps. Practice camps usually consist only of backfilled ditches and no finds. Examples can be found in the Xanten area (Vetera I and II). Aerial photographs from Britain and from Straubing-Hofstetten on the Raetian Danube Limes show that such practice camps also existed in the vicinity of auxiliary forts.⁸⁴

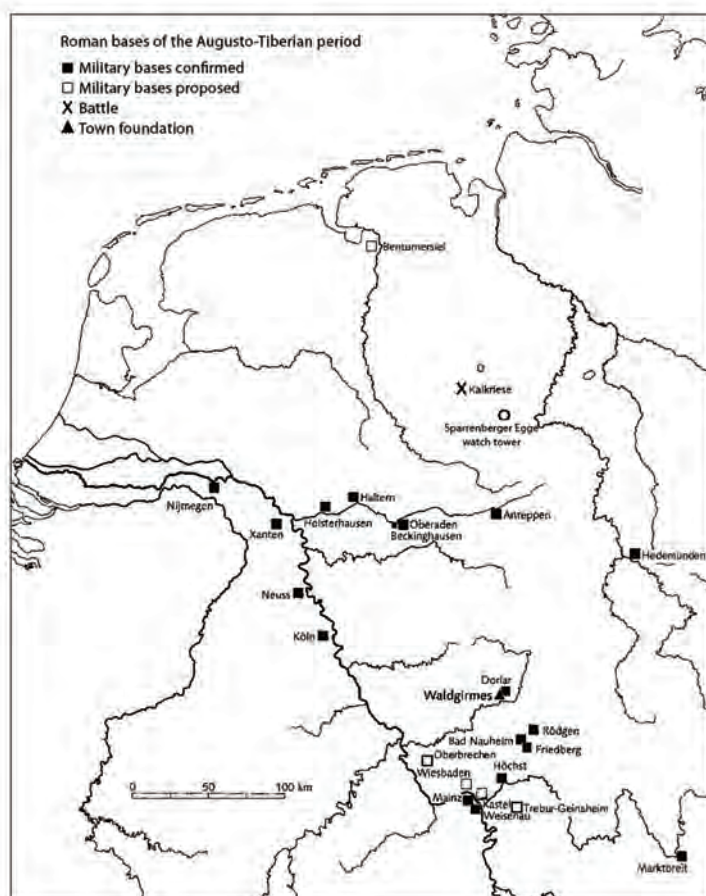


Figure 395 Roman military bases and civilian settlements between the Rhine and the Elbe in the Augustan to early Tiberian periods (after Fischer 2009a). Drawing: A. Smadi, Arch. Institute University of Cologne

Permanent camps with internal buildings

Semi-permanent Republican camps

While marching and practice camps lack internal buildings and are virtually free of finds, the so-called semi-permanent camps, which were built as winter quarters or siege camps, have internal buildings and finds, which are frequently suitable for extremely accurate dating independent of any historical tradition. The internal structures were mostly rudimentary designs, which changed according to the geographic location. In the arid areas of Spain or Palestine, these buildings were built from drystone walling and covered with wood. In the more temperate zones, such as in Gaul, buildings of just wood or, at best, wattle and daub were erected.

CÁCERES EL VIEJO (SPAIN)

This strictly rectangular camp with sharp-edged corners was excavated by Adolf Schulten during 1910–1930 and published by Günter Ulbert (Ulbert 1984). It was provided

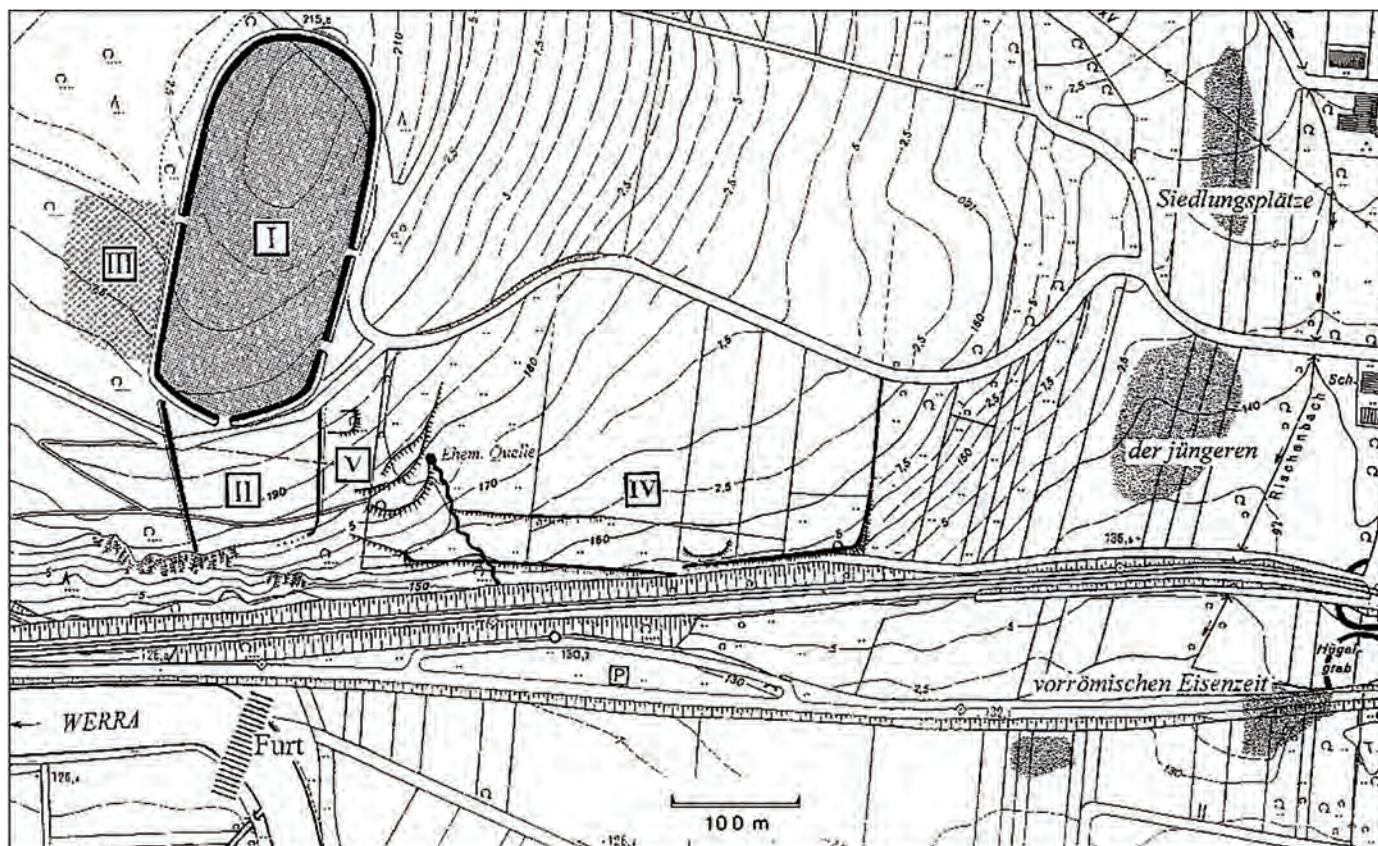


Figure 396 Augustan camp near Hedemünden. I: permanent camp with Annexes. II and III; IV–V: presumed camp; shaded: settlements of the Later Iron Age, east of which are two large burial mounds (after Fischer 2009a). Drawing: A. Smadi, Arch. Institute University of Cologne

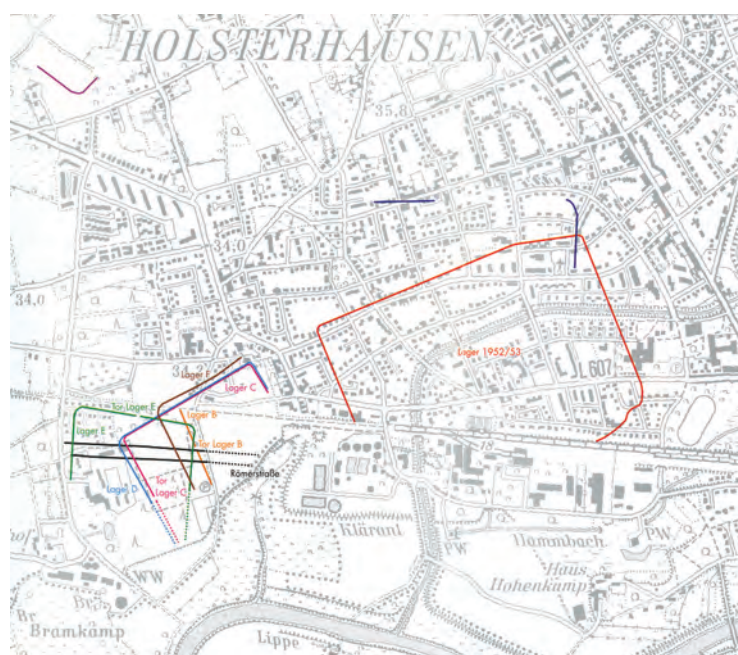


Figure 397 Augustan marching camp 1952/53 and excavation areas 1999–2002 in Holsterhausen (after Fischer 2009a). Drawing: A. Smadi, Arch. Institute University of Cologne

with sturdy internal buildings of stone, was occupied only briefly, and ended with a burnt layer rich in finds (Fig. 398). Cáceres was most likely *Castra Caecilia* of the Roman general, Caecilius Metellus, mentioned in the sources, destroyed during Rome's wars against the renegade commander Sertorius in 79 BC.

Siege works of the Republican and Imperial periods

NUMANTIA (SPAIN)

In the bitter and changing wars of Rome with the Celtiberians of Spain (154–133 BC), the northern Spanish city of Numantia played a particularly important role as the core of Spanish resistance. The conquest of Numantia was attempted several times by the Romans and ended in catastrophes for the besiegers. Only Scipio Aemilianus the Younger, the adopted son of Scipio Africanus, successfully captured the northern Spanish town of Numantia after an eight-month siege in the years 134/133 BC. The city was surrounded by an 8.9 km-long wall and ditch, including six large camps. Numantia capitulated in 133 BC. These camps were examined and published by the ancient historian Adolf

Schulten from Erlangen in the years 1906–1908 (Fig. 399) and even today represent an important milestone for provincial Roman military archeology.⁸⁵

ALESIA (FRANCE)

During Caesar's Gallic War, the Great Gallic Uprising under Vercingetorix took place in 52 BC. The insurgents gathered in Alesia, the *oppidum* of the Mandubiii. Caesar had the city surrounded with a 16 km-long fortification. This consisted of a line of obstacles facing the city, and a 21 km-long line of contravallation, which was a successful defence against the attacks by the Gallic relief army (Fig. 400). This circumvallation incorporated seven large military camps, which, following the first excavations under Napoleon III, have been investigated and published by a Franco-German research project (Reddé and von Schnurbein 2001; Reddé *et al.* 2006; Reddé 2006). Some Roman, Celtic, and probably also Germanic weapons were found, mainly in the ditches of the siege work around Alesia. Other Caesarian camps are known to some extent there and elsewhere, but have not yet been systematically explored.

DURA-EUROPOS (SYRIA)

The Persian siege works in the area of the city wall of Dura-Europos on the Euphrates dated to around AD 256/7.

Camps, fortresses and forts of the early and middle Imperial period

During the reign of Emperor Augustus (27 BC–AD 14), the conditions for the garrisoning of Roman troops changed fundamentally. After the end of the civil war and the final pacification of Spain, no major concentration of troops was needed inside the empire, apart from the Imperial guards and some units with a police function in Rome. The territorial expansion to the Rhine, Danube, and Euphrates had given Rome fixed frontiers, which were threatened by dangerous enemies. Thus it was only logical to station the military on these focal points for active or threatened conflicts. Since Tiberius revised the plans of Augustus to make the Elbe the frontier of the empire in AD 16, the Rhine frontier gained in importance as a naturally stable river frontier. This finally led to the establishment of fixed garrisons of troops, which then lasted for many years. This fixed garrisoning of troops on the frontier was soon followed by an ever-growing military and civilian infrastructure. In addition, there was a civilian settlement system that was closely related to the military and its huge economic potential. Under Claudius, auxiliary troops, which had previously been closely bound to the legions, gained

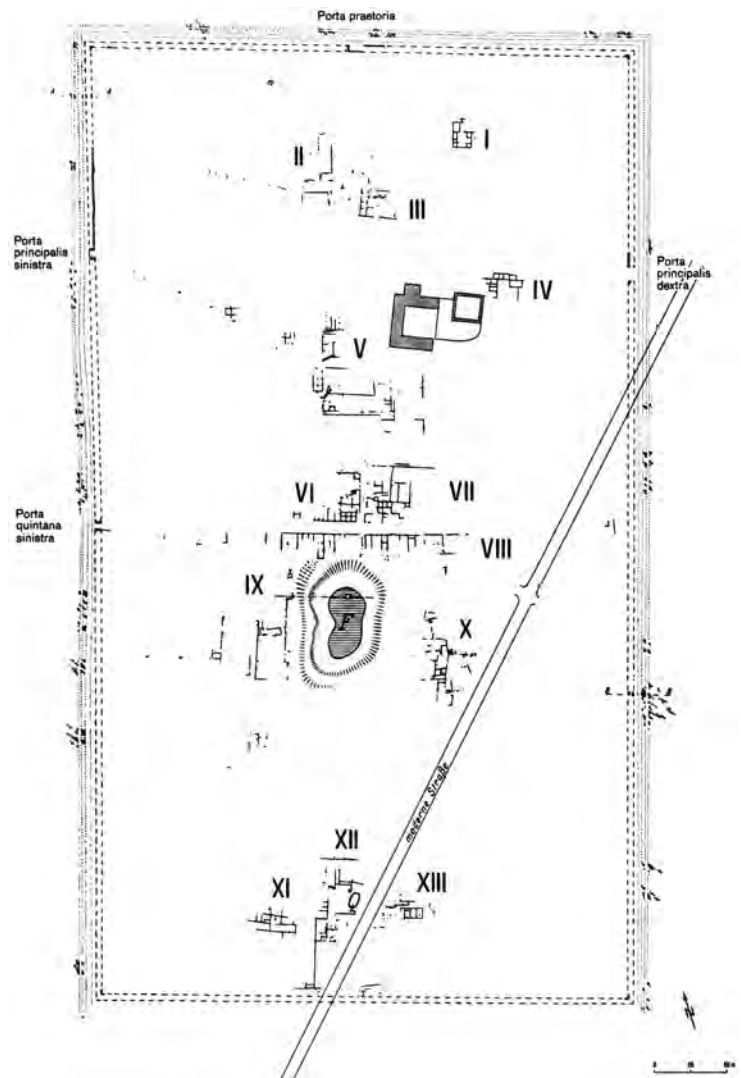


Figure 398 Plan of the camp at Cáceres el Viejo in Spain (after Ulbert 1984). Drawing: A. Smadi, Arch. Institute University of Cologne

greater independence. This was due to the fact that they were increasingly used for frontier protection. The basic form and interior construction of the now increasingly common group of auxiliary forts looked to legionary fortresses. From the middle of the 1st century, at the latest, Roman fortifications were presented as uniformly standardized installations with a mostly elongated, rectangular basic form with rounded corners ('playing card shape'). As a rule, these fortifications were built at first with a timber-reinforced earthen fortification and with internal buildings made of wattle and daub. Once the appropriate infrastructure was available in the Neronian period, they were converted into stone, starting with the legionary fortresses.

Double legionary bases in chronological order

TRIER-PETRISBERG (GERMANY)

The oldest Roman camp in Germany (30/29 BC) stretched over at least 50 ha on the Petrisberg on the steep eastern bank of the river Moselle, above the later Trier (Löhr and Trunk 2008). It offered space for two legions and auxiliary troops (cavalry). Geophysical prospection and rescue excavations under H. Löhr have taken place since 2001. The elongated oval base had defences comprising a turf

rampart and two V-sectioned ditches. Only the north gate has been found so far. Inside the single-phase, densely built camp, roads, the *praetorium* (?), wells, latrines, and cavalry barracks were found. Ceramic finds already discovered in the 1930s, combined with the coin series from the recent excavations and a dendrochronological date from the spring of 30 BC, connect the camp with the literary account from 30–27 BC of the suppression of the revolt of the Treveri under Nonius Gallus. The camp at Petrisberg was probably the short-term winter camp of Nonius from 30/29 BC.

NIJMEGEN/BATAVODURUM (NETHERLANDS)

Cassius Dio (54.32) reports that in 12 BC Drusus led his army over the *insula Batavorum* against the Germanic tribes of the Usipetes and Sugambri. A large Augustan camp of about 42 ha on the Hunerberg in Nijmegen can be directly connected with this action. There were two legions and auxiliary troops here (Fig. 401). The camp has the typical polygonal form of the early period, which is well adapted to the terrain. The camp was surrounded by a turf rampart, hardly visible during excavation, in front of which ran a double V-sectioned ditch. The east and the west gates (25×9 m), as well as towers 3×3.6 m and 24 m apart, have so far been detected. Out of the internal timber buildings, the *principia* (?), *praetorium* (?), tribunes' houses, and the barracks and the centurions' quarters are partly known so far. This camp was soon abandoned, but a legionary base, the camp of *legio X Gemina*, was erected in the Flavian period. The brief period of occupation begins with a deposit which predates the beginning of Drusus' offensive of 12 BC.⁸⁶

To the east, on the Kops plateau, contemporary with the large camp on the Hunerberg, an Augustan oval-shaped fortification of almost 3.5 ha and with an unusual internal



Figure 399 Numantia with the surrounding Roman siege works (after Luik 1997). Siege works of the Republic and the Imperial period at Numantia (Spain)

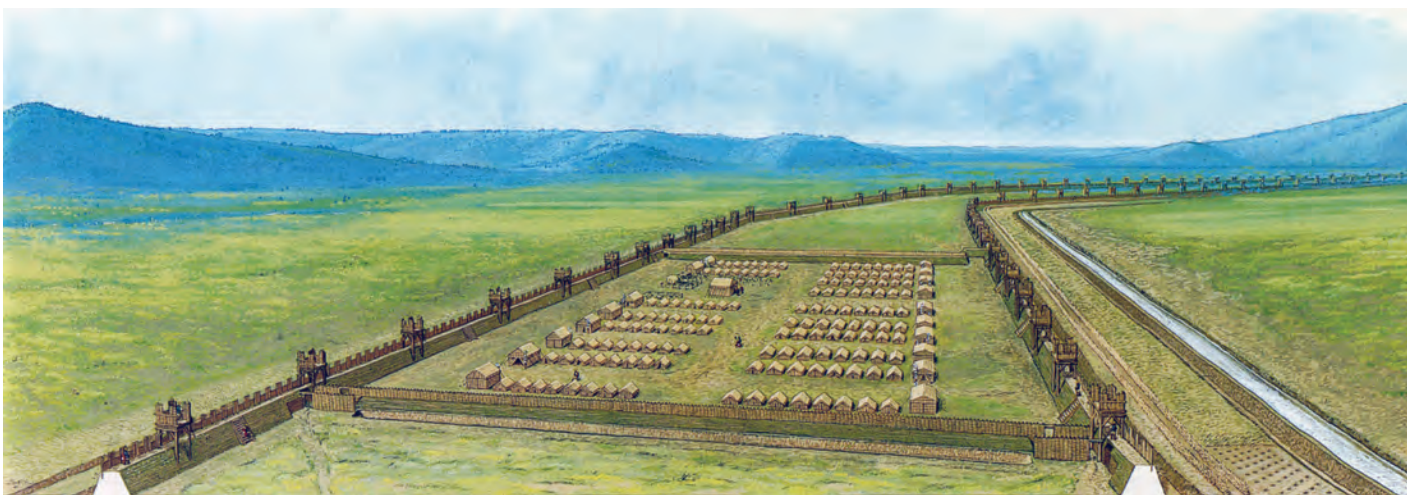


Figure 400 Reconstruction of the Caesarian siege works at Alesia (after Reddé 2006a). Graphic: P. Connolly

layout was created.⁸⁷ Inside, there was a remarkably large and luxurious wooden *praetorium* (Fig. 402), as well as several officers' houses, but hardly any accommodation for troops. The *praetorium*, which in many details corresponded to that of contemporary legionary camps, is a building with a floor plan clearly related to the top-quality residential architecture of the Augustan period in Italy, according to investigations by R. Förtsch.⁸⁸ From this, Förtsch concludes that the inhabitants were from the top echelons of society, perhaps Drusus himself. The theory that the headquarters of Drusus and other generals during the first Germanic offensive was on the Kops Plateau thus has much in its favour.

OBERADEN (GERMANY)

At Oberaden, a seven-sided camp of about 56 ha was built entirely of timber.⁸⁹ The sides measure about 840 × 680 m. The 2.7 km-long wall cleverly used the lie of the land, hence the remarkable, seven-sided form. The defences consisted of a V-sectioned ditch, 4–5 m wide and 2–3 m deep, and a 3 m-wide, double-shelled timber-and-earth rampart (Fig. 403). Four gateways have been found, with the construction of the east gate apparently being secondary. Towers have been detected every 25 m. In the modern excavations of the internal buildings, parts of the *principia* and *praetorium*, as well as accommodation for the troops, have been examined.

Finds of weapon and equipment point to legionary and auxiliary troops, including cavalry. For the earliest date, dendrochronological data are available: the wooden components of the defences at Oberaden are made of green oak, felled in the late summer of 11 BC. This date is in perfect agreement with the passage in Cassius Dio (54.33.4) where Drusus, retiring to winter quarters, built a camp as a bulwark against the Sugambri at the confluence of the Lippe and Elison. The dating of the final withdrawal from the camp is based on numismatic and historical considerations. In the year 8 BC, Tiberius, after the death of his brother Drusus the year before, stopped all Roman activity east of the Rhine. Some 40,000 Germans, especially Sugambri, were deported to the region to the west of the Rhine. Thus the main task of Oberaden, namely to keep the Sugambri in check, was gone. The camp was apparently rendered unusable, the larger buildings being burnt down. Similarly, the wells were systematically poisoned with faeces, animal carcasses, and kitchen waste, to prevent the enemies of Rome from using the site.

MARKTBREIT (GERMANY)

One of the most spectacular new finds of Roman archaeology of recent years is the large Roman timber-and-earth camp on a bend in the Main near Marktbreit in the Franconian region of Bavaria (Fig. 404). It was discovered by aerial photography and explored by magnetometer survey and

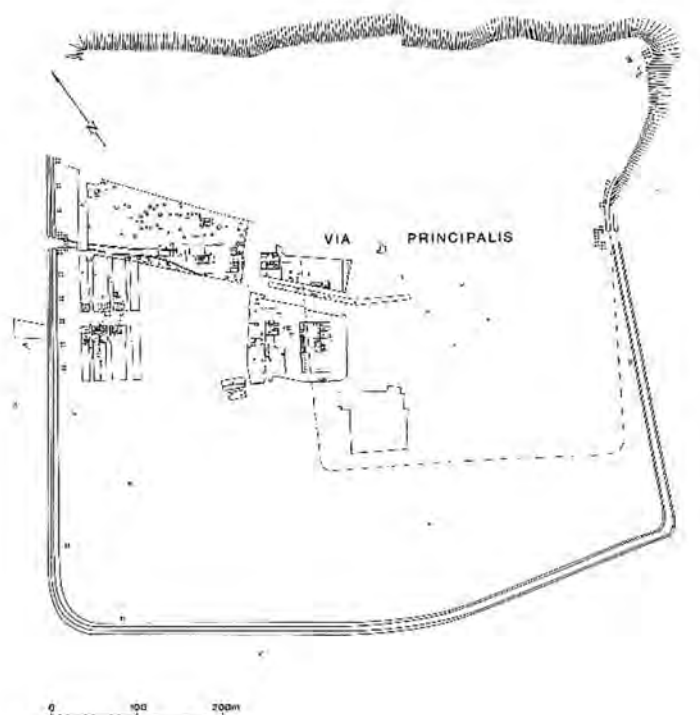


Figure 401 Nijmegen, the Augustan double legionary base on the Hunerberg (after Fischer 2009a). Drawing: A. Smadi, Arch. Institute University of Cologne



Figure 402 Nijmegen, the praetorium of the Augustan base on the Kops plateau. 1: posts in foundation trenches; 2: posts in foundation trenches – rebuild; 3: drainage channels; 4: hearth; 5: cellar; 6: rubbish pit; a: peristyle courtyard; b: central room with cellar; c: entrance; d: atrium; e: room flanked by a narrow corridor; f: north-east portico; g: modern disturbance; h: cistern (according to Fischer 2009a). Drawing: A. Smadi, Arch. Institute University of Cologne

excavation under the direction of Martin Pietsch up to 1993.⁹⁰ Over an older, smaller camp, a 37-ha base was built, with an area of 760 × 480 m and a defensive system of 2.3 km in length, which could accommodate two legions with their auxiliary troops. The fortification consisted of a timber-and-

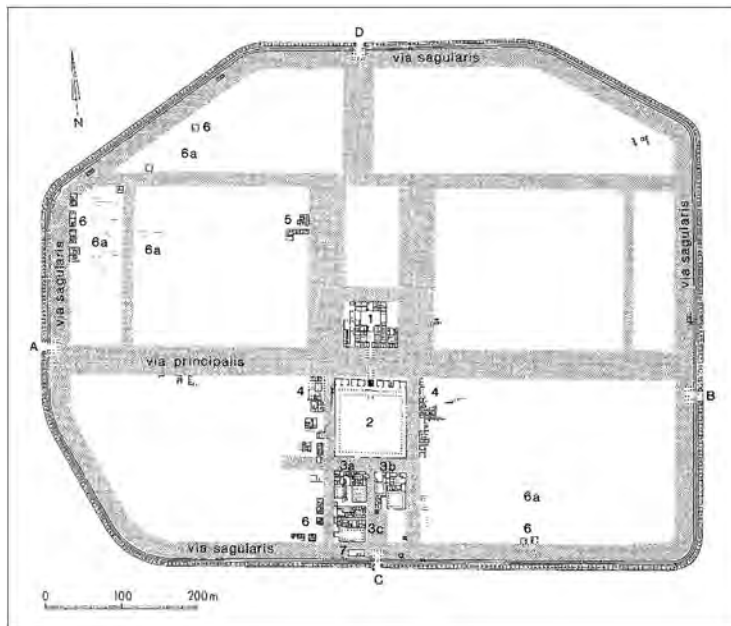


Figure 403 The Augustan double-legionary base at Oberaden. 1: praetorium; 2: principia; 3 larger residential buildings; 4: houses and tabernae; 5: buildings of unknown function; 6: officers' quarters; 6a: barracks; 7: structure at the south gate; A: porta principalis dextra; B: porta principalis sinistra; C: porta praetoria; D: porta decumana (after Fischer 2009a). Drawing: A. Smadi, Arch. Institute University of Cologne

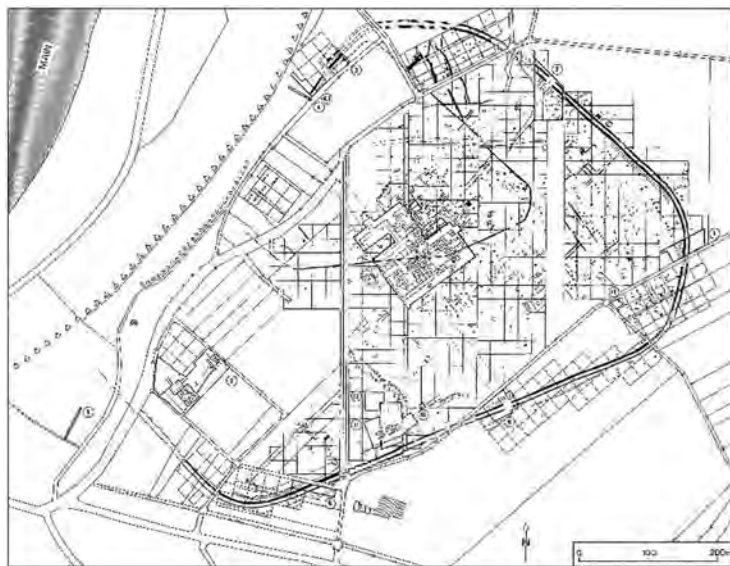


Figure 404 The Augustan base at Marktbreit. 1; 3; 4; 5; 6; 7; excavated areas of defences with south and north-east gates; 2: barrack and storage building; 9; 13; 15: central buildings; 10; 11: officers' quarters; 16: principia (after Fischer 2009a). Drawing: A. Smadi, Arch. Institute University of Cologne

earth wall (2.80 m width) and a double V-sectioned ditch. In the interior, the buildings were in part placed close to each other and included a *principia*, *praetorium*, officers' accommodation, and a timber *horreum*. However, there were also large open spaces. The few finds belong to the Haltern Horizon. The camp was obviously never occupied by troops and was deliberately burnt down by the Romans after a short time in which it had stood empty. There are various options for placing the camp at Marktbreit into a historical context, but, after weighing all possibilities, the most likely interpretation seems to be a connection with Tiberius' campaign against the Bohemian empire of Maroboduus of the Marcomanni in the year AD 6.

XANTEN/VETERA I (GERMANY)

In connection with Drusus' offensive, a first camp was erected around 13/12 BC on the Fürstenberg, a push moraine dominating the landscape at Xanten near the mouth of the Lippe, the name of which Tacitus has preserved as *Vetera Castra*. For the oldest camp, Enclosure B, the 18th Legion, which was defeated in the battle against Varus of AD 9 AD, is assumed to have built it, its presence being indicated by the tombstone of the centurion, Marcus Caelius. *Legio V Alaudae* and *legio XXI Rapax* are attested as the garrison of *Vetera* for the year AD 14 by Tacitus, then, around AD 46 the 21st Legion was replaced by the *legio XV Primigenia*. From the Tiberian to early Claudian period there was a polygonal double-legionary camp of about 45 ha on the Fürstenberg. The 56-ha rectangular Neronian double-legionary camp then replaced this. It was the first camp on the Rhine to be built in stone (Fig. 405) and possessed one *principia*, but two *praetoria* and a *valetudinarium*. There was a civilian settlement, the *canabae legionis*, belonging to the camp, of which a wooden amphitheatre is still visible in Birten as a depression in the landscape (Hanel 1995; Hanel and Song 2007).

Legionary camps in chronological order

From the Augustan period there were two types of fortress in which legionary troops were based. On the one hand, there are very large permanent camps (up to 56 ha), which are designated as double-legionary camps, and also included the auxiliary units assigned to the legions. The other are vexillation fortresses (well below 20 ha), in which parts of legions and auxiliaries, mostly cavalry and archers, could be found. The 'classic' legionary bases, in which a complete legion (initially together with their auxiliary troops) was based, only began in the Tiberian period with the base at Vindonissa. From the time of Claudius, auxiliary troops become increasingly self-sufficient and received their own forts, but there are also exceptions (e.g. Bonn) where, until the end of the 3rd century, they

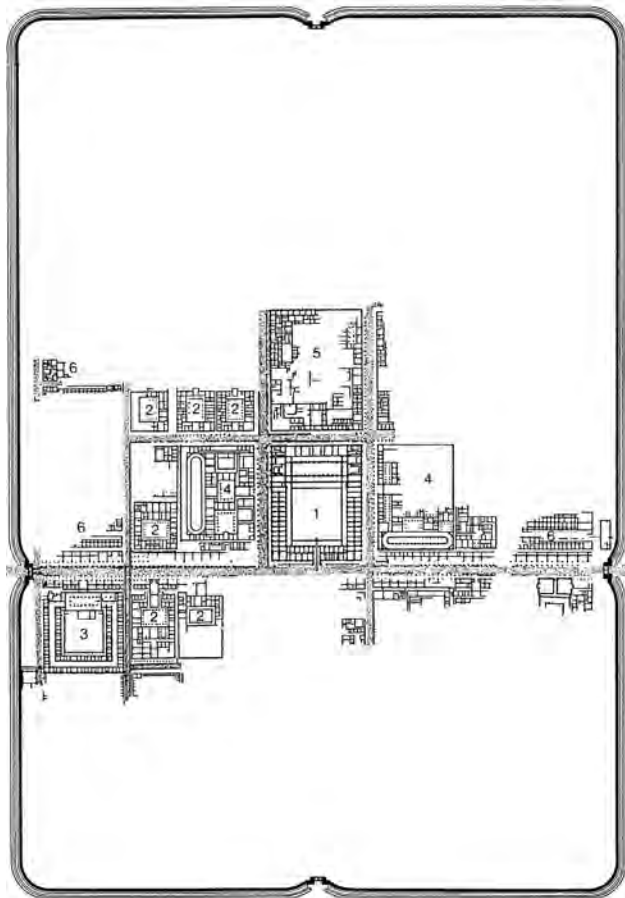


Figure 405 The double-legionary fortress of Vetera I (after Petrikovits 1975). Drawing: A. Smadi, Arch. Institute University of Cologne

remained in the legionary fortress (von Petrikovits 1975; Campbell 2006).

WINDISCH/VINDONISSA (SWITZERLAND)

In Windisch in the Swiss canton of Aargau, where the legionary base of Vindonissa had been since AD 16/17, a garrison of the Roman occupation army lay beneath the later camp. This small force probably did not have any offensive tasks, but was rather assigned to secure supply lines.

Under Tiberius, the 13th Legion was stationed in Vindonissa in a permanent earth-and-timber structure from AD 16/17 onwards (Fig. 406). The fortress lay on a high gravel terrace between the Aare and Reuß, and overlay a small Augustan military post. The fortress was related to important long-distance routes that led from the Rhône to the upper Danube or via the upper Rhine and the Bünde passes to Italy. The exact size and position of this earliest fortress are not yet known, but it is certain that there were also auxiliaries in the base. Around AD 45, the 13th Legion was transferred from Vindonissa to Pannonia and replaced by *legio XXI Rapax*. They constructed the fortress



Figure 406 The legionary fortress of Vindonissa (after Petrikovits 1975). Drawing: A. Smadi, Arch. Institute University of Cologne

in the form of an irregular, seven-sided stone construction covering 23 ha. It contained the *principia*, *praetorium*, tribunes' houses, bath buildings, a *valetudinarium*, store buildings and *horrea*, a temple of Mars, barracks, and – outside the fortress – a *forum* and an amphitheatre. Since the 21st Legion had made itself unpopular during the turmoil of 69/70 by triggering and suppressing a revolt of the Helvetii in this region, it was sent by Vespasian to Bonn in the year 70. The 11th Legion arrived at the fortress. The archaeological evidence here confirmed, as in Mainz, the information from Tacitus that Mainz and Vindonissa were the only fortresses on the Rhine which were not destroyed in the upheaval following the death of Nero. Under Trajan, the 11th Legion was withdrawn to the middle Danube, the fortress being abandoned and released for civilian development (Hartmann 1986).

NEUSS/NOVAESIIUM (GERMANY)

The legionary base of the Claudian to the Trajanic period was largely excavated and published by Constantin Koenen in 1988–1990 (Fig. 407). This so-called Koenenlager was for a long time regarded as the most excavated Roman legionary fortress. Today, this excavation still leaves many questions unanswered. With a size of 570 × 420 m (22.8 ha), the oldest wooden building phase of the fortress of *legio XVI* was already built in the form of a playing card, which was retained by the two (?) subsequent stone building phases. Following destruction in the Batavian revolt, *legio VI Victrix* rebuilt the fortress. After their withdrawal to the lower Danube area in the early 2nd century AD, the fortress was evacuated. Around the middle of the 2nd century, an unknown *ala* built its fort in the centre of the old legionary fortress. It measured 187 × 165 m and covered 2.7 ha.⁹¹

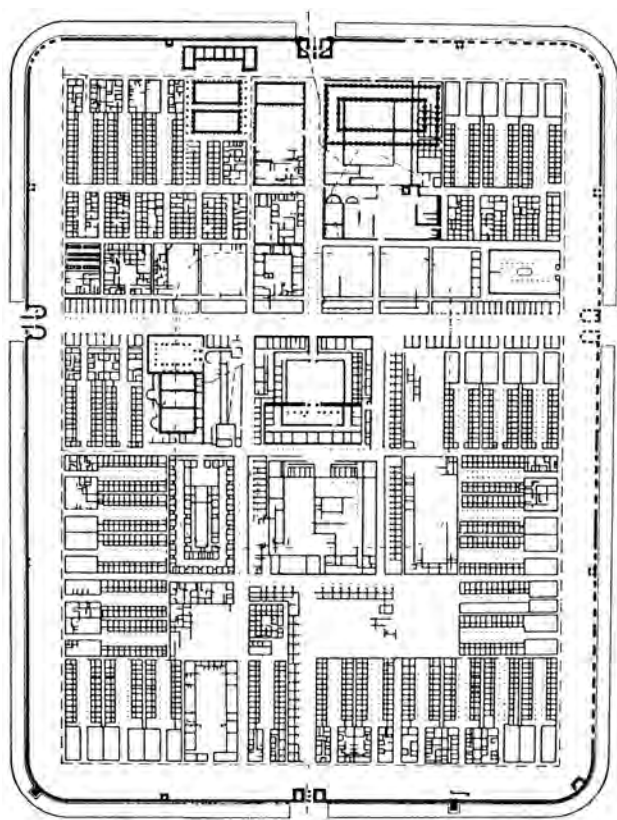


Figure 407 The legionary fortress of Novaesium (after Petrikovits 1975). Drawing: A. Smadi, Arch. Institute University of Cologne Carnuntum (A)

CARNUNTUM (AUSTRIA)

From the Claudian period onwards, various legions were based in the fortress at Carnuntum in Lower Austria: *legio XV Apollinaris* until AD 62, then *legio VII Gemina*, *legio X Gemina* and *legio XXII Primigenia*. After 72, *legio XV Apollinaris* returned, until it was replaced by *legio XIV Gemina Martia Victrix* under Trajan. This remained there until the end of the Roman frontier at Carnuntum. Apart from the legions, various auxiliary units are epigraphically documented, and the *classis Flavia Pannonica* also had its main base in *Carnuntum*.

Since the legionary base at *Carnuntum* was excavated extensively before the First World War by M. Groller von Miltensee, the results are, by today's standards, fraught with many problems. At virtually no point were natural deposits reached, the building traces of all periods being drawn together in an undifferentiated manner, and there was hardly any separation of finds and features according to their stratigraphy. In 1968–1977, a stratigraphic excavation of limited size in the north-east of the fortress yielded seven construction periods from the Claudian period to the 8th century AD.

The fortress forms an irregular polygon, the north side of which has fallen victim to erosion by the Danube (Fig. 408). Its length is still 490 m, the width varying



Figure 408 The legionary fortress of Carnuntum (after Gugl 2007a)

between 334 and 391 m. At only about 17.7 ha, Carnuntum is well below the usual size of legionary fortresses (about 20 ha). This could explain the perceived absence of fortress baths. Two unexpected details are a kink in the line of the defences to the north of the *porta principalis sinistra* on the one hand, and on the other an indentation in the defences at the *porta principalis dextra*. There was a double ditch around the fortress, which, however, at a point south of the east gate was replaced by a single ditch. Despite the unusual outline of the fortification, the internal structure of the stone building phase largely reflects the classic fortress layout: the *principia*, *praetorium*, tribunes' houses, and the barracks, the fortress bath buildings seemingly missing.

According to the available evidence, the fortress was built in the Claudian period (AD 41–54), using timber-and-earth constructions. Soon afterwards, rebuilding in stone began, probably only completed under Trajan. In the late 4th and 5th centuries, the remaining civilian population seems to have moved into the fortress. When barracks became dilapidated in the 5th century, they were in part replaced by Germanic post-built constructions. Destruction could not be verified for the late period, the fortress seeming to have slowly decayed in the course of the early Middle Ages (Gugl and Kastner 2007; Gugl 2007a).

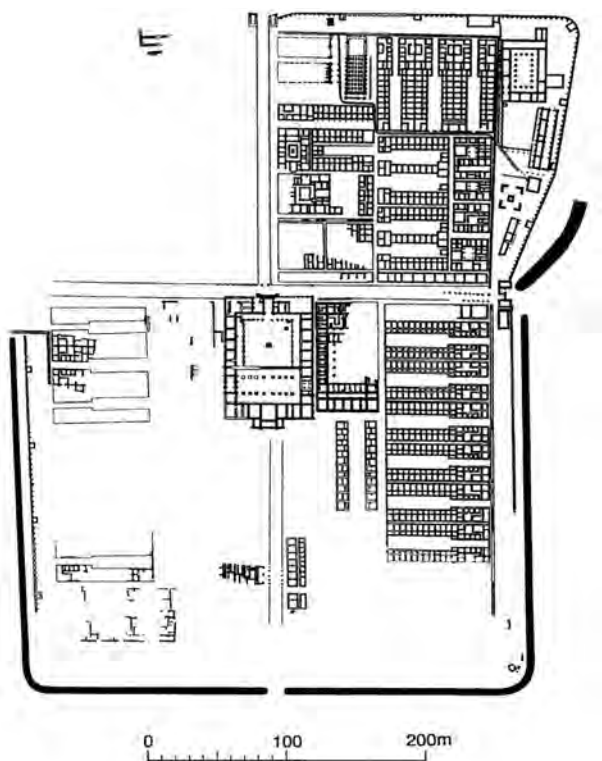


Figure 409 Nijmegen, Flavian legionary fortress (after Petrikovits 1975). Drawing: A. Smadi, Arch. Institute University of Cologne

NIJMEGEN/NOVIOMAGUS (NETHERLANDS)

In Nijmegen, Vespasian had a 17 ha legionary base built on the Hunerberg on the site of the Augustan double-legionary fortress, abandoned much earlier. This was rebuilt in stone under Trajan (Fig. 409). In the years AD 70–1, *legio II Adiutrix* occupied the fortress, replaced by *legio X Gemina*. This legion was then moved to Transylvania for the Dacian Wars around AD 104, afterwards being stationed in Budapest/*Aquincum*. After the withdrawal of *legio X Gemina* around AD 104, a vexillation of *legio XXX Ulpia Victrix* from Xanten (Vetera II) seems to have maintained a military presence here as a caretaker garrison. It is possible that around 121 under Hadrian, *legio IX Hispana* from Britain was in the fortress for a short time before moving to the East. By AD 125 at the latest there was no longer any garrison in Nijmegen, but to the west of the fortress, the civilian *municipium Ulpia Noviomagus* flourished.⁹²

MIREBEAU (FRANCE)

Following first the discovery of brick stamps and then aerial photography and excavations, it became apparent that *legio VIII Augusta* had for a short time occupied a legionary base at Mirebeau in Burgundy in the second half of the 1st century AD, and not, as had until then been assumed,

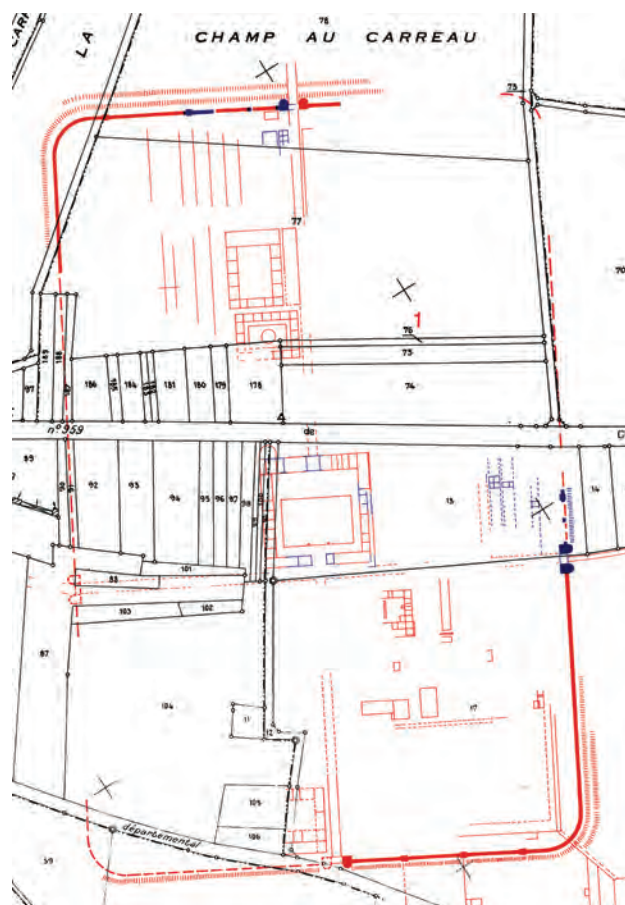


Figure 410 The legionary fortress of Mirebeau (after Goguet and Reddè 1995), Mirebeau (F)

returned to Strasbourg. The fortress lies on the road from Geneva to Langres in modern Burgundy, where a road leads from Autun to Dijon. In this location, a concentration of brick stamps of *legio VIII Augusta* had long been known (Fig. 410).

This means that it did not return to Strasbourg at the time of the restoration of the frontier defences under Vespasian (AD 69–79), but instead only shortly before AD 100. One reason for this is the fact that the uprisings in Gaul, which took place in the course of the year of three emperors and the uprising of the Batavians, made it advisable for the Romans to station a legion in this uncertain territory. The finds indicate Mirebeau was occupied for a period from the 50s to the 90s of the 1st century AD (Goguet and Reddè 1995).

INCHTUTHIL (GREAT BRITAIN)

The most northerly Roman legionary fortress was that at Inchtuthil in Scotland, which served as a base for the short-term Caledonian offensive of Agricola attributed to the 20th Legion. It was most probably only in use between AD 83 and 86. It is therefore well dated and closely too, and

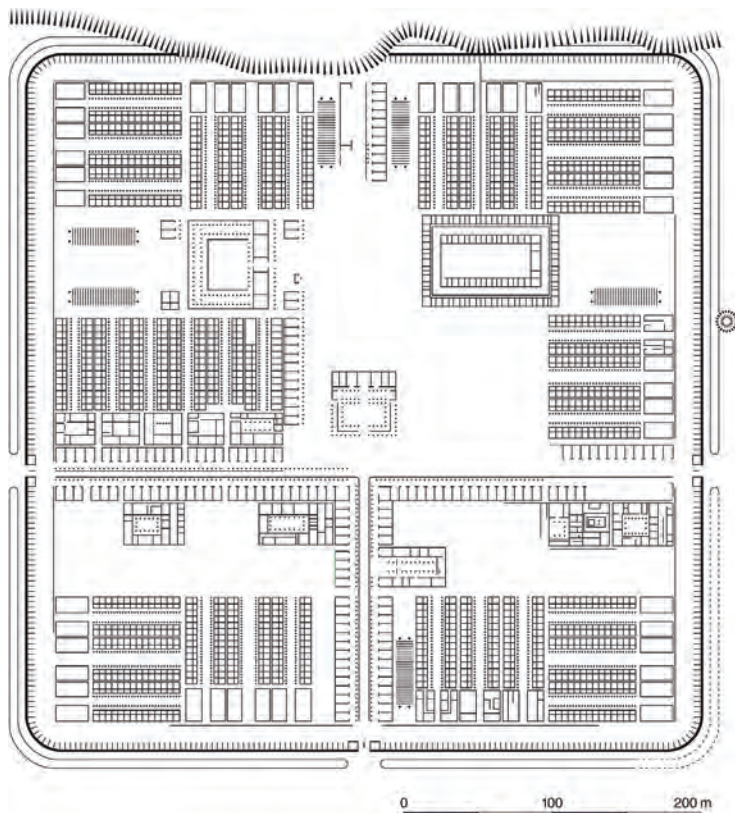


Figure 411 The legionary fortress of Inchtuthil (after Petrikovits 1975). Drawing: A. Smadi, Arch. Institute University of Cologne

moreover represents one of the very few legionary bases which, due to their short period of occupation, remained single-phase and without modifications to the interior, with only the wooden defences being quickly replaced in stone. Gates, towers, and internal buildings, however, were still timber structures (Fig. 411).

The base at Inchtuthil has numerous features typical of fortress construction in the Flavian period, but also some anomalies. These include the fact that obligatory buildings such as the *praetorium* are missing, while there is a lot of free space in the camp, which would be densely built up in a normal camp.

The defences of the almost-square legionary camp at Inchtuthil encompassed 21.8 ha. It was surrounded by a V-sectioned ditch of about 6 m width and 2 m depth. The *principia* at Inchtuthil lies in the centre of the camp behind the *via principalis*. At 45 × 42 m, the headquarters building is only slightly larger than those in most auxiliary forts, which is much too small for a legionary fortress. The *valetudinarium* was located in the *retentura*, both its construction and its size lying within the standard range. The *fabrica* was likewise built around a courtyard, but with three-aisled halls on three sides and one side with single rooms and the entrance. In the fortress there were

six large *horrea*, the place for at least two more having been left free. A building identified by the excavator as a *basilica exercitatoria* stood in the eastern *praetentura*, in front of the *scamnum tribunorum*. The building, measuring 25 × 50 m, was built around a gravelled courtyard, but its function is controversial.

The barracks for the 10 cohorts of the legion can be seen more clearly, the first of which with about 1000 men was twice as strong as the rest. The officers' quarters for the centurions of cohorts 2–10 were built at the end of the barracks, those of the first cohort being oriented towards the *via principalis*, next to the *principia*. However, not only the differing position separates the centurions' buildings of the first cohort from those the other centurions: the former are also much larger and more comfortably built, but still have smaller dimensions than the tribunes' houses. However, there were also clear differences within the first cohort: the house of the *primus pilus* with its pillared courtyard was the largest and most beautiful of all the five. As for other structures usual for a Roman legionary base, water and sewerage pipes, latrines, and ovens were found.⁹³

CAERLEON/ISCA (GREAT BRITAIN)

This 20.5 ha fortress was constructed in timber in the shape of a playing card in the years AD 74/75 for the control of southern Wales (Fig. 412). It replaced the earlier legionary base at Usk. The rebuilding in stone around AD 100 is connected with the arrival of *legio II Augusta*. The

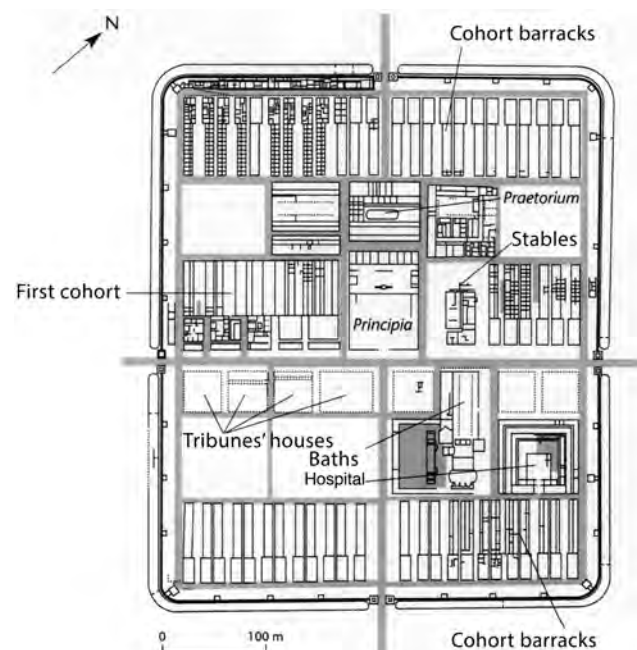


Figure 412 The legionary fortress of Caerleon (after Campbell 2006). Drawing: A. Smadi, Arch. Institute University of Cologne

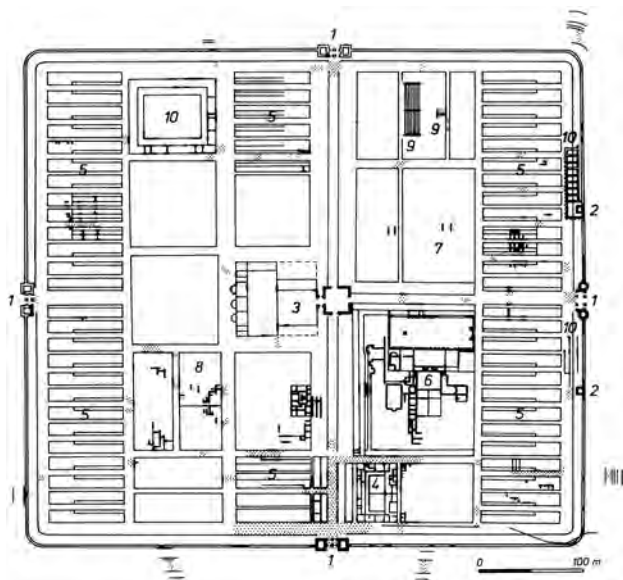


Figure 413 The legionary fortress of Budapest (after Polenz 1986). Drawing: A. Smadi, Arch. Institute University of Cologne

internal buildings are related to those at Inchtuthil, but here a large bath building was added in the *praetentura*. Up to AD 260, *legio II Augusta* remained in the camp until it was withdrawn under the British usurper Carausius (287–93).⁹⁴

BUDAPEST/AQUINCUM (HUNGARY)

As a result of the wars against the Quadi and the Dacians, a legion was stationed on the middle Danube in Budapest/Aquincum under Domitian: *legio II Adiutrix*. Its timber-and-earth base was first constructed around AD 89 in the form of a trapezoid, the later fortress only partially overlapping it (Fig. 413). However, the troops were soon withdrawn for the Second Dacian War and Trajan's Parthian campaign, and was replaced by *legio X Gemina Pia Fidelis* from Nijmegen between AD 105 and 118. When *legio II Adjutrix* returned to remain until the end of the Roman Empire, the *legio X* was transferred to Vienna/Vindobona. The stone fortress was built at the beginning of the 2nd century. It existed throughout the 2nd and 3rd century AD and had an area of 476 × 570 m (27.1 ha), with the *porta praetoria* facing the Danube. While on the western side, there was only one ditch, three ditches ran around the other sides. Some of the internal buildings are known: the *principia* with tetrastyle over the *groma*, tribunes' houses, one with *mithraeum*, fortress baths, *valetudinarium*, *fabricae*, and a *horreum*.

Around AD 330, that is, under Constantine I (AD 306–37), the old fortress was abandoned and replaced by a newly built Late Roman fortress, which adjoined the western wall of the former fortress.⁹⁵

VIENNA/VINDOBONA (AUSTRIA)

The legionary fortress at Vienna was built under Domitian (AD 81–96) when the *legio XIII Gemina* was moved from Ptuj/Poetovio to the Danube. This is interpreted as being in the context of the German Wars of AD 89–93. It was then soon replaced by *legio XIII Gemina Martia Victrix*. After AD 114, the *legio X Gemina* remained in Vienna until the 5th century AD. The size of the fortress, which was first built in wood and then in stone, is unclear, since its northern extent was washed away by the Danube in post-Roman times (Fig. 414). In addition to a plethora of minor separate observations, larger excavations have mainly occurred in the *latera praetorii*.⁹⁶

TURDA/POTAISSA (ROMANIA)

Around AD 170, a legionary fortress was constructed within sight of the gold-rich mountains of the Transylvanian highlands and near the salt mines of Turda, in order to better get the area under military control. The camp of *legio V Macedonica* was built on the site of the *vicus* of Potaissa, already mentioned under Trajan, the name of which passed to the fortress and its civilian settlement (Fig. 415). The legion was moved to Dacia Porolissensis from the province of Moesia Inferior on the lower Danube. After the evacuation of the province of Dacia under Aurelian (AD 271–4), the troops also returned. So far, only small parts of the camp have been uncovered and preserved. The camp was laid out as a regular rectangle, 573 × 408 m, which corresponds to an area of 23.37 ha.

The excavated parts are portions of the defensive wall with gates (*porta decumana* later closed by masonry) and (two-phased!) corner towers, with a ditch in front of it. Of the internal buildings, the *principia* has been completely excavated, and the baths have been identified, just as parts of the accommodation for the *prima cohors*, other barracks, and a *horreum*.⁹⁷

LAMBAESIS (ALGERIA)

The construction of the first fortress by *legio III Augusta* took place around AD 129 under Hadrian. The legion was disbanded and demobilized in AD 238 as a punishment, because it had committed itself to the wrong side in the civil war of that year. It was reformed under Valerian in AD 253, so a new fortress was built (Fig. 416). This existed until the time of the tetrarchy around AD 300. With the establishment of French colonial rule, the extremely well-preserved fortress was at first used as a quarry for a prison, with excavations starting in 1866. The *principia* and the *groma* in front of it are particularly well preserved.⁹⁸

REGENSBURG/REGINUM (GERMANY)

The building inscription (IBR 362) confirms the completion of the defences of Regensburg legionary base in the year

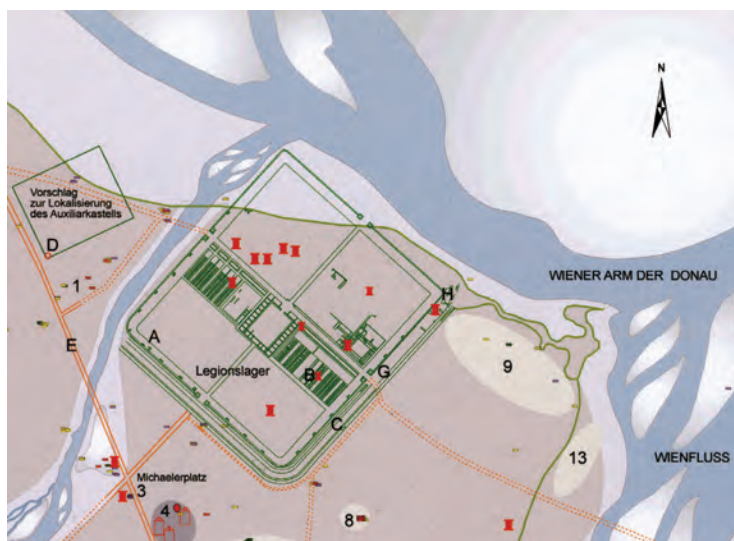


Figure 414 The legionary fortress of Vienna and probable location of the auxiliary station (D) (after Kronberger 2007)

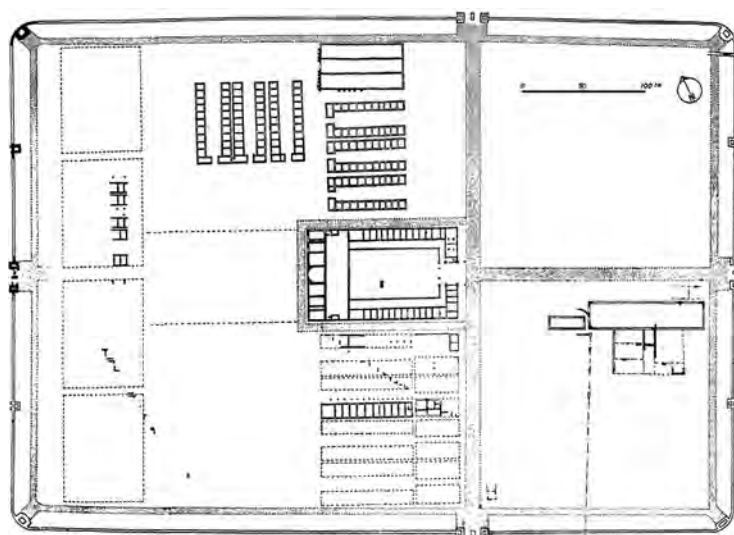


Figure 415 The legionary fortress of Potaissa (after Barbulescu 1997). Drawing: A. Smadi, Arch. Institute University of Cologne

AD 179. The 3rd Italica legion, which was only raised at the beginning of the Marcomannic Wars, is established as the garrison. This legion remained in its fortress in Regensburg, where it is attested to have been almost to the end of the Roman rule in Raetia in the early 5th century AD (Fig. 417). On the south bank of the Danube, opposite the mouth of the Regen, a fortress was completed within a few years of construction which, with its dimensions of 542×453 m (c.25 ha), clearly exceeded the area of about 20 ha necessary for a legion. So far, however, there is a lack of evidence for any auxiliary unit that may have been located within the fortress. After phases of destruction in the 3rd century AD, the unit was reduced in the Late Roman period and possibly occupied a smaller fort within.

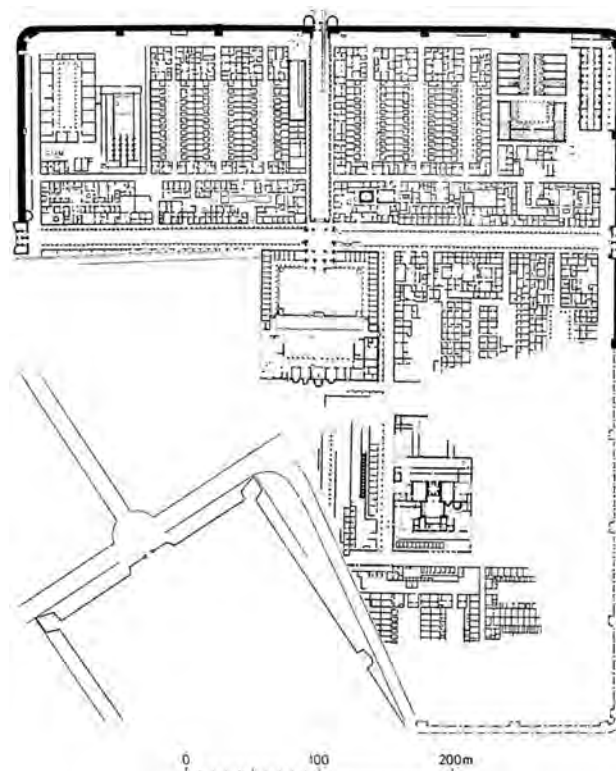


Figure 416 The legionary fortress of Lambaesis (after Petrikovits 1975). Drawing: A. Smadi, Arch. Institute University of Cologne

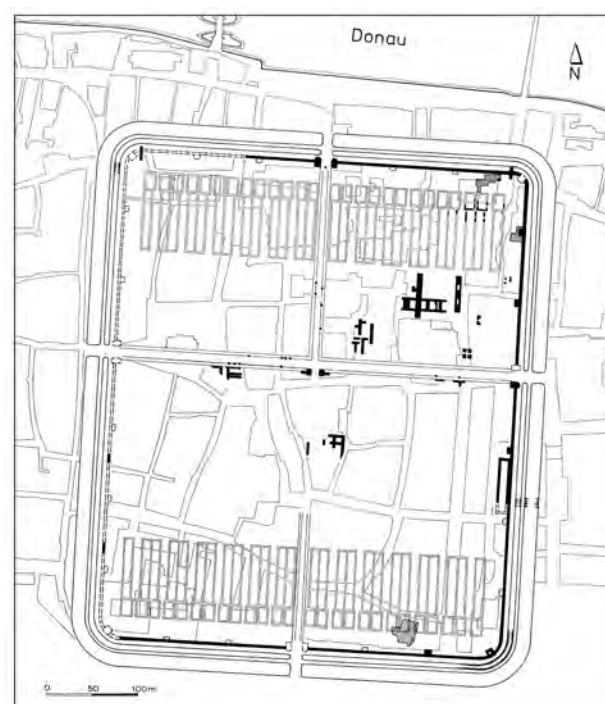


Figure 417 The legionary fortress of Regensburg (after Fischer and Rieckhoff-Pauli 1982). Drawing: A. Smadi, Arch. Institute University of Cologne

The rest of the area of the fortress offered space for the civilian population after the *canabae legionis* had been given up (Dietz and Fischer 1996).

LORCH-ENNS/LAURIACUM (AUSTRIA)

In the late 2nd century, the *legio II Italica Pia Fidelis* built the legionary fortress of *Lauriacum*, after abandoning the old base at Albing, and remained there until the Roman frontier was abandoned in the Late Roman period. The lie of the land here is responsible for a strange anomaly in the street grid, namely that the north-east to south-west and north-west to south-east oriented axes of the legionary camp do not cross at right angles, resulting in the ground plan of the fortress having the shape of an oblique-angled diamond (Fig. 418). The length of the legionary base was 539 m, its width 398 m, resulting in an area of approximately 21 ha. The defensive wall was 2.1 m wide at foundation level and secured by 30 towers in total (one tower at each corner, between which there were seven on the long and six on the narrow sides). In front of the wall was a 15 m-wide and 4 m-deep ditch, which is still visible in some stretches. Of the four gates, the *porta principalis dextra* was completely recorded, while the remainder was only partly recorded or not at all. A little bit of a problem arises with the internal buildings because, due to the older excavations, several phases from the early 3rd century to the Late Roman period have been drawn on the ground plan together. We know the following details of the internal structure: the *principia*,

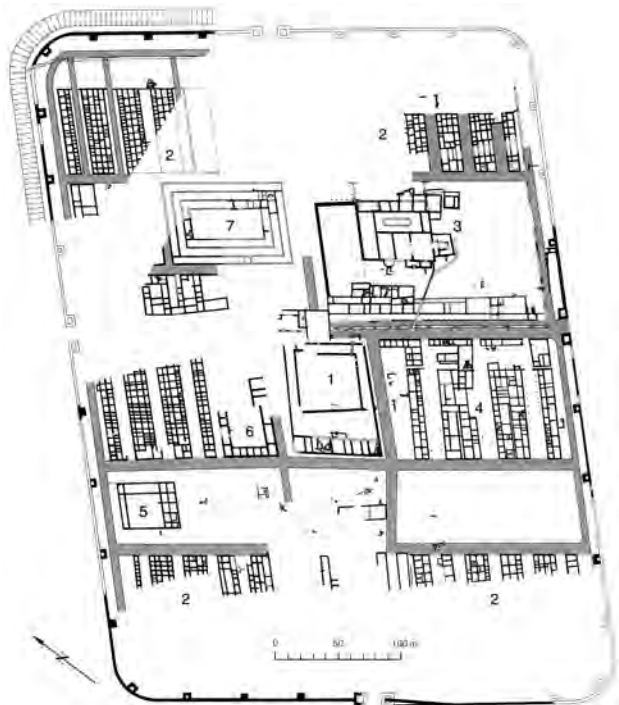


Figure 418 The legionary fortress of Lorch-Enns (after Petrikovits 1975). Drawing: A. Smadi, Arch. Institute University of Cologne

barracks buildings for 10 cohorts, the accommodation of the *prima cohors* (first cohort) to the right of *principia*, bath-buildings, *fabricae*, and the *valetudinarium*.⁹⁹

Vexillation fortresses in chronological order

Numerous detachments from legions, which were assembled from units for a limited time for campaigns or other special tasks, are known from literary and epigraphic sources (Saxer 1967). Often, legions were not sent into a theatre of war as complete units, but acted in the form of ad hoc detached subunits, the *vexillationes*. Together with auxiliary units, especially cavalry, these formed independent tactical units for a limited time, which were then disbanded after completion of the task and returned to their original units. We also know of some exceptions, where vexillations were garrisoned for longer periods separated from their original units, for instance in North Africa.

In Great Britain especially, archaeological research has identified fortresses which were evidently occupied by legionary troops, but are too small for a whole legion. As a rule, their size corresponds to half a legionary fortress (about 10 ha). In addition, there are also indications of auxiliary troops, especially cavalry, in these fortresses. Such bases have lately also been found on the Rhine and the Danube. These fortresses occur with particular frequency in the Augustan period on the Rhine and Lippe and in England during the period between Claudius and the Flavian dynasty. They are referred to as vexillation fortresses in publications.

It seems that, contrary to popular notions, vexillation fortresses were the norm in the early phase of the occupation of an area or in war, while double and normal legionary bases were the exceptions. For the Augustan period in Germany, for example, we know of no fortresses for a whole legion, with only double-legionary bases or vexillation fortresses known. It was not until the consolidation of Roman domination and the establishment of the Rhine border in the Tiberian period, that the sequence of classic single-legion sites began with Vindonissa. In Britain, during the occupation phase up to the Flavian period, vexillation fortresses outnumber legionary bases.

DANGSTETTEN (GERMANY)

The largest military base of the early occupation period is the camp discovered in 1967 at Dangstetten north of the upper Rhine.¹⁰⁰ The camp was an elongated oval in shape with a re-entrant south-east corner. It originally measured about 420 × 300 m, thus having an area of approximately 12 ha. It was protected by a timber-and-earth rampart in the form of a 3 m wide wooden, earth-filled box rampart of more than 1.3 km in length and with two V-sectioned ditches. Wooden towers were uncovered every 40 m; out of

development of this infrastructure is very unusual for a military camp planned for the short-term. From all this, S. von Schnurbein concluded that these were the signs of an ongoing process of transformation in the main base at Haltern, changing it from a purely military base to a more civilian town centre. This is in line with the testimony of the ancient sources that in this last phase of Roman presence in Germany east of the Rhine, the establishment of a province also led to the accelerated establishment of civil centres.¹⁰³

LONGTHORPE (GREAT BRITAIN)

The camp at Longthorpe near Peterborough in the south-east of England was discovered and examined by S. S. Frere and J. K. St Joseph (Frere and St. Joseph 1974). It was made up of two superimposed fortresses using timber-and-earth technology. The larger camp, at 10.9 ha, was a typical vexillation fortress for legionary infantry and auxiliaries, with defences of a turf rampart and two V-sectioned ditches (Fig. 421). The *principia*, *horrea*, and various barracks for legionary infantry and cavalry were recognisable among the wooden internal buildings. The camp offered space for about 2,000 legionary infantry and around 1,000 cavalry. The smaller base, 4.4 ha in size, overlay the larger, so it was later. Its defences featured an (established) turf rampart and a V-sectioned ditch. Internal buildings were not identified. It offered space for c.1,000 cavalry. The finds indicated that it dated to the Claudio-Neronian period. Longthorpe is one of the few Roman military camps to be linked directly to a historically recorded episode (Tac., *Ann.* 14.32): after the insurrection against Roman rule of the year AD 61, led by Boudicca, queen of the Iceni. Petilius Cerialis, the commander of the *legio IX Hispana*, was defeated by the insurgents when he came to the aid of the oppressed colony of *Camulodunum*/

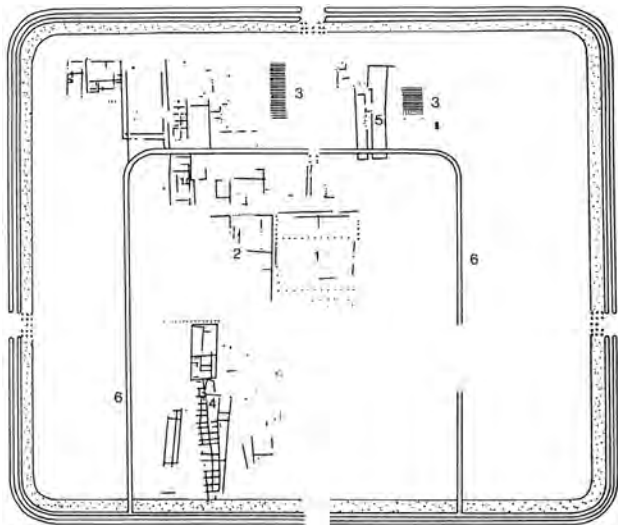


Figure 421 The Longthorpe vexillation camp (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

Colchester. His legion (or better: legionary vexillation) was completely wiped out. He had saved himself and his cavalry by fleeing back to his original fortress, retiring into it and refortifying it. The fortress of Longthorpe can now be regarded with certainty as the camp of Petilius Cerialis, which he had left with his vexillation of legionary infantry from the 9th Legion plus auxiliary cavalry. This corresponds to the larger, older camp (10.9 ha). After the infantry had been wiped out, Cerialis returned with just the cavalry and entrenched himself in his old fortress for the rest of the war in a base that was reduced to the size of the force. This base can undoubtedly be equated with the later, smaller camp (4.4 ha).

EINING-UNTERFELD (GERMANY)

A large base was located on the Unterfeld field near Eining in Bavaria thanks to casual finds and the surviving remains of ditches. Excavations in the 1960s, as well as aerial photographs, which were published in 1979, today reveal a camp of 328 m in length and 320 m in width with an area of c.10.6 ha, the north side of which was washed away by the Danube. In the centre of the camp is a stone *principia* with a semi-circular apse forming a chapel of the standards; at the highest point in the eastern *retentura*, there was a building with two apses, which were connected by a corridor (Fig. 422). These comprised the stone components

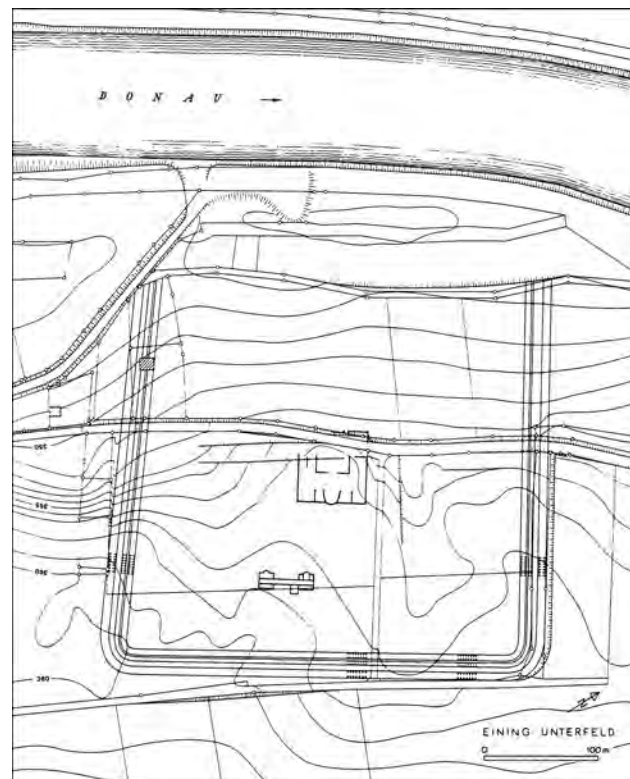


Figure 422 The vexillation fortress of Eining-Unterfeld (after Christlein and Fischer 1979)

of an otherwise wooden *praetorium*. Stray finds suggest a workshop for the processing of copper alloy. Numerous finds confirm the dating of the Eining-Unterfeld fortress, which was only in use for a short period, during the time of the Marcomannic Wars between AD 171/2 and 179.¹⁰⁴ The base at Eining-Unterfeld was a vexillation fortress in which the finds (brick stamps, small finds) indicate legionary infantry (about half of the *legio III Italica*) and auxiliary cavalry were located temporarily. With the completion of the Regensburg legionary base in AD 179, the camp at Eining-Unterfeld was abandoned.

Vexillation forts

This designation was proposed in 2010 by M. Mackensen in the publication of his excavations at Gheriat el-Gharbia in Libya (Mackensen 2010). These are sites which, at 1.15 ha (Bu Njem) or 2.25 ha (Gheriat el-Gharbia), for example, are similar in size and construction to cohort forts. However, there are enough inscriptions to demonstrate, for example, a legionary unit from the *legio III Augusta* outposted from Lambaesis as garrison at Bu Njem/*Gholaia* in Libya. Their strength of about 200 men is based on calculations from the excavated troop accommodation (Figs 423–4). After the disbandment of *legio III Augusta* in the summer of AD 238, this unit is downgraded and now bore the name *vexillatio Golensis*. In addition, there were also some

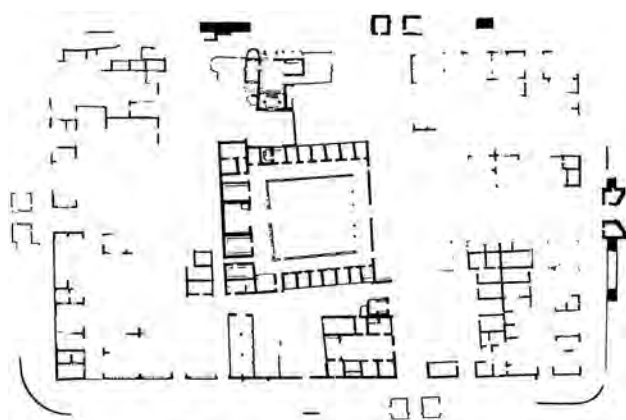


Figure 423 The Bu Njem vexillation fort (after Mackensen 2008)

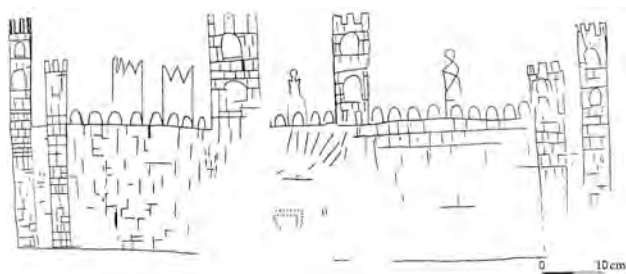


Figure 424 The Bu Njem vexillation fort, graffito of a fort (after Mackensen 2008)

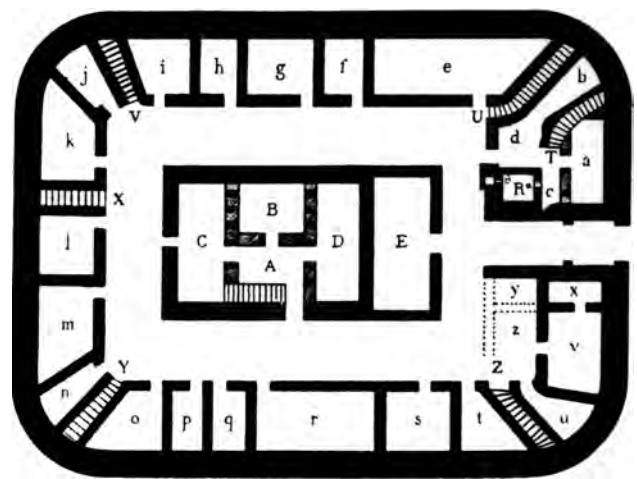


Figure 425 Rhilane vexillation fort (after Mackensen 2010)



Figure 426 The vexillation fort of Rhilane, gate (after Mackensen 2010)

cavalry who were drawn from a larger unit (Mackensen 2008). At Geriat el-Gharbia/*Myd* (...) in Libya, a *vexillatio* of the *legio III Augusta* from *Lambaesis* was also recorded epigraphically for the period AD 201–38, but as the internal buildings are unknown, we have no indication of their strength (Mackensen 2010a). The exceptionally well-preserved, 0.09-ha small fortlet of Ksar Rhilane/*Tisavar* in Tunisia (Figs 425–6) should also be classified as a vexillation fort, since a garrison of a *vexillatio* of *legio III Augusta* from *Lambaesis* can be assumed here (Mackensen 2010).

The fort of Hod Hill in southern England can also be attributed to this type of fortification (Fig. 427). This fort (4.4 ha), which was only occupied for a few years, was built during the course of the Claudian conquest of southern England by incorporating parts of the surrounding fortifications of a fortified British settlement ('hillfort') into the defences of the fort. Therefore, the layout has a slightly different form from the usual 'playing card shape'. From the remains of buildings and from the finds, a garrison of legionary infantry and auxiliary cavalry can be confirmed (Brailsford 1961; Richmond 1968).

Supply bases

ANREPPEN (GERMANY)

A peculiarity among the Augustan military camps in Westphalia was the wooden base at Anreppen south of

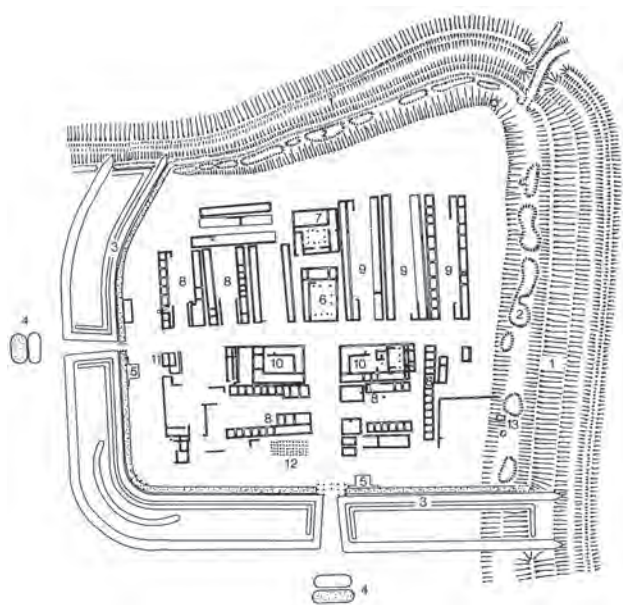


Figure 427 The vexillation fort of Hod Hill, 8 auxiliary barracks; 9 legionary barracks (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne



Figure 428 Anreppen, Augustan base. 1: praetorium; 2, 3: residential and service buildings; 4 officers' quarters; 4a: barracks; 5: porta principalis dextra; 6, 11: horrea; 7 bath building; 8: structures on the side of the gates; 10: barracks (after Fischer 2009a). Drawing: A. Smadi, Arch. Institute University of Cologne

Delbrück. It is situated on level ground immediately on the southern bank of the Lippe (Fig. 428), without taking advantage of higher ground or an elevated bank. The camp was designed in the form of an irregular oval of about 750 × 330 m in size and about 23 ha in area. It was thus still 5 ha larger than the main fortress at Haltern. A re-entrant in the defences on the bank of the Lippe has been explained with good reasons as a riverine harbour, which was thus directly under military protection. The

eastern part of the camp was recently excavated south of this port, where several *horrea*, some of which were separated from the rest of the camp by palisades, have been found.¹⁰⁵ Consequently, Anreppen can be seen as a hitherto unknown combination of an encampment for troops and a supply base for a larger campaign. The *praetorium*, with its 3,375 m², was far larger than the *praetoria* of the other Lippe camps (Oberaden 2,420 m², Haltern main fortress 2,120 m²). This largest of all known *praetoria* is also very unusual in its layout. R. Förtsch concluded from this that Tiberius was the erstwhile builder and inhabitant of this building,¹⁰⁶ for which there is further evidence (see below).

From the size of the camp, a legion, including auxiliary troops, could have been accommodated. Finds suggest the presence of legionary soldiers and auxiliary troops (oriental archers and cavalry). Apparently, the camp was abandoned by the Romans after a short period of time and deliberately burnt down. A first, cursory examination of the finds indicates a dating within the Haltern Horizon, in other words the first decade AD. Since coins with Varus counterstamps are missing from the now immense coin series, it ended before AD 7, the year when Q. Varus took over the governorship of Germany.¹⁰⁷ It is thus with good reason that the camp of Anreppen can be seen as the winter camp of Tiberius, dating from AD 4/5, attested to by Velleius Paterculus (2.105), when Tiberius personally took command of the '*immensum bellum*' in AD 1 and finished it victoriously.

RÖDGEN (GERMANY)

The Augustan supply base at Rödgen in the Wetterau is a unique facility up until now. It was excavated on a large scale by H. Schönberger.¹⁰⁸ The polygonal shape of the fortification is based on the local topography. Around the base ran two V-sectioned ditches, of which the inner was up to 3 m deep. A 3 m-wide timber-and-earth rampart consisted of a front and back wall filled with earth. It encompassed 3.3 ha and had wooden towers at regular intervals (Fig. 429). As for the gates, the main gate is recorded as having features typical of the period; two further gates are extrapolated just from the narrowing of the ditches and seem only to have been sally ports. The south gate is only suspected. The wooden interior of the camp at Rödgen completely disrupts the regular pattern of Roman military bases: in the centre is a sort of administrative building with a large court which has little to do with a conventional *principia*. Here, the *praetorium* seems to have been integrated into a kind of residual *principia*. The most important buildings are three large *horrea* (Buildings A, B, and C9), which were 47.2 × 29.5 m, 29.5 × 33 m, and 35.5 × 30.7 m. The function of a two-room building is unclear. About 1,000 men could theoretically have been accommodated in six barracks with officers' quarters. A large part of the base was only equipped with light buildings or not built upon. Without doubt, the

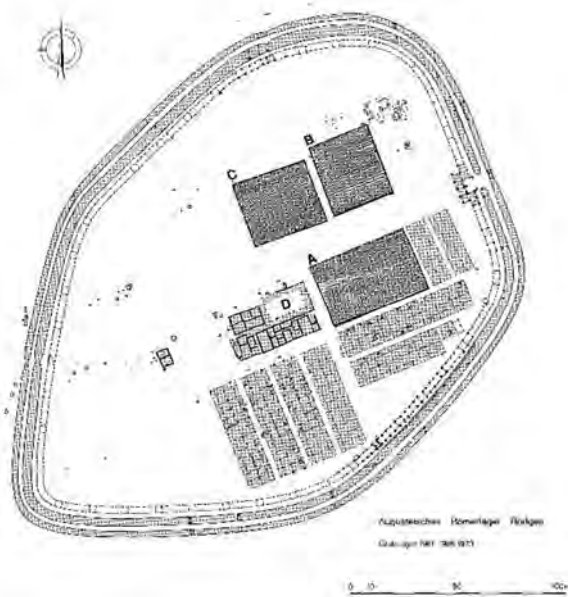


Figure 429 The Augustian supply base of Rödgen. A–C: horrea; D: principia (according to Fischer 2009a). Drawing: A. Smadi, Arch. Institute University of Cologne

fortification at Rödgen was not a base for troops, but rather a heavily guarded supply base for campaigns or the supply of other camps. In addition to cereals, for example, horses, draft animals, and cattle could have been accommodated there. The small finds clearly show that the camp at Rödgen belongs to the Oberaden Horizon, that is, from about 10–8/7 BC, perhaps within the framework of the Drusus offensive. Then the camp was vacated as planned.

SOUTH SHIELDS (GREAT BRITAIN)

The fortified supply base at South Shields, near the eastern end of the Hadrian's Wall, is characterized by a highly complex architectural history (Fig. 430). Here, grain from the south of England, which had been brought by ship, was stored in order to carry it further to supply the frontier troops and for campaigns. In the late 2nd and 3rd centuries AD, extensive structural changes were carried out in the fort: a smaller camp was developed under Septimius Severus (AD 193–211) into a supply base with 24 *horrea* to prepare for his campaigns in the north of Britain. In the years AD 222 and 235, even the old *principia* was transformed into *horrea*. In exchange, a new *principia* and troop accommodation were created in the former *retentura*. Between 273 and 318, the barracks in the *retentura* were replaced by a large residential building, probably a *praetorium*. A part of the *horreum* built into the former *principia* was restored into its old function. The last occupants of South Shields, according to the *Notitia Dignitatum*, was a *numerus barcariorum Tigrisiensium*, which replaced the previous garrison of the *cohors V Gallorum* (Bidwell and Speak 1994; Allason-Jones and Miket 1984).

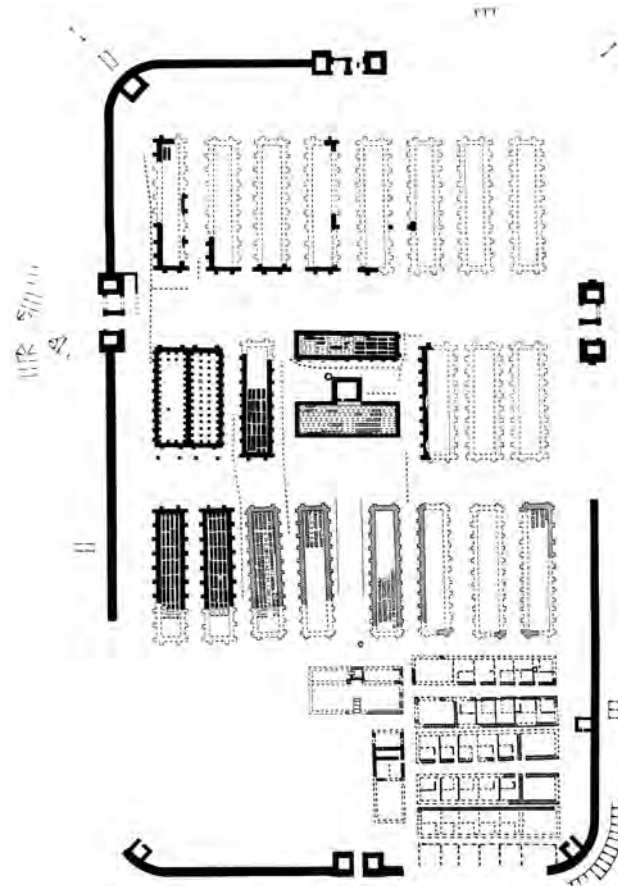


Figure 430 The South Shields supply base (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

Auxiliary forts

From the time of the Claudian period and during the second half of the 1st century AD, a blueprint for the construction of auxiliary forts developed, which, complemented by various individual peculiarities, lasted until the end of the 3rd century AD. From the time of the Flavian era, most of the forts were laid out in the 'playing card shape', borrowing heavily from the structure and design of legionary fortresses, but they were naturally smaller in line with the size of the garrison. For a 500-strong infantry unit (*cohors quingenaria*) up to a 1000-strong cavalry unit (*ala milliaria*), the space needed was between c.1.5 and c.6 ha. However, we are less and less inclined to take the size of the fort as proof for the type of unit in occupation. Increasingly, the evidence suggests that, besides the garrison unit, detachments of other units could also occur in auxiliary forts (Johnson 1987; Campbell 2009).

Ala forts

Cavalry forts were designed for either an *ala quingenaria* or for an *ala milliaria*. An *ala quingenaria* was made up of 480 cavalrymen, each divided into sixteen *turmae* of 30 men, the leader of the *turma* being the *decurio* (not to

be confused with the title of a city councillor of the same name). A *praefectus alae* from the equestrian order served as commander of an *ala*. From the Flavian period onwards, an *ala milliaria* consisted of 1008 cavalrymen, divided into 24 *turmae* of 42 men. *Ala* forts were each about 3.1 to 4.2 ha in the case of an *ala quingenaria*, *alae milliariae* being accommodated in forts of around 5.2 to 6 ha.

For a long time, there has been discussion as to whether stables and barracks were structurally separate in cavalry forts. By now, new excavations, for example in Ladenburg, Oberstimm, or in Wallsend in northern England, showed that stables and the men's quarters were accommodated in common barracks buildings. Another unanswered question was the problem that not all of the horses, including the remounts, could be accommodated within any cavalry base. This was solved by only stabling one horse per rider in the camp, while the remounts were kept in paddocks outside the fort.

ALA QUINGENARIA

CARNUNTUM (AUSTRIA)

The fort of approximately 4 ha was founded under Domitian (AD 81–96) and rebuilt under Hadrian (AD 117–38) by the *ala I Thracum Victrix* (Kandler 2007). The fort was thus reduced to about 3.65 ha. As a peculiarity, the fort baths were located within the facility (Fig. 431). Used as a kind of

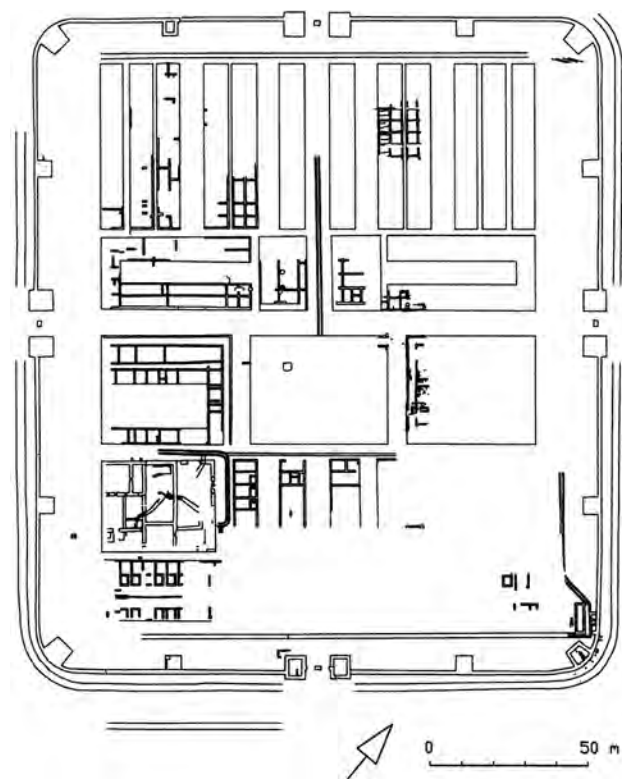


Figure 431 Ala fort at Carnuntum (after Kandler 2007). Drawing: A. Smadi, Arch. Institute University of Cologne

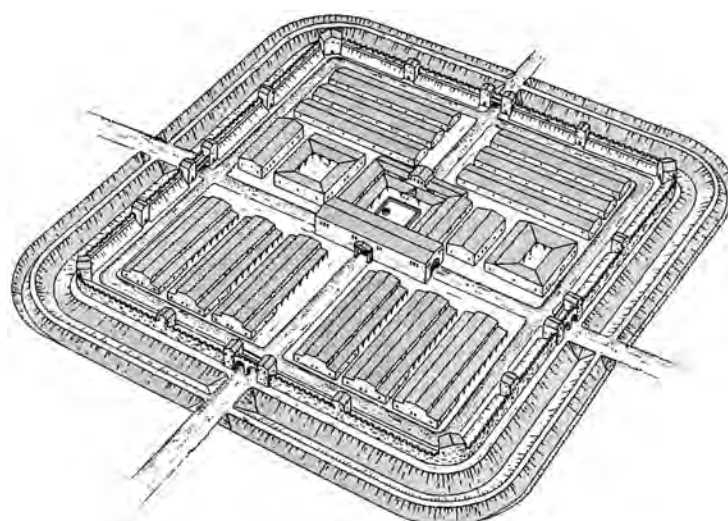


Figure 432 Ala fort at Weißenburg (after Fischer and Riedmeier-Fischer 2008) Weißenburg/Biriciana (Germany)

supply base during the Marcomannic Wars, the *ala* fort at Carnuntum existed until the 3rd century AD (ibid. 2007).

WEIßENBURG/BIRICIANA (GERMANY)

The fort of *ala I Hispanorum Auriana* was built in timber-and-earth around AD 90. It was about 175 × 179 m large and enclosed about 3.1 ha area. In a second construction phase around the middle of the 2nd century, the rebuilt stone fort had almost the same size (Fig. 432). In the second half of the 2nd century, the north gate, which was modelled on the *porta praetoria* of Regensburg legionary base, was rebuilt with semi-circular projecting towers. The *principia*, the *praetorium*, and a *horreum* as well as stone rooms from larger half-timbered structures are known out of the interior buildings following the excavations of the *Reichlimeskommission*. Extensive levels of burning with many finds and a hoard of coins put the violent destruction of the fort close to AD 254.¹⁰⁹

ALA MILLIARIA

HEIDENHEIM/AQUILEIA (GERMANY)

One of the most archaeologically explored forts of an *ala milliaria* is currently Kastell Heidenheim in western Raetia. It lay in the Brenztal at an important junction in the area of the Ostalb. An older timber-and-earth fort was replaced in the early days of Trajan by the stone fort of *ala II Flavia milliaria*. This fort of the largest and most distinguished unit in the province of Raetia covered about 5.6 ha (Fig. 433). In addition to the defences, the *principia* is known. The other functional buildings in the *latera praetorii* have only been investigated to a limited extent. The barracks in the *praetentura* (six double barracks and four single barracks) and the *retentura* (four double barracks) are now known through the excavations of M. Scholz

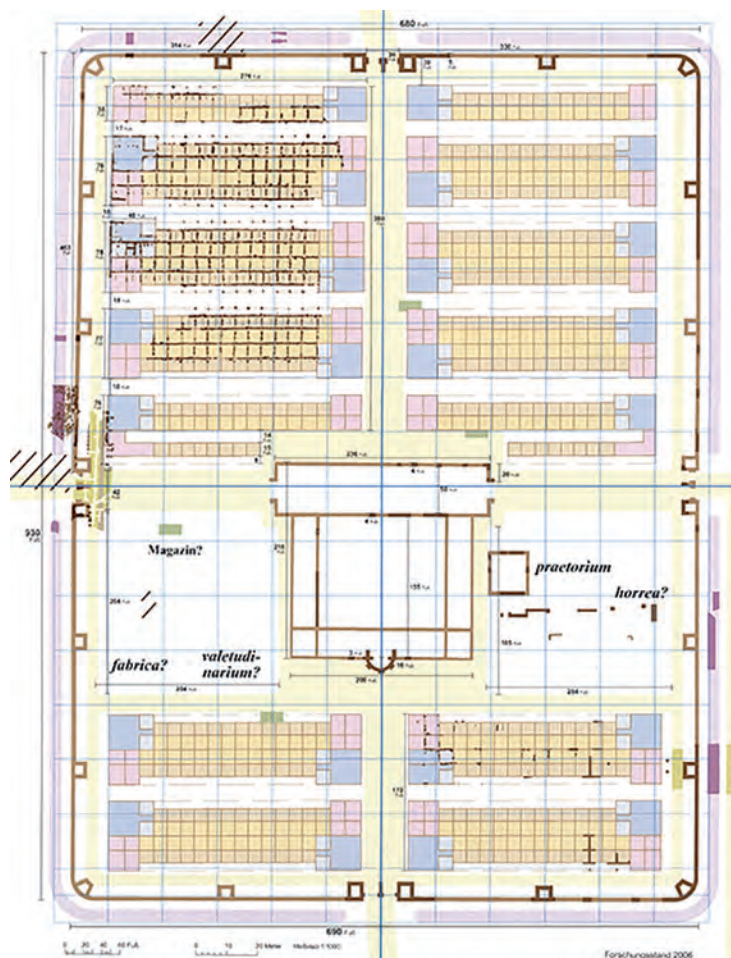


Figure 433 Fort of ala II Flavia milliaria at Heidenheim (after Scholz 2009)

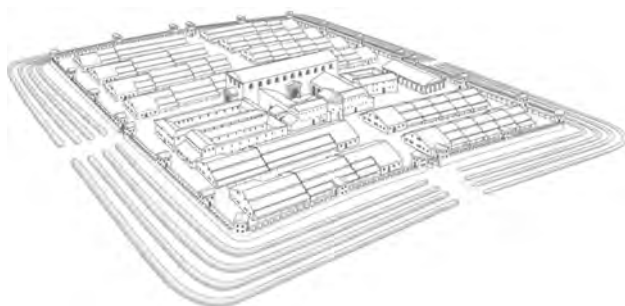


Figure 434 Reconstruction drawing of the fort of ala II Flavia milliaria at Aalen. Drawing: A. Smadi, Arch. Institute University of Cologne

(Scholz 2009). The evacuation of the fort took place around AD 150. The unit moved to Aalen with the advance of the Upper German Limes, in order to erect a somewhat larger fort of 6.07 ha (Fig. 443). According to Scholz, the difference in the area is due to the fact that Heidenheim lay on a plain, whereas Aalen was on a slope. As a result, the internal buildings had to be terraced, which led to an increase in space requirements to some degree.

Cohors equitata forts

Forts with mixed units of infantry and cavalry, the *cohortes equitatae*, are relatively frequent. A *cohortes quingenaria equitata* of about 500 men (the exact strength is uncertain!) consisted of six *centuriae* and four *turmae* and a staff, the equestrian commander being the *praefectus cohortis*. With a *cohortes milliaria equitata* of 10 *centuriae* of 80 men each and 10 *turmae* of 24 riders each, the title of the commanding officer was *tribunus cohortis*. The size of the forts of a *cohortes quingenaria equitata* varies from 2.1 to 3.3 ha, while those of a *cohortes milliaria equitata* range from 2.1 ha to 3.1 ha.

COHORTES QUINGENARIA EQUITATA

HOFHEIM, TIMBER-AND-EARTH FORT (GERMANY)

This polygonal timber-and-earth fort with double V-sectioned ditches and turf rampart of 1.9 ha existed from the late Tiberio-Claudian period up to the Neronian and early Flavian period (Fig. 435). It was destroyed in the Batavian uprising of 69/70. Traces of burning and numerous metal finds, particularly weapons and unburied skeletal remains, suggest combat. It is assumed the garrison was a *cohortes equitata*. In the early Flavian period, the fort was once again repaired (single V-sectioned ditch), then replaced in the early Vespasianic period by the stone fort, some 90 m to the east. The plan shows the mostly wooden interior. Most finds from the Hofheim timber-and-earth fort belong to the Claudio-Neronian period with the main focus close to the destruction horizon of 69/70. This so-called 'Hofheim



Figure 435 Fort of a cohortes equitata: Hofheim, earth-and-timber fort (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne. 1 = principia, 2 = praetorium, 3 = horrea, 4 = barracks

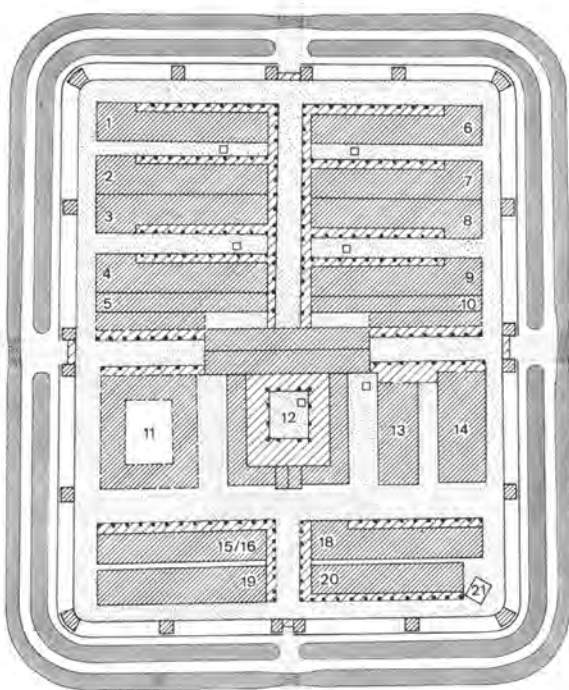


Figure 436 Fort of a cohors equitata: Künzing, Phase 1 (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

horizon' is of considerable significance for the chronology of the 1st century AD (Ritterling 1912).

KÜNZING/QUINTANA (GERMANY)

The founding of the fort at Künzing took place around AD 90, obviously as a successor to the early Flavian fort of Moos-Burgstall, which was only occupied for a short period. The excavations were able to detect four phases of defences, two timber-and-earth phases and two in stone. The size of the fort remained approximately the same in all building periods at 132.5 × 165.5 m (2.25 ha). In phase 1 (c. AD 90–120), the fortification consisted of a wooden front wall with an earth rampart and a V-sectioned ditch in front of those (Fig. 436). In phase 2 (120–35) the construction changed: in front of a wall formed from an earth-filled wooden box with wooden front and back faces there were now two ditches. In phase 3, between AD 140 and 150, the first stone fort with up to five ditches was built, which was destroyed by AD 200. The next stone fort of phase 4 had only one ditch, falling victim to a Germanic attack around the middle of the 3rd century.¹¹⁰

WALLSEND/SEGEDUNUM (GREAT BRITAIN)

Wallsend is the easternmost fort on Hadrian's Wall. Built in Hadrianic times with stone defences and internal buildings partly of timber, at 1.6 ha it had room for a *cohors quingenaria equitata* (Hodgson 1999). In the *retentura*, which had a simple *porta quintana* on the western side instead of an

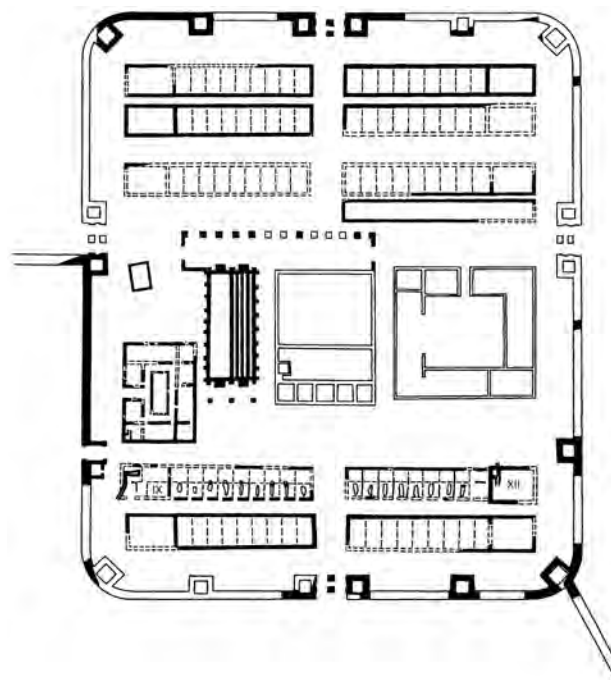


Figure 437 Fort of a cohors equitata: Wallsend (after Hodgson 1999). Drawing: A. Smadi, Arch. Institute University of Cologne

interval tower, there was room for four *turmae* (Fig. 437). In two of these barracks, nine *contubernia* for three men and three horses (with soakaways!) were found in each during recent excavations, so that each barrack held 27 riders, plus decurions and further junior officers, i.e. 30 men, the regular size of a *turma*. Six centuries of infantry were housed in the *praetentura*. This division was retained even after a rebuilding phase towards the end of the second century (ibid.).

COHORS MILLIARIA EQUITATA

STRAUBING/SORVODUNUM – EAST FORT; FORT III (GERMANY)

In the first half of the 2nd century AD, the *cohors I Flavia Canathenorum milliaria sagittariorum equitata* constructed a 3.1-ha fort, first as a timber-and-earth site, then as a stone fort. This was destroyed after AD 170 in the Marcomannic Wars, but soon rebuilt. Of the internal buildings, the *principia* is known from aerial photographs, as are further stone buildings in the *latera praetorii*, and cavalry barracks (Fig. 438). The fort was destroyed in the 3rd century AD, probably in AD 254, and was not rebuilt.¹¹¹

Cohors peditata forts

A *cohors quingenaria peditata* possessed six centuries of 80 men or 480 men plus staff under the guidance of a prefect or *praepositus cohortis*. The size of the forts ranged from 1.4 to 2.5 ha. However, regular *cohors quingenaria peditata* forts have seldom been completely excavated. The size of a *cohors milliaria peditata* is not known for certain; it had

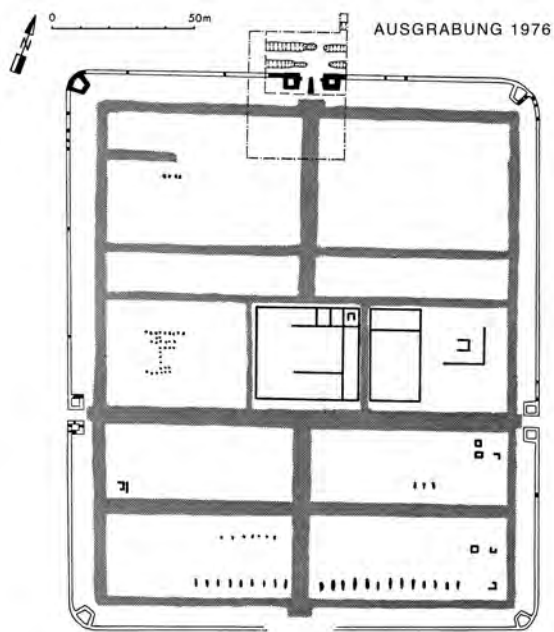


Figure 438 Fort of a cohors equitata milliaria: Straubing (after Prammer 1976). Drawing: A. Smadi, Arch. Institute University of Cologne

10 centuries, but this would mean only 800 troops. Their commander was the *tribunus cohortis*. There are no typical examples for the size of the forts.

COHORS QUINGENARIA PEDITATA

GELLIGAER (GREAT BRITAIN)

This fort in Wales was built in stone around AD 110, its Flavian predecessor being adjacent to it (Fig. 439). A building inscription shows that the fort was built between AD 103–11 by a *vexillatio* of *legio II Augusta*. It had six barracks for *centuriae*, which indicates a garrison of a *cohors quingenaria peditata*.¹¹²

COHORS MILLIARIA PEDITATA

DROBETA (ROMANIA)

According to F. Marcu, the 1.69-ha fort at Drobeta in the province of Dacia Superior, with its barracks for 10 centuries, could be considered as intended for a *cohors peditata milliaria* (Fig. 440). In the 3rd century AD, this would most likely have been *cohors I sagittariorum*.¹¹³

Forts for mixed garrisons

Occasionally the overview literature gives the impression that most of the Roman camps and fortifications of the Imperial period can be easily pressed into a clearly defined scheme. However, with the increasing knowledge of the individual forts, fortresses and camps, this becomes increasingly less so, especially in the case of auxiliary forts. Many of the forts, even those for which the garrison is known from inscriptions and tile stamps, often exhibit considerable departures from

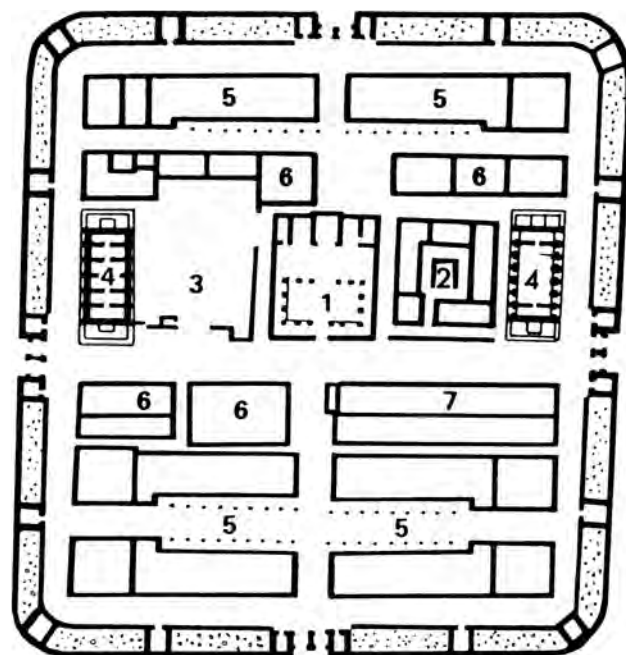


Figure 439 Fort of a cohors quingenaria: Gelligaer (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

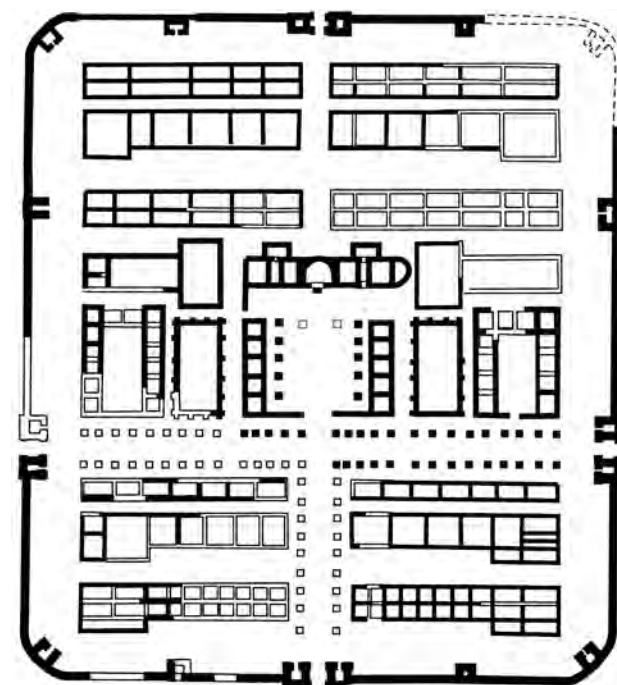


Figure 440 Fort of a cohors milliaria: Drobeta (after Marcu 2009). Drawing: A. Smadi, Arch. Institute University of Cologne

the 'norms' for their size and internal structure, without there being an immediate explanation. It seems that a large number of forts were not occupied by a single, complete unit. The range of possibilities extends from the accommodation of several smaller units, through legionary vexillations to units not matching the anticipated nominal strength. This

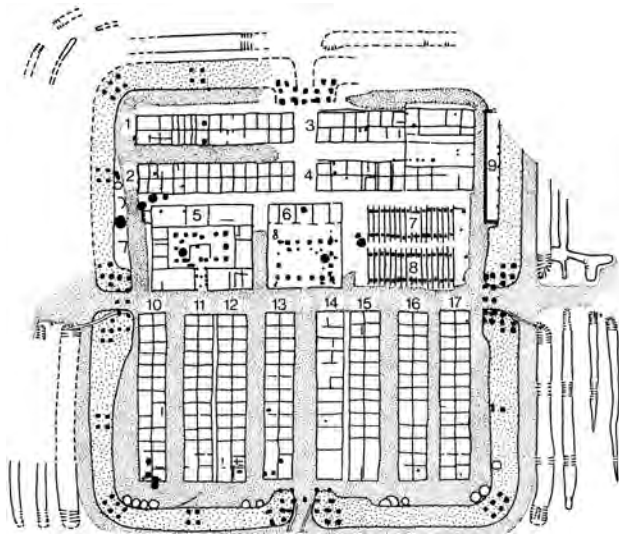


Figure 441 Elginhaugh (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

may even have been the case in forts, which, from their size seem at first sight to have been occupied by 'normal' auxiliary units. It almost seems as if a paradigm shift has recently taken place in this field of research, if for instance W. S. Hanson writes, 'It has become increasingly evident, and is now more widely accepted, that forts constructed for single units were the exception rather than the rule.'¹¹⁴ However, before making sweeping statements, one would have to distinguish between short-term campaigns and phases of occupation on the one hand, and long-term stable installations for frontier protection on the other.

ELGINHAUGH (GREAT BRITAIN)

This fort, only held briefly during the offensive of Agricola in Scotland around AD 83–6, has 12 centurial barracks, which does not correspond to any known pattern for the accommodation of an *auxilia* unit (Fig. 441). In addition, the finds material confirms the occupation of the fort by a mixed garrison. In any case, parts of a bolt-shooting artillery piece point to legionary soldiers (Hanson 2007; Hanson *et al.* 2007).

HOFHEIM, STONE FORT (GERMANY)

The early Flavian wooden predecessor of the Hofheim stone fort (Nuber 1986) had an area of 2.1 ha. So, according to conventional ideas, the garrison would be a *cohors quingenaria peditata* (Fig. 442). However, it has 14 barracks instead of six barracks for *centuriae*. In addition, a small inscription for a *scorpionarius* indicates an artillery detachment of legionary soldiers at least (Fig. 443). So here too a mixed garrison of unknown composition should be assumed.

POMET/POROLISSUM (ROMANIA)

This exceptional complex was the most important and largest fort on the Dacian Limes in the province of *Dacia*

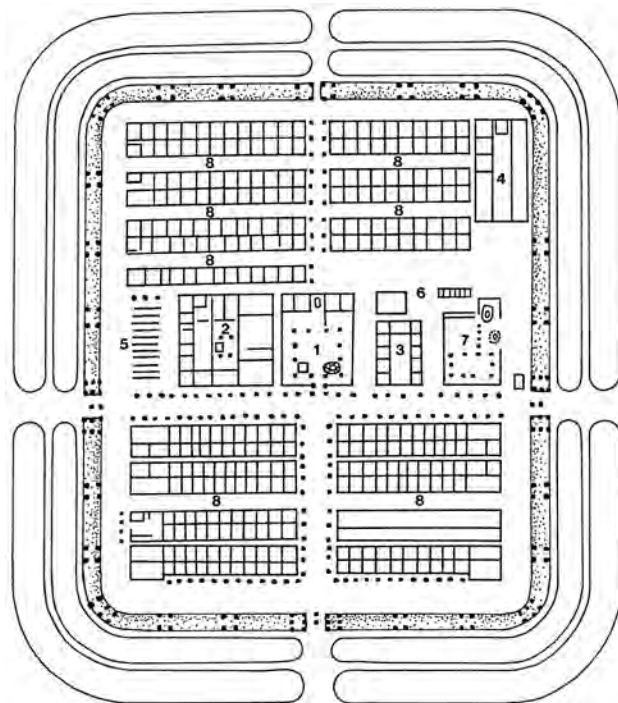


Figure 442 Hofheim stone fort (after Nuber 1986). Drawing: A. Smadi, Arch. Institute University of Cologne

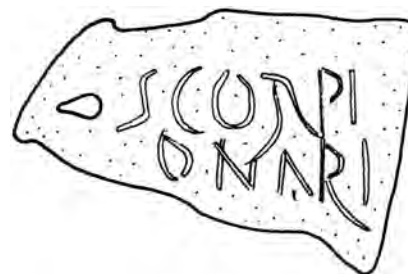


Figure 443 Lead tag naming a scorpionarius (after Nuber 1986). Drawing: A. Smadi, Arch. Institute University of Cologne

Porolissensis. The base on the hilltop at Pomet protected an exceptionally important pass from Transylvania to the valley of the Tisza (Fig. 444). The 230 × 300 m large stone fort of the early 3rd century, at 6.9 ha, was preceded by a slightly smaller timber-and-earth fort, which was occupied in the first decade of the 2nd century AD. In the stone fort, an abundance of units are attested epigraphically, of which a temporary garrison (complete or only in vexillations) is assumed for *Porolissum*. These are: the *cohors I Ulpia Brittonum*, the *cohors I Aurelia Brittonum milliaria Antoniniana*, the *cohors I Hispanorum quingenaria*, the *cohors V Lingonum*, the *cohors VI Thracum*, the *cohors III Dacorum*, the *cohors III Campestris*, the *cohors I Ituraeorum*, a *numerus Palmyrenorum Porolissensium*, and detachments from *legio III Gallica Felix*, *IV Flavia Felix*, *legio VII Gemina*, and *legio XIII Gemina*.¹¹⁵

NIEDERBIEBER (GERMANY)

With an area of 5.24 ha, the stone fort at Niederbieber was one of the largest forts on the Upper German Limes. It was

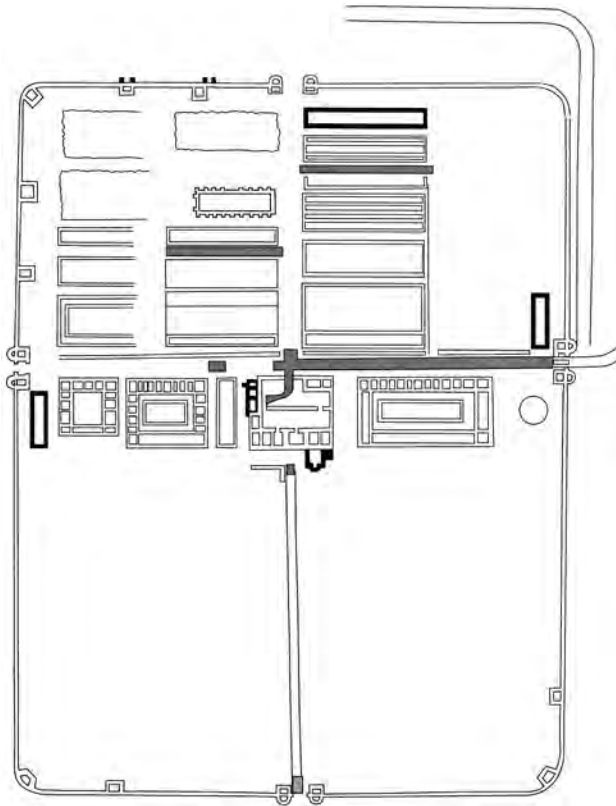


Figure 444 The fort of Porolissum (after Marcu 2009). Drawing: A. Smadi, Arch. Institute University of Cologne

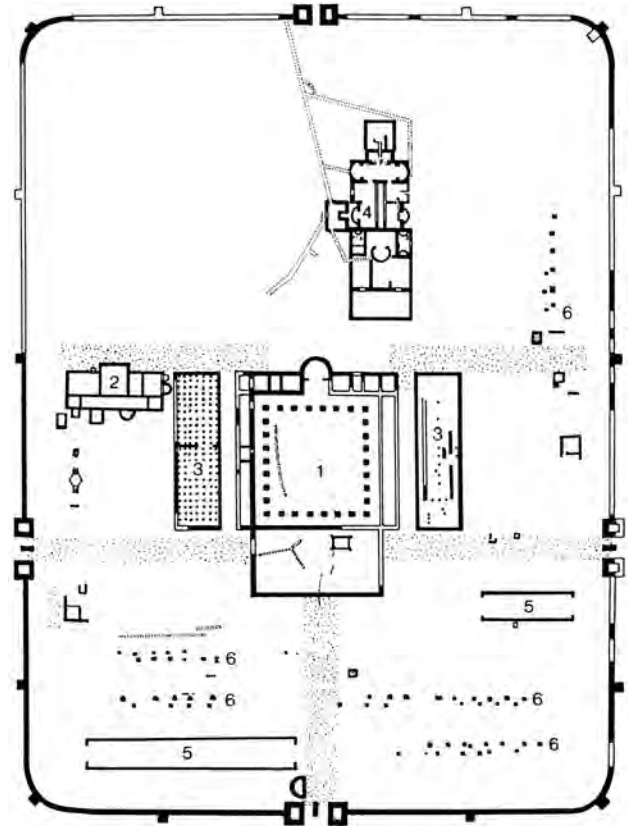


Figure 445 The fort of Niederbieber (after Johnson 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

built around AD 200 and most probably replaced the older fort of Heddesdorf. Its garrison is unusual, as we know of two units, a *numerus Brittonum* and a mounted *numerus exploratorum Germanicorum Divitiensium*. This unit must have been unusually strong because their prefect was a Roman equestrian, T. Flavius Salvianus, who belonged to the *quarta militia*, a pay grade which was otherwise only held by the commander of an *ala milliaria*. This late fort was also characterized by a number of peculiarities: the towers protrude beyond the wall and the baths are located within the fort (Fig. 445). The fort was violently destroyed with a burnt deposit rich in finds and human skeletal remains. This destruction took place around 259/60, which is proved by three coin hoards, the eponymous iron helmet of the Niederbieber type, and parts of a field sign of the *cohors VII Raetorum equitata*, which were found with one skeleton. Recent investigations show that this troop had not come to their aid from the neighbouring fort of Niederberg, as has hitherto been assumed. On the contrary, Niederberg had already been evacuated earlier, probably after the invasion of AD 233, and the Raetian cohort belonged to the regular garrison in the last decades of Niederbieber.¹¹⁶

Garrison within a city

DURA-EUROPOS (SYRIA)

Dura-Europos was a Hellenistic city founded around 300 BC and under Parthian rule for a long time. It lay on the southern bank of the Middle Euphrates on the edge of the desert. In AD 195, the city was conquered by the Romans under Septimius Severus and given a permanent military occupation. In order to accommodate this garrison, the northern part of the city was cleared of civilian population and remodelled as a military camp. The area was separated from the civilian city by a wall. The military buildings known there are a *principia*, *praetorium*, baths, and an amphitheatre, as well as barracks, consisting of converted residential buildings (Fig. 446). In addition some temples, including a *mithraeum*, were now mostly used by soldiers. The 3rd century garrison of Dura-Europos probably included legionary vexillations from *legio IV Scythica* and *legio XVI Flavia Firma*, as well as *cohors XX Palmyrenorum*. In the years AD 255/256, the city was besieged and conquered by the Persians. Since then, it has remained abandoned. The remains of this Persian siege are the reinforcement of the western city wall by a provisional mud brick wall on the inner side, a Persian mine and a Roman countermine at Tower 19,

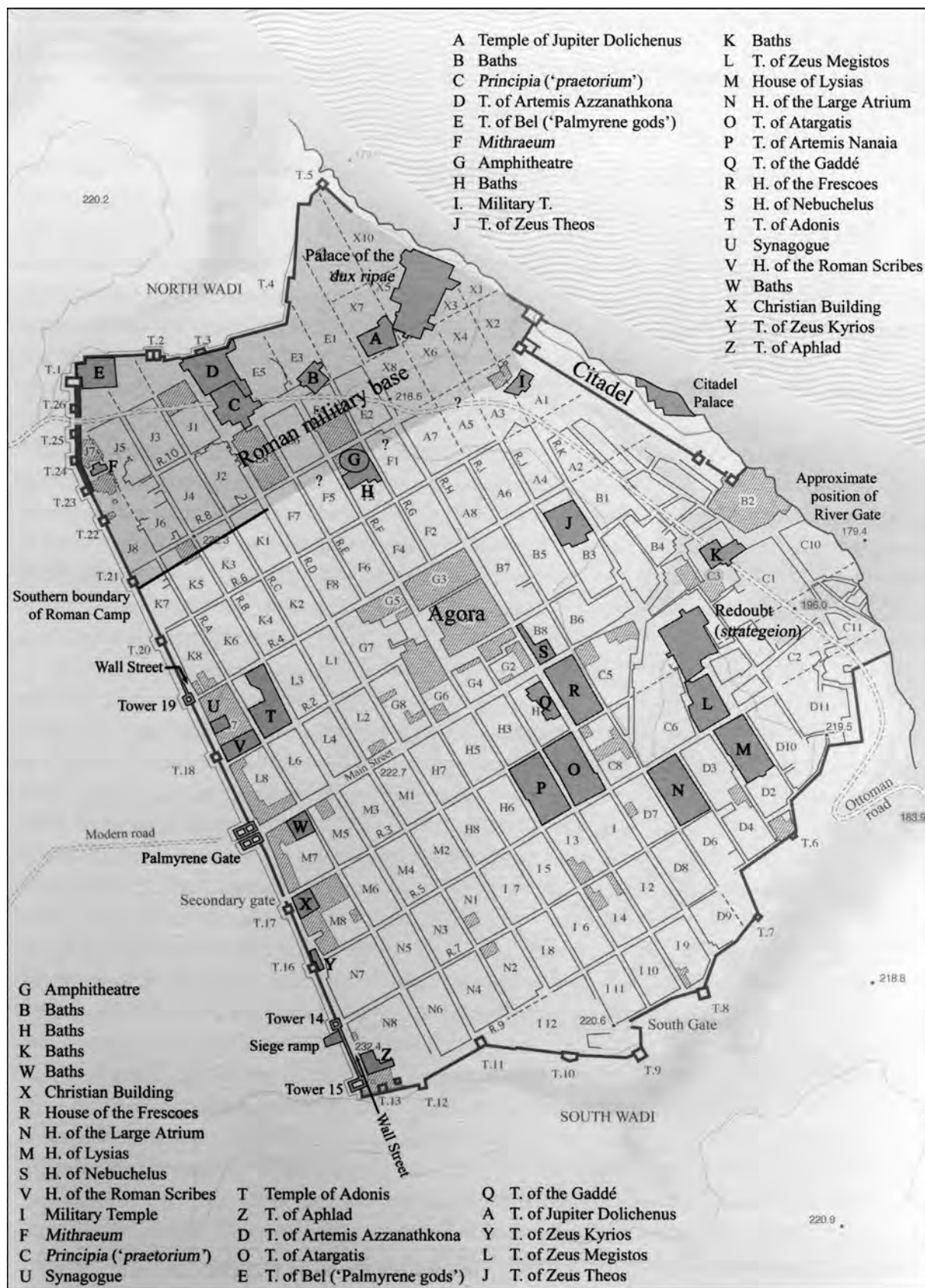


Figure 446 Plan of Dura-Europos with the segregated military area of the 2nd and 3rd centuries AD in the north-west (after James 2004)

with the remains and equipment of fallen soldiers, and a siege ramp at the south-east corner (James 2004 and 2005).

Numerus forts

The so-called *numeri* appeared in the Roman army during the late 1st century. They were included among the *auxilia*. The *numeri* were about 100- to 200-strong guards and reconnaissance units stationed on fixed stretches of frontier. If such units were mounted, they were called *exploratio*. They were under the command of a *praepositus numeri*, often a legionary centurion detached from his unit. *Numeri* were used in addition to the *alae* and cohorts for frontier protection, especially in remote forest areas or for exploring and securing the *Limesvorland* (the area directly in front of the *limes*), as in the Taunus or the Odenwald (Reuter 1999). In contrast to the other *auxilia*, they were apparently always used in the same province and always in the same frontier sector, and were not detached to take part in campaigns. This shows that they were scouts who were especially well-acquainted with a particular frontier section. The forts of the *numeri* were generally less than 1 ha.

HESELBACH (GERMANY)

This fort was completely excavated and published by Dietwulf Baatz.¹¹⁷ It was a typical *numerus* fort. The complex had an area of 0.6 ha, three gates and, in the place of the *porta decumana*, only a small gate. The complex was founded at the beginning of the 2nd century, with a fortification in timber-and-earth technique and a V-sectioned ditch. In the second quarter of the 2nd century, the former received a front wall of drystone walling and a retaining wall in the same technique along the *via sagularis*. Around the middle of the 2nd century, the fort defences were finally rebuilt with a mortared stone wall (Fig. 447). The internal buildings



Figure 447 Reconstruction drawing of the numerus fort at Hesselbach (after Campbell 2009)

also had three phases, but without exception consisted of half-timbered buildings. Phase 3 belonged to a civilian, post-fort period. The fort at Hesselbach was abandoned around AD 165 as part of the relocation of the frontier. The small *principia* discovered highlights that *numeri* were self-administered tactical units, the *praepositus numeri* inhabiting a larger building behind the *principia*. The approximately 140 men of the garrison were accommodated in small barrack buildings of the contemporary building type; in the *retentura* there were stables, sheds, and a store building.

Smaller forts

In the province of Raetia, there are a number of forts which, at under 1 ha, are similar in size to *numerus* forts. The building inscriptions of *numeri*, so common in Upper Germany, are absent here, and if inscriptions are found, they are never related to *numeri*, but rather to auxiliary units and their *vexillationes*.

ELLINGEN/SABLONETUM (GERMANY)

The fort of Ellingen is located about 1.8 km behind the *limes*, just 4 km north of Weißenburg (Fig. 448). The almost complete excavation of the fort took place in the years 1980–2. There was also a completely preserved building inscription in front of the south gate. W. Zanier summarized the results of all research so far (Zanier 1993). The fort was founded either late in the Trajanic era (AD 98–117) or in the early Hadrianic period (AD 117–25).

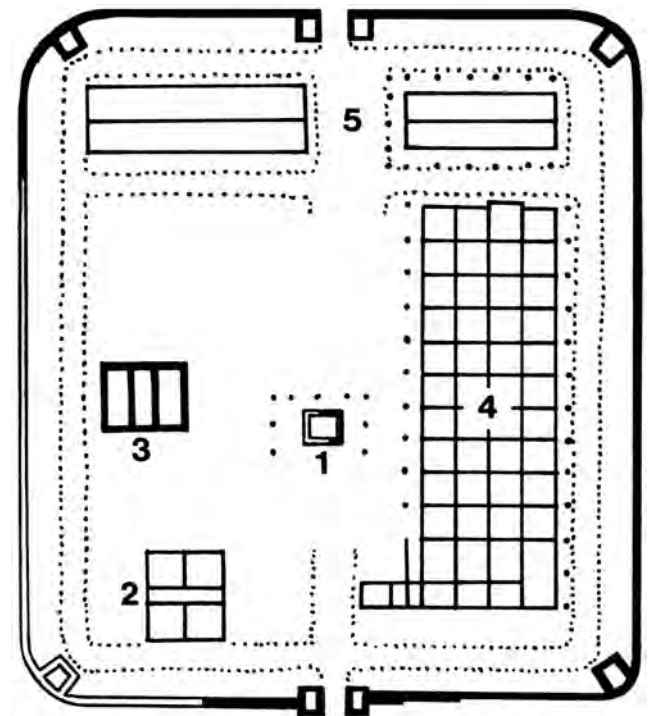


Figure 448 The fortlet of Ellingen (Fischer and Riedmeier-Fischer 2008). Drawing: A. Smadi, Arch. Institute University of Cologne

The defences of the fort of c. 90 × 90 m and 0.72 ha in area were in wood at first and then rebuilt in stone in the year AD 182, according to the excavation results and the building inscription. Four corner towers and two gates reinforced with towers were found on the northern and southern narrow sides of the fort. A ditch ran around the fort which was U-sectioned in the south. The older internal buildings consisted of four rectangular timber structures, which seem to have been built during the timber phase of the defensive rampart. With the rebuilding of the fort in stone, the interior was also redeveloped: in the centre, a kind of *principia* reduced to the shrine of the standards in stone with a wooden *peristyle*. Building 4 was a large double barrack of 51 × 17 m with 24 *contubernia*, while in Barrack 5L, there were ten *contubernia*. Soldiers were probably also housed in Building 5R, while Building 3 was more likely to have been a storage building. Building 2 was interpreted as the residence of the commander of the Ellingen garrison. The garrison of the fort at Ellingen is also known, at least for the time after 182: the building inscription mentioned above names the unit involved in construction as the *pedites singulares* with c. 250 men.

Fortlets

From the time of Claudius to the Flavian period, small-scale sites of less than 0.2 ha were found on the Upper Danube and in Britain which were constructed both for a shorter period and for a longer period (Mackensen

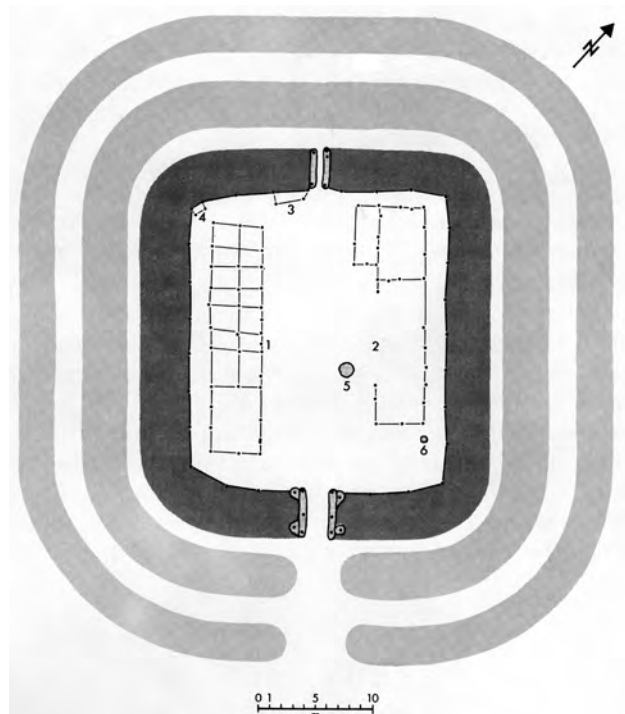


Figure 449 The fortlet of Nersingen (after Mackensen 1987). Drawing: A. Smadi, Arch. Institute, University of Cologne

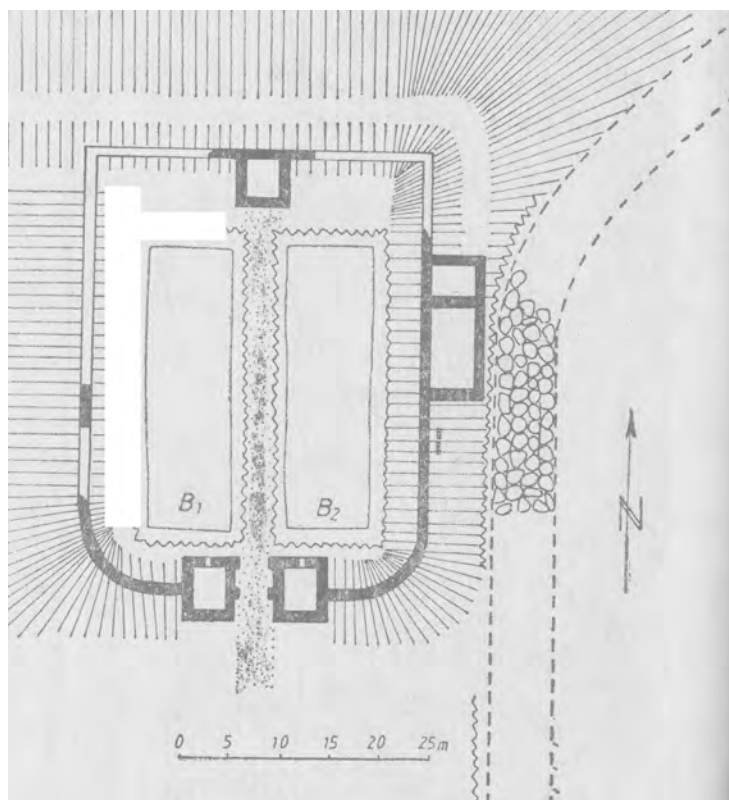


Figure 450 The customs station at Porolissum (after Gudea 1996). Drawing: A. Smadi, Arch. Institute University of Cologne

1987 and 1988). These are sites such as Burlafingen and Nersingen (Fig. 449) on the Upper Danube. Mackensen sees them as customs stations rather than military installations.¹¹⁸

This function also applied to the milecastles on Hadrian's Wall. A previously completely isolated facility, which looks amazingly similar to the Hadrian's Wall milecastles, was excavated near the Romanian fort of Pomet/Porolissum at the Mesec-Limes (Fig. 450). The excavator, Nicolae Gudea, has convincingly interpreted this fortlet, occupied in the 2nd and 3rd centuries AD, as a customs station with the help of inscriptions and finds (Gudea 1996).

Watchtowers

Dietwulf Baatz has summarized the current state of knowledge on watchtowers on the Upper German and Raetian Limes (Baatz 1989). Watchtowers belong with those elements of military construction which the Romans took over from the Greeks. The Latin term *burgus* for watchtowers is derived from the Greek *pyrgos* (*pyrgos*), but the Latin term *turris* was also used. Solitary towers are already known from the Augustan period, such as the Sparrenburg Egge near Bielefeld (Bérenger 1995), where the circular ditch of a supposed wooden tower has been excavated. The coins probably date to the Oberaden horizon. The first stone



Figure 451 Watchtower on Trajan's Column (after Lipsius 1598)

towers, the Walensee towers, are also known from the Augustan period.¹¹⁹ On the Upper German-Raetian Limes, wooden towers with circular ditches are known (Batz 1989). A whole chain of such wooden towers secured a late Flavian military road in Scotland known as the Gask Frontier.¹²⁰ In the 2nd century, the wooden towers were replaced by stone towers on the Odenwald Limes, the Upper German-Raetian Limes, the Dacian Limes, and also on the river frontiers of the Rhine and Danube. Their appearance (three floors, pyramidal roof, surrounding gallery) are traditionally reconstructed according to the representations on the columns of Trajan or Marcus (Fig. 451). However, other constructions are also possible and documented.¹²¹

Camps and forts in and around Rome

Most of the camps and forts of the Roman Empire had been erected along the frontiers or in their immediate hinterland, with only a few exceptions, the interior of the empire remaining free from military garrisons. Only the capital, Rome, which was free from the military in the Republic, at least according to the law, had a considerable concentration of soldiers during the Imperial period. A. W. Busch estimates them at up to 40,000 men.¹²² Under Septimius Severus (AD 193–211), *legio II Parthica* was transferred from the Danube region to Albano near Rome as an additional force, a clear signal to potentially unreliable forces in the capital (Busch 2010b and 2011). With the best will, it is impossible to say that the buildings of the military have so far been a focal point in

the archaeological exploration of Rome. Actual descriptions of these monuments are correspondingly meagre. In addition, it was very difficult to gain an overview of the military in Rome from the scattered and, in some cases, contradictory literature. The Cologne dissertation published by A. W. Busch, published in 2011, now provides a remedy (Busch 2010).

Castra Praetoria

Under Tiberius (AD 14–37), the Praetorian Camp for the nine Praetorian cohorts (as they were then) was established in the north-east of the city in the years AD 21–3, sending a clear message to the inhabitants of Rome (Fig. 452). The troops had hitherto been garrisoned in a decentralized fashion, partly in the vicinity of Rome.¹²³ Three urban cohorts as well as smaller special units (*speculatores Augusti*, *statores Augusti* and *evocati*) were accommodated in this base. If we can assume a garrison of about 6,000 men at the start, up to 16,000 soldiers would later be stationed in the base. The first construction phase of about 15.7–16.72 ha was constructed to the playing card shape, with an approximately 5.2 m high *opus caementicium* wall with brick facing, later construction phases strengthening these defences. The possible function of the Praetorian Camp as an example for frontier forts and camps has already been mentioned. Little is so far known of the central administrative buildings, the troops' quarters, being partly built on to the defensive wall, were two-storeyed, and generously furnished with mosaics and wall paintings. It was rebuilt several times, finally being incorporated into the Aurelian city fortification.

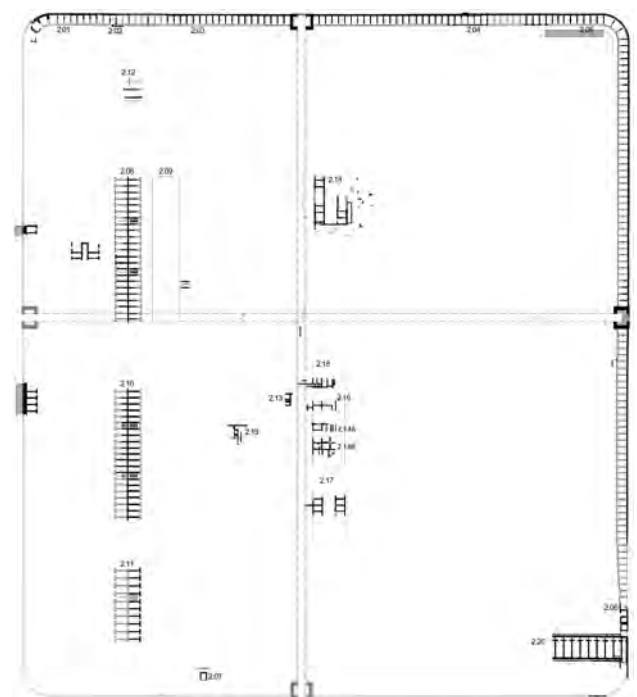


Figure 452 The Praetorian Fortress in Rome, 1st phase (after Busch 2010). Drawing: A. Smadi, Arch. Institute University of Cologne

Accommodation for the cohortes urbanae

Before the three units of the *cohortes urbanae* were stationed in the *castra praetoria*, they were probably lodged in *stationes* throughout the city. In the 3rd century AD, when their strength had grown to 6,000 men, they are supposed to have received a single camp under Aurelian. This has not yet been identified, probably lying in the north of the city.¹²⁴

Accommodation for the Germani corporis custodes

This imperial bodyguard, founded by Augustus, consisted of Germans, mainly Batavians. It was dissolved by Galba (AD 68). This unit was mounted and probably possessed the strength of an *ala*. Little is known about their accommodation, apart from the fact that they were likely to have been located in Trastevere in the west of Rome.¹²⁵

Forts for the equites singulares Augusti

With the founding of this guard cavalry unit of 500 or 1,000 men strong under Trajan (AD 98–117), a fort (*castra priora equitum singularium Augusti*) was erected on the south-east side of the city, its size being unknown.¹²⁶ When the unit was doubled in strength under Septimius Severus (AD 193–211), the *castra nova equitum singularium Augusti* was added to the south-west.¹²⁷ Here, parts of the internal buildings are known, Busch presuming a rectangular site of c.2.6 ha.

Castra Peregrina

This camp in the southern part of Rome, on the Caelian, accommodated soldiers who had come from all the provinces, and were residing in the capital for temporary tasks (*peregrini*). The size and shape of the camp are unknown, but among the remnants of the well-equipped interior there was also a *mithraeum*.¹²⁸

Forts for fleet personnel

Personnel from the imperial fleets at Misenum and Ravenna were dispatched to the city, in the Colosseum, for example, to set up and dismantle the awnings. Their accommodation is also suspected near the Colosseum. In Trastevere, in the west of Rome, were stationed fleet personnel from Ravenna, whose help was needed for naval battles (*naumachia Augusti*).¹²⁹

Accommodation for vigiles

In AD 6, Augustus founded a paramilitary urban Roman unit, the *vigiles*, divided into seven cohorts (*cohortes vigilum*). This unit, with its policing function, also acted as the fire brigade. It was distributed in seven stations and 14 watch posts (*excubationes*) throughout the whole city, and later also in Puteoli and Ostia. In the 3rd century AD, the number of *vigiles* had seemingly doubled, and their participation in regular military ventures outside Rome has now been demonstrated.¹³⁰

Legionary base at Albano

Domitian (AD 81–96) built a huge imperial villa in the area of the modern town of Albano Laziale, including today's papal summer residence at Castel Gandolfo. Here, only 20 km south of Rome, the camp of *legio II Parthica* was erected under Septimius Severus (AD 193–211). Its name was *Castra Albana* (Fig. 453). In the process, older buildings and installations of the imperial villa were

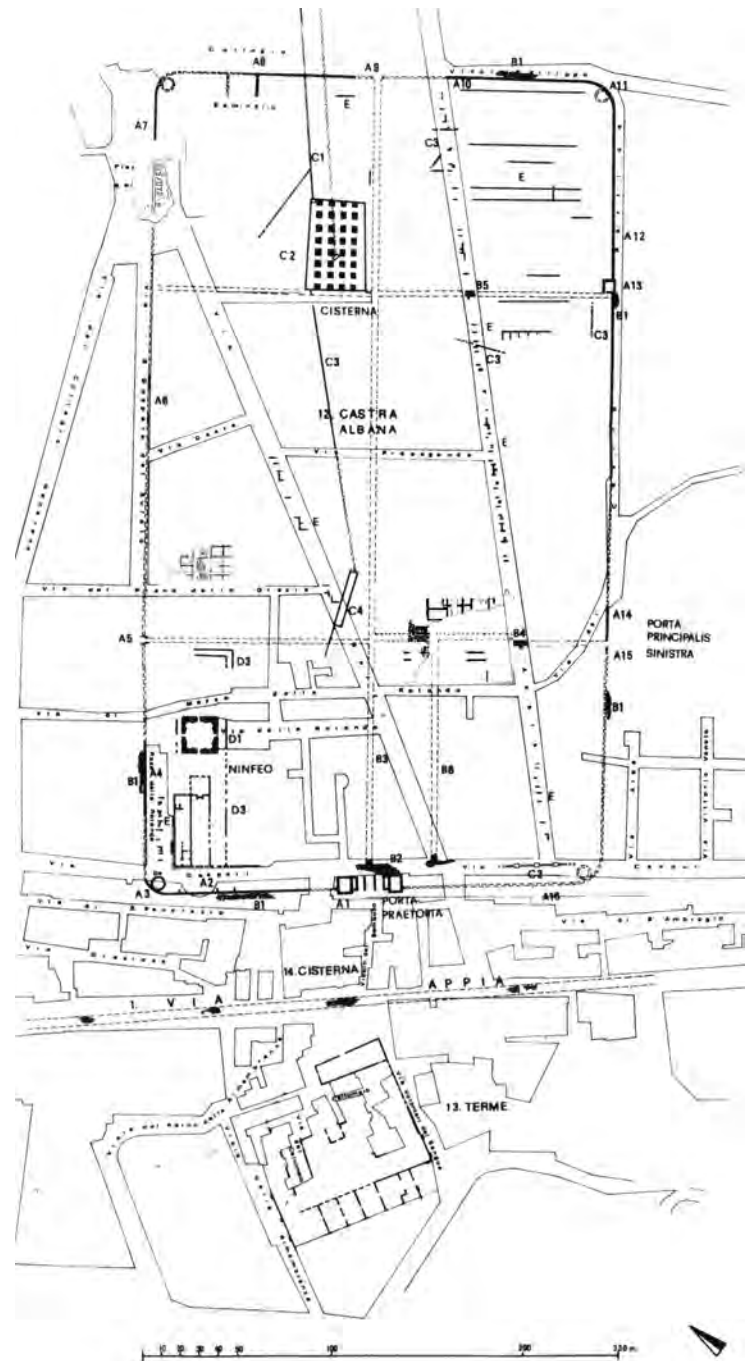


Figure 453 The legionary fortress of Albano (after Busch 2011). Drawing: A. Smadi, Arch. Institute, University of Cologne Legionary fortress of Albano

included in the camp. The camp is on a slope above the Via Appia, being internally terraced several times. Its partially well-preserved walls, made of solid tufa blocks, contain a rectangular area of about 9.5 ha. The base was thus only half the 'standard size' of a legionary camp. It is not currently possible to clarify this contradiction. Two-storey barracks in the *retentura* have recently been excavated from among the internal buildings. The camp was only used militarily until the end of the 3rd century (Busch 2010a; 2011).

4. Late Roman fortifications

Forts

The Late Roman period, from the Tetrarchy (c. AD 300), with its altered military organization, also brought about serious changes in military and civilian fortifications. The army was divided into stationary frontier groups (*limitanei*, *riparienses*) and a mobile army (*comitatenses*) divided into flexible garrisons. The size of military camps was reduced, since the size of the *limitanei* troops was generally much smaller than that of the earlier auxiliary units of the middle Imperial period.

In many cases, the old camps and forts were repaired, but their defences were often considerably reinforced. On the Danube and Iller in Raetia, on the Upper Rhine, and on the Danube frontier in the province of Moesia Superior, the *limes* fortifications of the Late Roman period had to be completely rebuilt since, after the loss of the Upper German and Raetian Limes or the province of Dacia, the advanced forts were also lost. In the course of constructing the new chain of forts, the new, strongly defended fortifications were placed at naturally defensible sites, like the fortresses of the Middle Ages, for instance at Kellmünz high above the bank of the Iller (Fig. 454). On the Danube frontier in Noricum, on the other hand, the basic form of the older camps was often retained in the Late Roman period and strengthened by just the addition and reinforcement of towers and gates (horseshoe and semi-circular towers) outside the walls.¹³¹

Troops and the civilian population were frequently accommodated together within the restored walls of the old forts and fortresses from the 3rd century. The military was occasionally housed within its own internal enclosure in the fort, as at Eining on the Danube or Dormagen on the Rhine.¹³² Thus Late Roman fortified towns with military occupation often grew out of the purely military camps and forts of the middle Imperial period. A similar development also occurred in the hinterland, especially in Gaul: cities and *vici* were strongly fortified and also received garrisons, more rarely in the form of stationed troops, but often in the form of detachments from the mobile army, which could be quartered in the cities in emergencies or overwintered

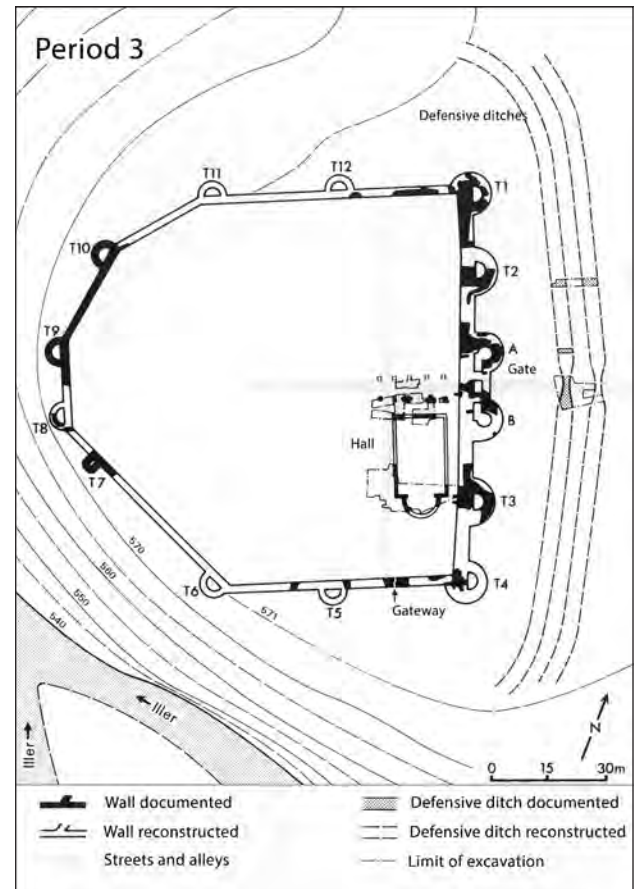


Figure 454 The Late Roman fort of Kellmünz (after Mackensen 1995)

there. Finally, there were purely military garrisons, supply bases, and chains of watchtowers formed in the hinterland.

These hinterland military installations do not often differ from the numerous fortified civilian settlements on heights, which were now emerging, if the necessary natural and geographic conditions were available, in the Eifel, the Hunsrück, the Ardennes, Condroz, the Palatinate, Alsace, the Upper and High Rhine Valley and the Bavarian *Voralpenland* to the Eastern Alps and to Upper Italy.¹³³

Late Roman fortifications, with their mighty walls, were much more extensively fortified than the older forts had ever been. Late Roman walls, which were apparently often built quickly under great threat, frequently used old architectural fragments or tombstones and other monuments for spolia.

The classic 'playing card shape' was abandoned entirely for the basic form of the fortifications, in favour of entirely different types of structure. The uniformity of military construction, which was so characteristic of the early and especially the middle Imperial periods, disintegrated completely. Depending on the size of the body of men, and in particular according to the topographical requirements, rectangular, square, semi-circular or polygonal, or even irregular groundplans of forts were built, whose walls

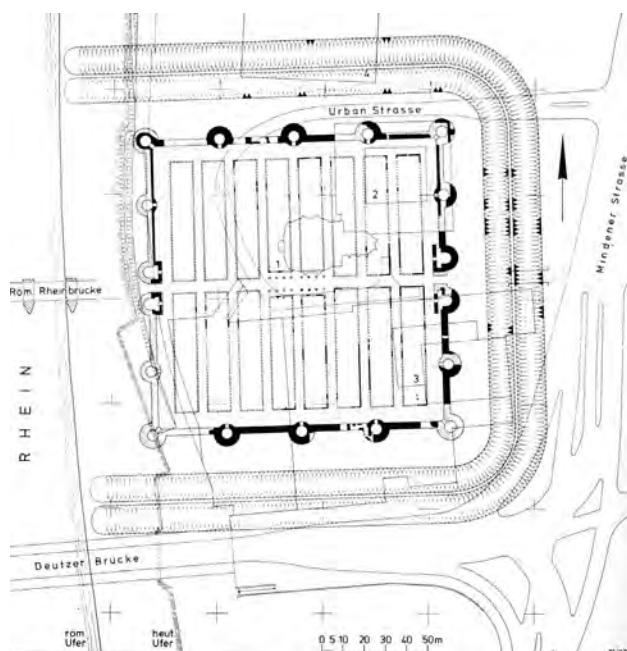


Figure 455 Constantinian bridgehead fort of Cologne-Deutz (after Horn 1987). Drawing: A. Smadi, Arch. Institute University of Cologne

were now at least twice as thick and high as in the middle Imperial period. Only the Constantinian bridgehead fort of Cologne-Deutz is discussed as an example here (Fig. 455). The ‘*tetrapyrgium*’ shape, that is, quadrilateral layout with four corner towers,¹³⁴ was particularly popular from the Tetrarchic period onwards, especially in the East.

In the case of gate, corner, and intermediate towers, which were round, semi-circular, square, or polygonal to fan-shaped, it can be seen that, in contrast to the preceding period, they always projected outside the defensive wall. This can best be explained by the fact that, in the Late Roman period, artillery pieces, the bolts from which are found everywhere in Late Roman fortifications, played a greater part in defence. For with them positioned on the projecting towers, the enemy could be enfiladed from the flank more effectively during sieges and attacks. While many elements of Late Roman fortifications are ubiquitous, the towers occasionally possess regional aspects. For example, the fan-shaped towers at the corners of the fort and horseshoe-shaped interval towers are mainly concentrated on the Danube frontier in the province of Noricum Ripense. In the West, that is, in Raetia, the German provinces, and Britain, they are absent, with very few exceptions. Characteristic of the fortification of the Late Roman period is the now frequent insertion of brick courses into the walls, which were otherwise built of undressed stones, with a curtain wall of dressed ashlar (Johnson 1983 *passim*).

The internal buildings of most late forts are largely unknown. For there were now no more regular layouts, as in the early and middle Imperial periods: almost every fort

looked different. In principle, it must be admitted that Late Roman defensive architecture on the Rhine and the Danube is something entirely new for the region but still contains no fundamental new developments. Rather, components, such as the basic forms of forts, the types and shapes of towers and gates, were taken from the military architecture of the East, North Africa, or from town defences and combined anew, but almost all of the basic elements were already present in Hellenistic fortifications. However, Parthian and Persian influences were also brought into play in the origin of Late Roman forts.¹³⁵

Burgi

A further development from the frontier towers of the middle Imperial period is the so-called *burgus*. Under this term, which occurs repeatedly in epigraphic and literary sources and is already used for early and middle Imperial watchtowers, researchers jumble together many different things: smaller watchtowers right up to small fortifications laid out to the *tetrapyrgium* scheme, civilian refuges at estates or – especially on the Upper Rhine and the Danube in Pannonia – fortified shipyards. *Burgi* were set along the river frontiers, but also served to ensure security, control, and communication along the main roads (Hock 2001).

5. Military infrastructure

Roads

Undoubtedly, the well-developed system of artificial roads is one of the most important civilising achievements of the Roman Empire. The active role of the Roman military of the Imperial period in road construction can be proved by ancient documents, but in particular by inscriptions on milestones. However, various historical circumstances have led to the fact that the role of the Roman military in road construction has generally been overrated. Not all important, long-distance roads were built by the military; there are also a number of ‘civil’ roads.¹³⁶

Canals

In order to support logistics for campaigns, Roman troops also dug canals, which were also useful to the civilian infrastructure for a long time after fulfilling their often only short-term military purposes (Hanel 1995). Drusus the Elder, for example, had canals built during the fighting against the Chauci in 12 BC.¹³⁷ Similarly, in the struggle against the rebellious Frisians and Chauci in AD 47, general C. Domitius Corbulo had a canal built between the mouth of the Maas and the Rhine, the *fossa Corbulonis*. This

probably served as an important trade and traffic route until the Carolingian period.¹³⁸

6. *Limites and ripae*

In the imperial era, the Romans knew better than virtually any subsequent state how to defend their huge empire effectively with a never equalled small number of professional soldiers. The bases for this were the frontier systems (*limites* and *ripae*), monitored by the military, which for a long time were adapted to the local conditions, ensuring the protection and security of the inhabitants of the empire. Beginning in the north-west, Hadrian's Wall and (for a short time) the Antonine Wall protected the island province of Britain. Highly controlled river boundaries from the mouth of the Rhine to the Danube delta were interrupted at only two sections of the frontier by clearly marked, militarily defended land frontiers: the Upper German-Raetian Limes and the Dacian Limes. Naval units patrolled the shores of the Black Sea, and the Euphrates limes protected the frontier with the Parthian and, later, Persian empires. The *limes Arabicus*, military camps in Egypt, and the *limes Tripolitanus* protected the Roman inhabitants of the fertile agricultural areas against the warlike nomads of the deserts beyond the frontiers.¹³⁹

However, the concept of frontiers in antiquity differed quite considerably from what is now understood as a 'border' or fixed 'state boundary': the Roman empire of the Imperial period at the height of its power possessed very clear concepts of what differentiated and separated it (ideologically but also practically) from the peoples outside – the barbarians. Rome and its empire, of course, were, in all respects, the centre of the world and the repository of civilization. Outside its territory there lived only inferior 'savages', the barbarians, with whom concepts such as 'uncouth', 'unsettled', 'traitorous', and 'aggressive' were connected. However, they too had a chance to become 'real' people – as subjects of Rome.

From this clear self-understanding of the Romans, it was only logical that there were no borders protected by a generally recognized international law between Rome and the countries of the barbarians. That would then have meant that they saw them as equal partners. This, however, was a long way off – binding frontier arrangements with peoples outside the empire were at best only temporary. The current needs and the military capabilities of Rome dictated the course of the frontiers. However, these were unilaterally considered as dynamic; in other words, they could theoretically be advanced at any time, at the expense of the barbarian peoples. Thus, the frontiers of Rome were always where the effects of the *gladii* and *pila* of the legions

reached far enough to uphold Roman domination (Cicero, *In Pisonem* 38). With this basic attitude it was also a logical consequence that, for example, every 'good' emperor had a duty to prove his *virtus* by incorporating new territories of Barbaricum into the Roman Empire.

On the other hand, pragmatic military considerations called for these frontiers to be fixed, not because Rome respected the borders of barbarian territories for fundamental reasons, but because the extensive installations necessary for the military control of the borders and the protection of Roman territory, worked best when they were in place for a long time. These roads, frontier barriers, forts, and watchtowers are the ones that are nowadays called the *limes* in modern research.¹⁴⁰

The terms 'limes' and 'ripa'

The Latin word '*limes*' originally comes from the technical vocabulary of Roman land surveyors. At first, it only meant a road constituting the boundary between two properties or surveying systems. It then developed into a somewhat different meaning during the 1st century AD, namely the term for the militarily controlled frontier of the Roman Empire in the Imperial period. The term '*limes*' comprises the actual frontier marked by an artificially erected barrier construction, for example a palisade, a wall or earthen rampart, and ditches. In addition, there were a system of frontier military roads, and a system of signal towers constructed to be intervisible, as well as a network of larger and smaller forts on the frontier or further back in the hinterland, connected by roads for the control and defensive system of the *limes*. If a river replaced the artificial frontier barriers, the word '*ripa*' ('bank') was used for such frontier sections in antiquity with the same meaning as '*limes*'.

Function

None of these *limites* and *ripae* constituted a rigid military defence and fortification system, which, like modern fortifications, would be able to break attacking waves of larger groups of troops. On the contrary, they served only to control the frontier traffic and to collect customs duties. Furthermore, the *limites* were intended to thwart penetration by smaller robber bands and, as a signalling system, account for and locate more extensive invasions. Such larger attacks from outside had then to be tackled using mobile warfare by larger armies, which were brought from the interior of the province or even from other border sectors. Larger-scale warfare was no longer the task of frontier troops – that was mainly the concern of the elite units of the Roman army stationed in the legionary fortresses along the frontiers: the legions.

Actual frontier guard duty was undertaken by smaller units of lower rank, auxiliary groups (*auxilia*) in their forts and fortlets along the frontiers. The latter were often located in the immediate vicinity of the frontier barrier near crossing points. They were frequently erected at a later stage of the construction of the *limes*, often only in the 3rd century AD. From the late 1st century onwards, the *numeri* were still included among the *auxilia*.

The weakness of the early and mid-Imperial frontier system was that most of the troops were on the frontier without any significant reserves in the hinterland in case of a major invasion. When devastating simultaneous incursions by Germans, Parthians, Persians, and other enemies took place in the north and east, the frontier defence system inevitably collapsed. However, the end only came after it had proven itself for a long time (about 150 years), which cannot be said of any comparable modern military defensive system.

None of these *limites* are mentioned much in the contemporary ancient written sources. For Hadrian, the *Historia Augusta* mentions details, some of which can also be confirmed by archaeology: 'at that time, as elsewhere, he separated the barbarians from the territory of the empire, in many areas where the frontier against the barbarians was not formed by rivers, with artificial barriers formed from a system of large posts, which were driven deep into the ground and attached to each other in the manner of a wall-like palisade' (*HA, Hadr.* 12.6).

If we were only dependent on the ancient written sources on the *limites* and *ripae* around the empire, it would be very difficult to understand the military frontiers of Rome. Most of what is known today is the result of archaeological research, which mainly started in the middle of the 19th century. This information has been acquired during excavations on the monuments of the *limes* itself and is now available in such quantities that it can hardly be grasped in its entirety by a single person anymore. The Imperial Frontier Commission (Reichslimeskommission), founded at the suggestion of Theodor Mommsen in 1892, for a long time did the pioneering work on the Upper German-Raetian Limes in Germany (ORL; Fischer 2010).

Late Roman Frontier Defence

Comprehensive and comparable research on the *limites* of the 4th and 5th century is at the moment mainly found in the north-west and north of the empire, such as in Britain (Maxfield 1989; Breeze and Dobson 2000) and on the Rhine and the Upper Danube frontiers (Bechert and Willems 1995; Cüpers 1990; Garbsch 1988). Likewise, in recent years, research has caught up on the middle and lower Danube (Visy 1985, 2003, and 2003a; Gudea 1997, 2001, and 2005), on the Euphrates and in the deserts of

Syria (Konrad 2001), Jordan (Kennedy 2000), and North Africa. However, these frontier sections have not all been equally as well explored as the ones in north-western Europe, although the forts and other defensive systems, for example are much better preserved in the East. Quite often these sites were in use up to the Byzantine period, *i.e.* into the 7th century AD, or even very often into the (Islamic) Middle Ages. It is then frequently very difficult to differentiate the Late Roman phases of the 4th and 5th centuries, let alone older ones.

The Late Roman period, with its modified military organization, also brought about major changes in frontier defences. Artificial barriers were largely abandoned, river frontiers or dense chains of forts and watchtowers (*burgi*) along well-developed military roads being used instead. In addition, there were also defences in the hinterland of the *limites*, especially in Raetia, Gaul, and Pannonia, particularly on important long-distance roads. So Rome moved from a purely linear defensive concept, directly on the frontier, to a defence in depth: along important roads there were now chains of watchtowers and small fortifications (*burgi*). Heavily defended forts and supply bases for the mobile army developed on passes and at nodal points on the road system in the hinterland of the frontier provinces. There were also changes in the course of the frontiers. Where areas had to be cleared in the 3rd century AD, as in the frontier region occupied by the Alamanni in the south and south-west of Germany, or in Dacia, new sections of the *limes* were built in the Upper Rhine and Danube in the Late Roman period, whereby – in part, at least – abandoned defended sites were recommissioned.

The frontier security systems of the Roman Empire

Hadrian's Wall

In AD 122, the Emperor Hadrian visited the province of Britain and personally ordered the beginning of a fortified frontier barrier which, as Hadrian's Wall, is still the best preserved monument of the Roman era in England, (Fig. 456). This can be inferred from the biography of the Emperor in the *Historia Augusta* (*HA* 11.2):

After he had reformed the army (in Germania) in royal style, he went to Britain; here, too, he made many improvements, and was the first to make a wall over a distance of 80 miles, which was to form a boundary between the barbarians and the Romans.

Hadrian's Wall (Breeze and Dobson 2000) was 76 Roman miles long from Wallsend to Bowness-on-Solway, equivalent to 70 modern British miles or 113 km. Original planning can be distinguished from later modifications. Originally, a defensive curtain wall with a ditch beyond it was provided,

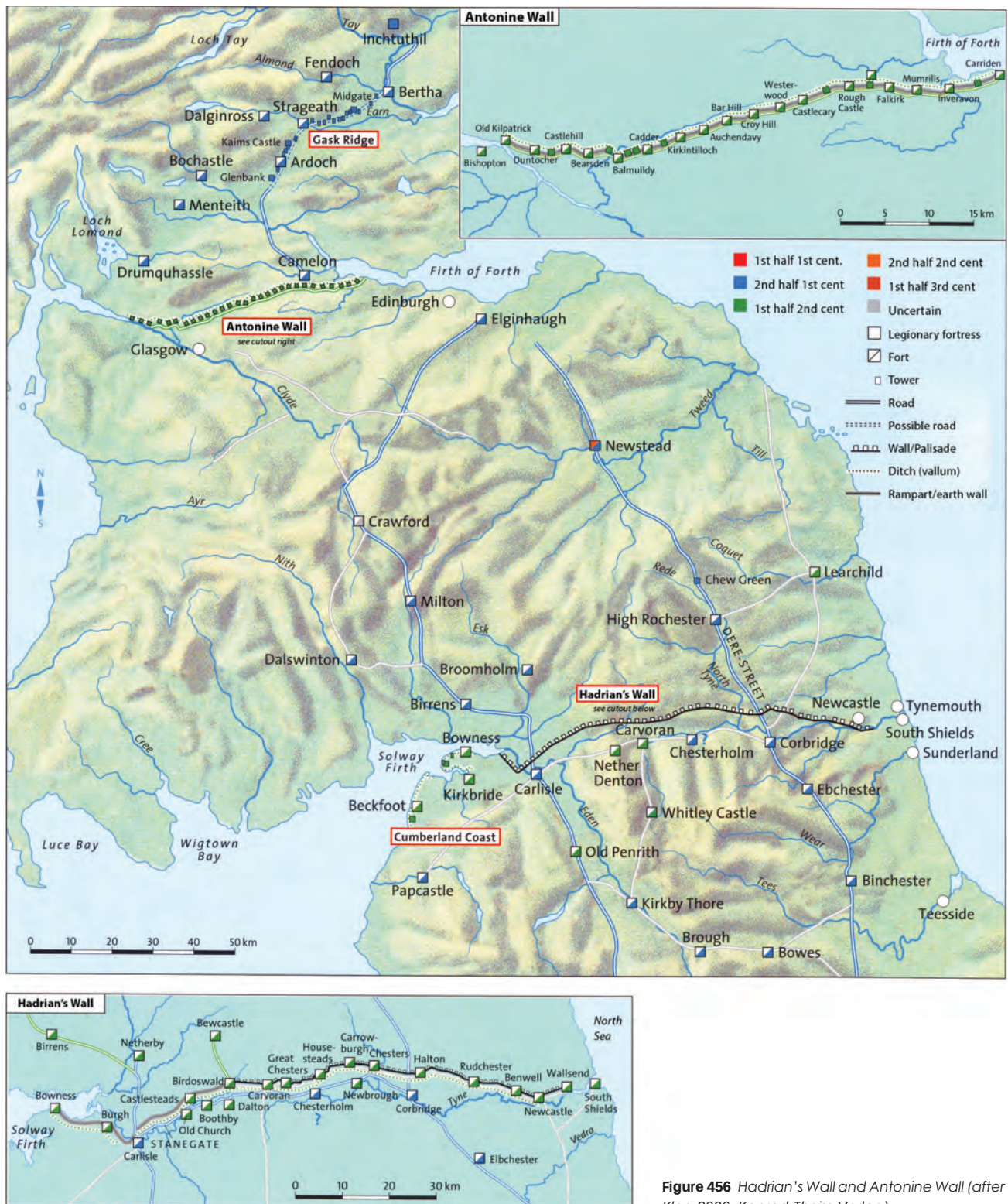


Figure 456 Hadrian's Wall and Antonine Wall (after Klee 2006, Konrad Theiss Verlag)

in which there were fixed gateways (milecastles) every mile. In between, there were two turrets. The forts were to be some way behind the wall, along the Stanegate, a military road. The initial plan was then modified so as to move the

forts up to the Wall and to link them to it directly. This is clearly reflected by the fact that there are no gaps in the Wall where the forts are today, the newly built Wall having been demolished instead.

The Wall itself initially consisted only of a stone curtain wall in the eastern section, from Newcastle upon Tyne to the river Irthing near Birdoswald. In the western section to Bowness on Solway, it at first consisted only of a turf rampart. Later, the turf wall was replaced in stone, and the fortifications in the east were extended to Wallsend. Likewise, in the west, along the Cumbrian coast, a line of milecastles and towers, in part with palisaded walls, was used to monitor raids from the sea.

The original planning of the Wall in the east still provided for a width of 10 Roman feet (c. 3 m: Broad Wall). In the middle of construction, the standard dimensions were changed and the width was reduced to 7 Roman feet (c. 2.1 m: Narrow Wall). In the east, where the Stone Wall later replaced the Turf Wall, only the Narrow Wall is found. Even narrower are sections of wall with a characteristic white and very hard lime mortar, which are attributed to a restoration under Septimius Severus (AD 193–211).

The height of the Wall is estimated to have been about 4.2 m, with an 8 to 12 m wide V-sectioned ditch located beyond a 6 m wide berm. Behind the wall, the old military road, the Stanegate, ran as a connecting route. In contrast to the Upper German-Raetian Limes, Hadrian's Wall also had obstacles to approaching its rear, to the south. This was the so-called *vallum* of about 36 m in width. It consisted of a ditch, accompanied by two ramparts, which, together with the actual curtain wall, marked a kind of military security zone along which the frontier road ran. It must have been built a little later than the wall, although probably also under Hadrian, because the *vallum* avoided existing Hadrianic fortifications.

Building inscriptions show that construction was divided into sections, which were erected by vexillations from the three legions stationed in Britain (*legio II Augusta* from Caerleon, *legio VI Victrix* from York, and *legio XX Valeria Victrix* from Chester).

Only auxiliaries are recorded as garrison troops for the forts on Hadrian's Wall. Depending on the topography and the presence of important north–south connections, the garrisons consisted of infantry, cavalry, or mixed units (Fig. 457). The defences of the forts on Hadrian's Wall were built in stone, where the Stone Wall had been erected, as well as their inner buildings. Where the Turf Wall existed as the first phase of the Wall, the defences of the forts consisted first of all of a turf rampart, but their inner buildings already were partly built in stone. During the reconstruction of the Wall, the defensive circuits of the forts were also replaced in stone.

As with the construction of the wall, vexillations of the legions stationed in Britain were occasionally involved in the construction of the forts. Seventeen forts, from Wallsend in the east to Bowness-on-Solway in the west, lie on the Wall. Over the course of time, outpost forts were also added: Risingham, High Rochester, Bewcastle,

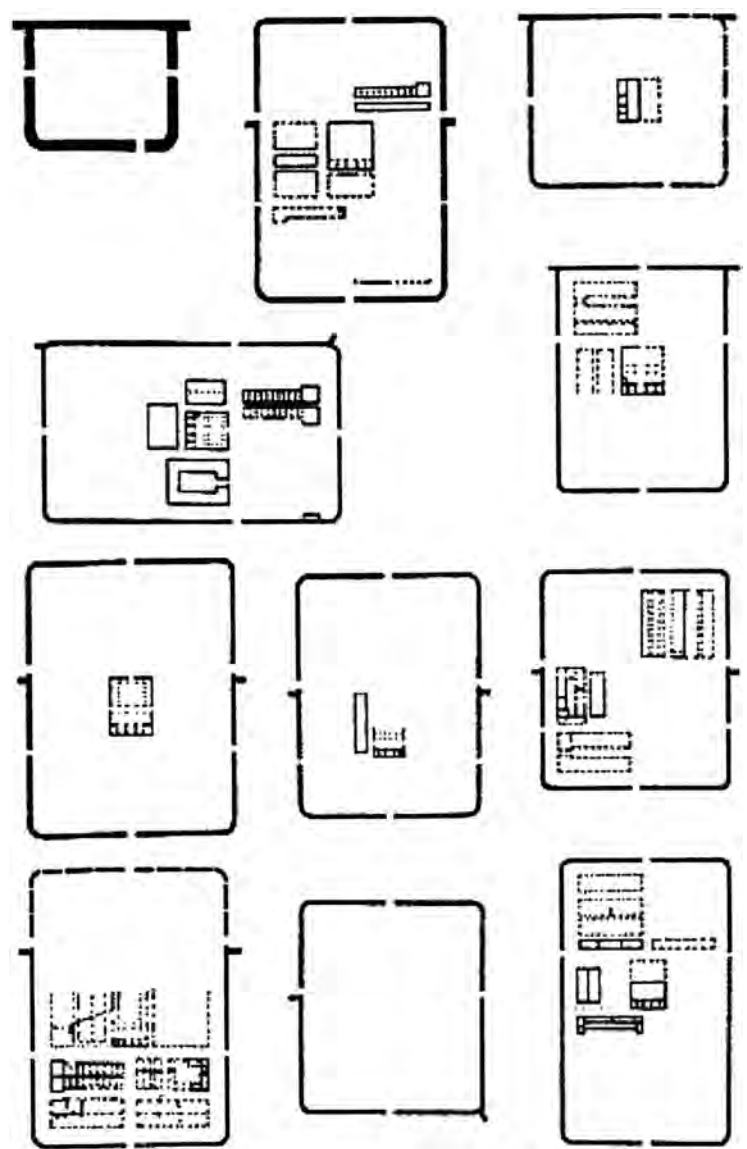


Figure 457 Forts on Hadrian's Wall (from the upper left to the lower right): milecastle, Birdoswald, Great Chesters, Housesteads, Carrawburgh, Chesters, Halton Chesters, Rudchester, Benwell, Wallsend (after Klee 2006). Drawing: A. Smadi, Arch. Institute University of Cologne

Netherby, and Birrens. Some of the older forts in the hinterland, on the old Stanegate line, remained occupied (Corbridge and Chesterholm/Vindolanda). On the Cumbrian coast, a line of forts, fortlets, and watchtowers continued Hadrian's Wall. These forts were Beckfoot, Maryport, and Ravenglass.

Between the fortresses, there were 80 fortlets (so-called milecastles) with gates through the Wall and to the rear, and with their interior buildings along the sides. They served as guard and customs posts, their garrisons being commanded by the neighbouring forts. In between, there were towers of stone, which were attached to the Wall, two each between two milecastles. This system was observed

without deviation and without regard for the topography. In this, Hadrian's Wall stands in remarkable contrast to, for example, the Upper German-Raetian Limes, the structures of which were very cleverly adapted to the terrain. The reason for this must lie in a rigid system devised, or at least sanctioned, by Hadrian himself, which was then implemented without compromise by the military.

Antonine Wall

Under the Emperor Antoninus Pius (AD 138–61) the Roman frontier policy in the north of Britain changed again. In the years AD 139–41, there were tensions with the neighbouring northern tribes. As a consequence, further areas of the province of Britannia to the north of Hadrian's Wall were incorporated. Therefore, at the narrowest point of the island, on the Forth–Clyde isthmus, the Antonine Wall was built. As later events showed, these plans had, however, been realized on uncertain ground and soon required correction. For as early as AD 155, the Antonine Wall was apparently abandoned and cleared on short notice, but in an orderly fashion. It was reoccupied only shortly afterwards, only to be finally abandoned about AD 163. The line of Hadrian's Wall was restored and maintained until the end of the 4th century (Breeze and Dobson 2000).

At first sight, the Antonine Wall on the Forth–Clyde isthmus had a topographically more favourable position than Hadrian's Wall. At 37 miles long (about 60 km), it was almost half as long as it, with its 113 km. Such a one-sided view is, however, not very realistic, as other and more important factors certainly played a role in the establishment and evacuation of this frontier, such as the behaviour of the indigenous tribes, who do not appear to have been at all comfortable with the advance of the border, or the over-extension of supply lines.

The Antonine Wall differed fundamentally in its construction from Hadrian's Wall: it consisted of a 3 m high turf wall on a 4.5 m wide stone foundation. In front of it lay a 6 m wide berm and a 12 m wide and 4 m deep V-sectioned ditch. Once again, building inscriptions show that the construction of the Wall and forts not only involved auxiliary troops, but also detachments from all three legions stationed in Britain.

There is a greater variety of fortifications on the Antonine Wall than on Hadrian's Wall. There were forts, fortlets, as well as marching camps and other enclosed areas, but no towers. Some of the sites were erected before the Wall was built, but others were erected afterwards. Originally it seems that only six forts were planned, with fortlets every mile of the fortification. However, then there was the need to enlarge the garrison, so that there were fifteen auxiliary forts on the Antonine Wall, with outpost forts at Camelon, Ardoch, Strageath, and Bertha.

Late Roman Frontier Defence of Britain

Since the late 3rd century AD, new enemies had been forming in and around Britain, which now brought to the forefront a completely different kind of threat. The danger now came from the sea: beyond Hadrian's Wall a new, dangerous tribal coalition had formed, the Picts. From the late 3rd century onwards, they not only attacked the frontier, but had perfected a new tactic. In small seagoing ships, they outflanked the defensive line of Hadrian's Wall and devastated Roman territory on the east coast. At the same time, the Scotti from the north of the island of Ireland terrorized western Britain as pirates. Despite these attacks, Hadrian's Wall remained occupied far into the Late Roman period. Meanwhile, it is known that many places remained occupied until the first half of the 5th century (Böhme 1986). Major rebuilding can be found in the forts in Late Antiquity, at Birdoswald the newer excavations even extending its continuous use into the early medieval period (Wilmott 1997).

LITUS SAXONICUM/SAXON SHORE

In the south and south-west of Britain, a new threat occurred in the late 3rd and 4th centuries AD, which is reminiscent of the later Viking attitudes. Here Frankish and Saxon pirates wrought havoc. This permanent threat to essential shipping and unprotected settlements in the coastal area required effective counter-measures and, as a result, a line of coastal fortifications and signal stations were built in the last third of the 3rd century AD which were combined into a regular defensive system, the *litus Saxonicum*. They are still mentioned as a separate military command in a Late Roman troop manual, the *Notitia Dignitatum*, from the early 5th century AD (Fig. 458).



Figure 458 Saxon Shore (after Maxfield 1989)

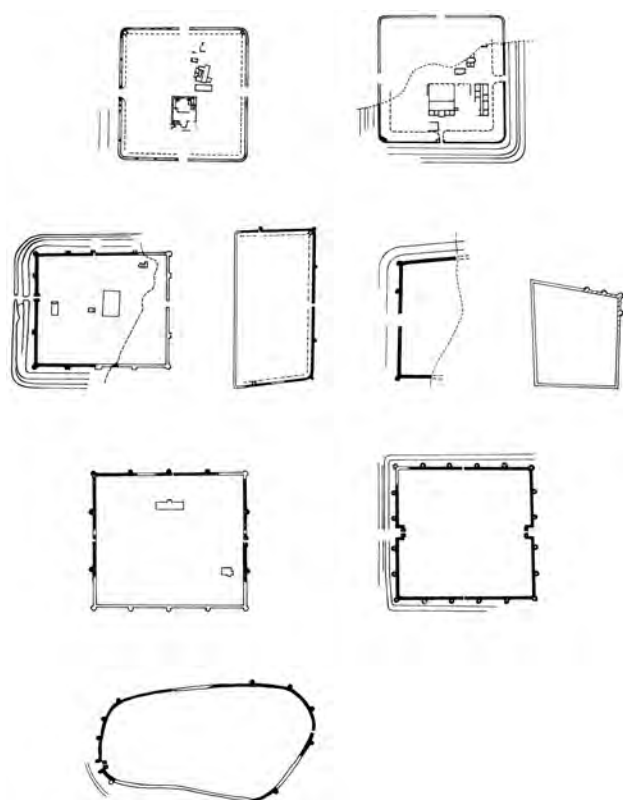


Figure 459 Forts on the Saxon Shore (from the upper left to the lower right): Brancaster, Reculver, Richborough, Burgh, Bradwell, Dover, Lympne, Portchester, Pevensey (after Maxfield 1989). Drawing: A. Smadi, Arch. Institute University of Cologne

These fortifications, which are known in British research as Saxon Shore forts (Maxfield 1989), were often enormous installations, some of which are still standing today, as they were used as fortresses in the medieval period. Since this line of fortifications was not all built at once, but during the course of the 3rd and 4th centuries AD, they help to understand the general developments in Roman military architecture. At the beginning, the forts still had the classical Imperial playing card shape and corresponding internal buildings, such as Brancaster, Reculver, or the first phase of Richborough. At the turn of the 4th century AD, the typical, mighty Late Roman installations with strong walls, better adaptation to the terrain, and modified, more individual, gateways and external towers, were introduced (Fig. 459).

Fortresses that also belonged to the *litus Saxonicum* were located on the Gallic side of the Channel. Between the forts of the *litus Saxonicum* and those in the north-east, there were numerous small fortifications, which served as signal stations. These are, for the most part, no longer preserved in the south-east, since they have completely disappeared with the erosion of the coast, which has also damaged a few forts.¹⁴¹

The Rhine frontier in Lower Germany (Ripa Rheni Germaniae inferioris)

With the conquest of Gaul by Julius Caesar, the Rhine was regarded as a (provisional) frontier for the Roman sphere of interest. When, in the reign of Augustus (AD 27), Germanic tribes from the regions to the east of the Rhine repeatedly undertook successful raids into the Roman area on the west bank and succeeded in defeating Roman troops, the plan ripened in Rome to extend Roman territory to the Elbe and to organize it as a province of Germania. As starting points for these offensives, large military bases on the Rhine at Nijmegen, Xanten, Neuss, and Mainz were established. The defeat of Quintilius Varus in the Teutoburger Wald in AD 9 (the battlefield has now been located at Kalkriese in Lower Saxony) brought the failure of these plans and the retreat to the Rhine line.

In the years following the defeat of AD 9 and before the foundation of the province under Domitian (AD 81–96), the army of Lower Germany made a decisive change: from an offensive army stationed in winter camps to the west of the Rhine, which conducted operations to the east in the summer, it developed from the Tiberio-Claudian period onwards into a frontier army, whose auxiliary forts formed a linear defence along the west bank of the Rhine (Fig. 460). The legions were based on the Rhine without being directly involved in the guarding of the frontier. In AD 81, during the reign of Domitian, there were four legions in the Lower German army, namely in Nijmegen, Xanten (Vetera II), Neuss and Bonn.

The shifting of the military focus from the Rhine to the Danube under Domitian and Trajan meant a major change. Legionary troops were withdrawn from Nijmegen and Neuss. From about AD 130, there were only two legions in Lower Germany, the *legio I Minervia* in Bonn and the *legio XXX Ulpia Victrix* in Vetera II.

The auxiliary troops in Lower Germany were also reduced over the course of time: under Tiberius there were still eight *alae* and about 20 cohorts stationed there; on the eve of the Batavian uprising there were still at least eight *alae* and 12 cohorts, most of which were raised in Germania or Gaul. During the civil war after Nero's death and the Civilis uprising, at least four *auxilia* units of the Lower German army were completely destroyed, the remainder going over to the insurgents. Vespasian then almost completely disbanded these auxiliaries, so that there was now no longer a single unit formed in Germania based on the Rhine. It is assumed there were six *alae* and 26 cohorts in the Flavian period. In the Flavian-Trajanic period, the auxiliary units were greatly reduced between 83 and 106. In the post-Trajanic period, four *alae* and probably 15 cohorts were located at the Lower Rhine frontier. This force remained largely unchanged until the 3rd century.



Figure 460 Lower German Rhine frontier (after Klee 2006, Konrad Theiss Verlag)

The Lower German frontier was hardly affected by military events between the Flavian period and the 3rd century AD. Only in the late Domitianic period or early Trajanic periods were campaigns against the Bructeri on either side of the Lippe mentioned in the literature.

The military installations on the Lower German river frontier consisted of the so-called frontier road, the auxiliary forts on the Rhine, or its delta, and fortlets that had been added over the course of time. Only a few forts lay at the northern section of the hinterland. There seems to have been a complete optical and acoustic signal chain by means of watchtowers, which are rarely explored at the moment. Patrols by the *classis Germanica* were also important for monitoring the river; there must have been many more moorings and bases for the fleet than are known today.¹⁴²

The Upper German-Raetian Limes

The *limes* in Upper Germany and Raetia (Baatz 2000), which acted as a land connection from the Rhine to the Danube as it looked around the middle of the 3rd century AD, shortly before its end, was the result of a development lasting more than 150 years. Since the end of the 1st century AD, Rome had struggled to maintain a militarily controlled line of demarcation under constantly changing conditions (Fig. 461) on this frontier, as well as on other frontiers of the empire.

THE UPPER GERMAN FRONTIER

The river boundary of the Upper German army district on the Rhine was secured by a line of forts during the time of Tiberius (AD 14–37) and Claudius (AD 41–54),

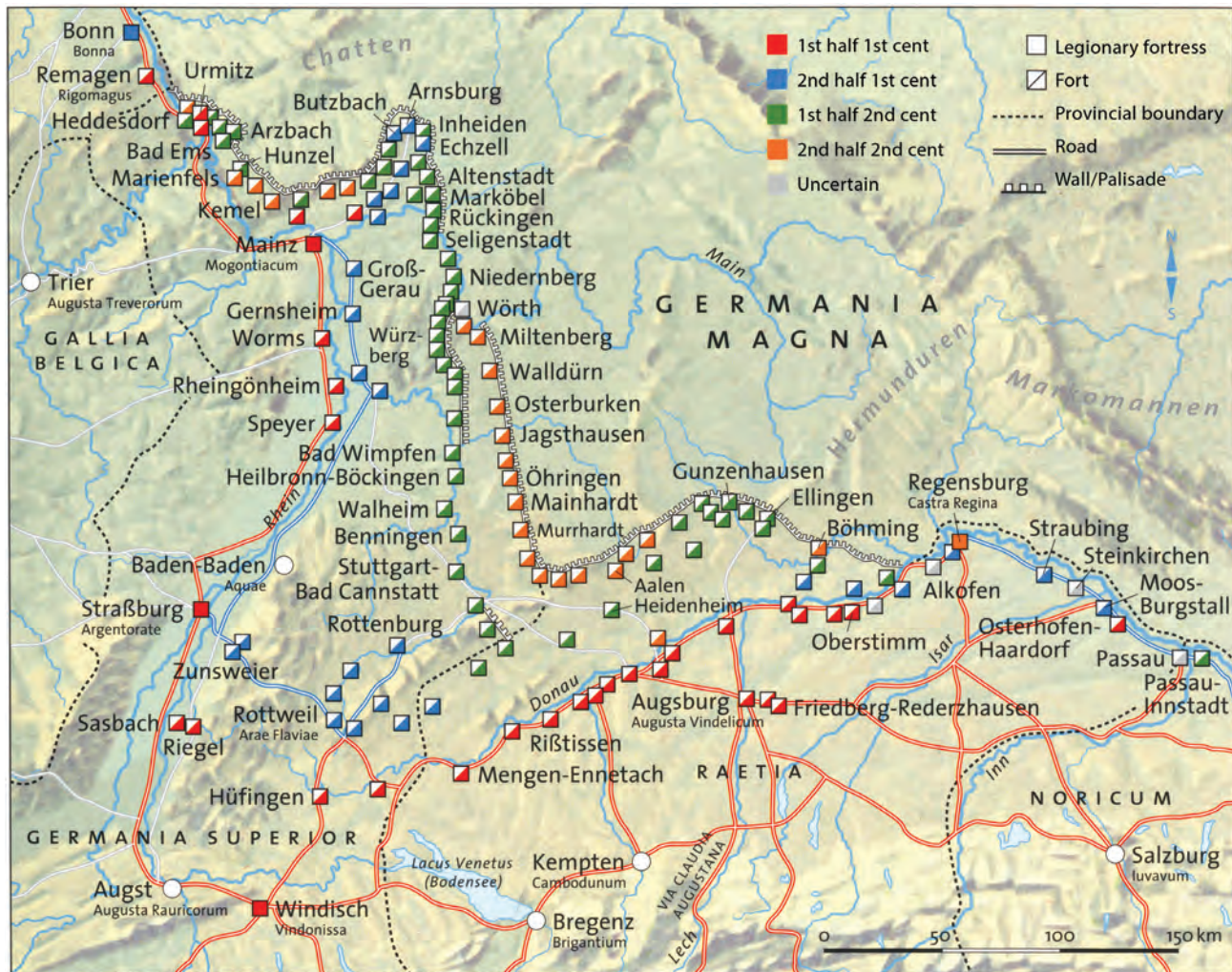


Figure 461 Upper German-Raetian Limes (after Klee 2006, Konrad Theiss Verlag)

following the abandonment of offensive plans in Germany. Only in the area to the east of Mainz, around Wiesbaden, had the Romans permanently occupied land to the east of the Rhine since the Augustan period. Military operations during the civil war after Nero's death and the defeat of the resultant Batavian uprising in the years AD 68–9 had clearly shown that the detour which the troops had to take from the Danube region into the Rhineland, via the upper Danube, Lake Constance, and the upper Rhine, was highly impractical. Vespasian (AD 69–79), who had emerged victorious from the civil war, began to change the state of affairs shortly after the first damages of the war had been removed. He had a road built through the Black Forest area, from Argentorate (Strasbourg), across Offenburg and then through the Kinzigtal, to Raetia, and secured it with forts. Nothing is known of any battles while this was done. The most important military base for these enterprises was Rottweil. Under Domitian (AD 81–96), further areas were occupied up to the river frontier on the Neckar, protected

by auxiliary forts from Bad Wimpfen to Köngen. The passes through the Swabian Alp were also militarily secured during this time (the 'Alp limes'; Heiligmann 1990). The existing gap between Köngen and the Alp limes was closed by the so-called Lautertal limes.

Vespasian had also occupied the land on the east bank of the Rhine in front of Mainz in the Wetterau. A larger territorial gain and the initial building of a linear frontier in the Taunus and Wetterau took place under Domitian (AD 81–96) within the framework of the war against the Chatti.

Under Trajan (AD 98–117), an intensive reconstruction of the imperial frontier began, during the course of which the Upper German Limes was created in the sense of a clearly marked and militarily supervised frontier. To continue the Taunus and Wetterau frontier, the Main limes was now also constructed. This was followed by a frontier from Würth am Main to Bad Wimpfen on the Neckar, the so-called Odenwald Limes. During the reign of Antoninus Pius (AD 138–61), the area between the Rhine and the Danube that

was protected by the frontier reached its largest extent when the Odenwald and Neckar Limes were abandoned and the front line of the *limes* constructed. This now ran almost directly from the Main to the Raetian frontier at Lorch.

The actual frontier barrier of the *limes* changed its appearance several times over the course of time. First, clearings, which were as straight as possible, were cut through the dense forest in order to mark the border. There was a patrol track within these clearings. At prominent points in the terrain within the linear clearings, watchtowers were built so closely that they were intervisible, and that forts placed to the rear could also see the *limes* watchtowers. This ensured that in the case of enemy raids, it was possible to transmit messages quickly through optical (smoke, fire, flags) or acoustic signals (wind instruments). Around the wooden towers, the ground floor of which consisted of a combination of wood and a drystone (*i.e.* unmortared) construction, there was a ring ditch to drain the tower. In the early 2nd century, the frontier received an additional marker in the form of a massive wooden palisade. The dilapidated wooden towers were not repaired but were replaced by three-storey towers made of solid stonework. With the erection of the forward *limes* line, the forts previously built in timber-and-earth construction were upgraded to stone.

Finally, the Upper German Limes achieved its final appearance with the construction of a wall-and-ditch system. The palisade, which for a long time has been seen as contemporaneous with this frontier barrier, was gone by then according to recent studies. This probably happened around the middle of the 2nd century. Only in a few places was a drystone or mortar wall erected on the frontier as a barrier.¹⁴³

THE RAETIAN LIMES

Raetia was conquered by the Romans in 15 BC, but the Danube frontier was only secured with a line of forts under Tiberius (AD 14–37) and Claudius (AD 41–54), which ended in the east with Oberstimm near Ingolstadt. Between Oberstimm and Linz, a chain of fortlets is gradually being revealed, but larger bases have not been found. The history of the Raetian Limes is closely linked to that of the Upper German frontier. Although both *limites* were, in fact, a single continuous line between the Rhine and the Danube, there were significant differences which show how important the discretion of the provincial administrators was in such construction projects.

The measures undertaken under Vespasian in the western part of Upper Germany also led to a corresponding action further east in the neighbouring province of Raetia. It seems that Vespasian had already sought expansion beyond the Danube north of Augsburg and a further shortening of the frontier with the Rhine. To this end, the first newly founded forts north of the Danube followed at Nassenfels and Kösching.

Under the Flavians, the gap in the linear control of the upper Danube between Oberstimm and Linz, which had existed at this point since the time of the Claudian period, was also closed. As a next step, a frontier line guarded by troops was built in the Raetian part of the *limes* north of the Danube. The frontier line from Eining on the Danube to the Nördlinger Ries was probably drawn here as early as the reign of Trajan. In this manner the connection to the Alp *limes* and to the strongest garrison of the province, the fort of *ala II Flavia milliaria* in Heidenheim/*Aquileia*, was established.

A *limes* line was built between Eining and Ruffenhofen, with its first patrol tracks and the wooden tower signalling system. The route of the frontier line protruding in a bulge far to the north was not due to the constraints of the topography, but instead was apparently dictated by economic considerations. During the time of the Emperor Antoninus Pius (AD 138–61), special measures were taken to improve the defensive strength of the line of the *limes* in many places. Several meandering lengths of the *limes* were replaced by new, straighter and shorter stretches, and marked with the well-known wooden palisade. The defences of the forts erected in timber-and-earth construction were replaced by stone walls with fixed towers and gates, and the wooden *limes* towers by multi-storey stone structures. For the Raetian Limes, the advance from the Neckar to the outer line around AD 150 meant that, in its western part, directly on the outer line of the Upper German Limes, new forts had to be erected in order to close the gap thus created. These are the forts from Schirenhof to Halheim. A few smaller forts were inserted into this line. From the fort at Eining, the land-based Raetian Limes became the ‘wet *limes*’ (*ripa Danuvii provinciae Raetiae*) on the Danube. On the Raetian Limes, on the other hand, according to the latest research, a c.3 m-high stone wall, the Raetian Wall, was erected under Septimius Severus as a final barrier after AD 206/7. After the Marcomannic Wars, Raetia was heavily reinforced with troops by the deployment of *legio III Italica* to Regensburg, there having been no legionary occupation in the province beforehand.¹⁴⁴

THE END OF THE UPPER GERMAN-RAETIAN LIMES

Since the great invasion of the Germans in the year AD 233, which mainly affected the western part of Upper Germany and the countryside to the east of Mainz (Biegert and Steidl 2011), there was continuous destruction by barbarian incursions and thinning of the frontier troops, which were needed either in the East in the conflicts against the Persians or internally during conflicts of rival emperors. This ultimately led to withdrawal from the Upper German-Raetian Limes. While the eastern part of the Upper German Limes was not lost until AD 260 under Emperor Gallienus (AD 253–68), the Raetian Limes north of the Danube had probably collapsed earlier, under Valerian (AD 253–60) and his son Gallienus. All dendrochronological and numismatic

data from other Raetian forts suggest an end to the *limes* just after AD 254, when Valerian withdrew Upper German and Raetian troops to the East.¹⁴⁵

The Late Roman Danube-Ille-Rhine limes

Due to the loss of the *limes* area, a new defensive line had to be created along the new frontier after AD 260. This would only be achieved after several decades of chaos. In Upper Germany, Rome withdrew to the old line on the Rhine, and in Raetia partly to the old Danube frontier.

Between Lake Constance and the confluence of the Iller and the Danube, Diocletian (284–305) established a new continuous frontier defensive system, the so-called Late Roman Danube-Ille-Rhine limes (Fig. 462). Under the reign of the Emperor Valentinian I (AD 364–75), Rome was once again able to strengthen the frontier fortifications and numerous small fortifications (*burgi*) were now erected. While research had previously assumed that the end of the Late Roman frontier defences began around AD 401, when Stilicho, the army commander in the West, withdrew troops from the Rhine and Danube



Figure 462 The course of the Danube-Ille-Rhine limes in Raetia I and II as well as in Maxima Sequanorum: 1 Windisch; 2 Oberwinterthur; 3 Burg bei Eschenz; 4 Pfyn; 5 Konstanz; 6 Arbon; 7 Bregenz; 8 Schaan; 9 Bellinzona; 10 Betmauer bei Isny; 11 Kempten-Burghalde; 12 Kellmünz; 13 Günzburg; 14 Bürgle bei Gundremmingen; 15 Faimingen; 16 Burghöfe; 17 Burgheim; 18 Neuburg; 19 Manching; 20 Eining; 21 Weltenburg; 22 Untersaal; 23 Straubing; 24 Künzing; 25 Passau; 26 Passau-Innstadt; 27 Salzburg; 28 Seebruck; 29 Pfaffenhofen; 30 Goldberg bei Türkheim; 31 Lorenzberg bei Epfach; 32 Füssen; 33 Moosberg bei Murnau; 34 Martinsbühel bei Zirl; 35 Innsbruck-Wilten (after Mackensen in Weber 2000)

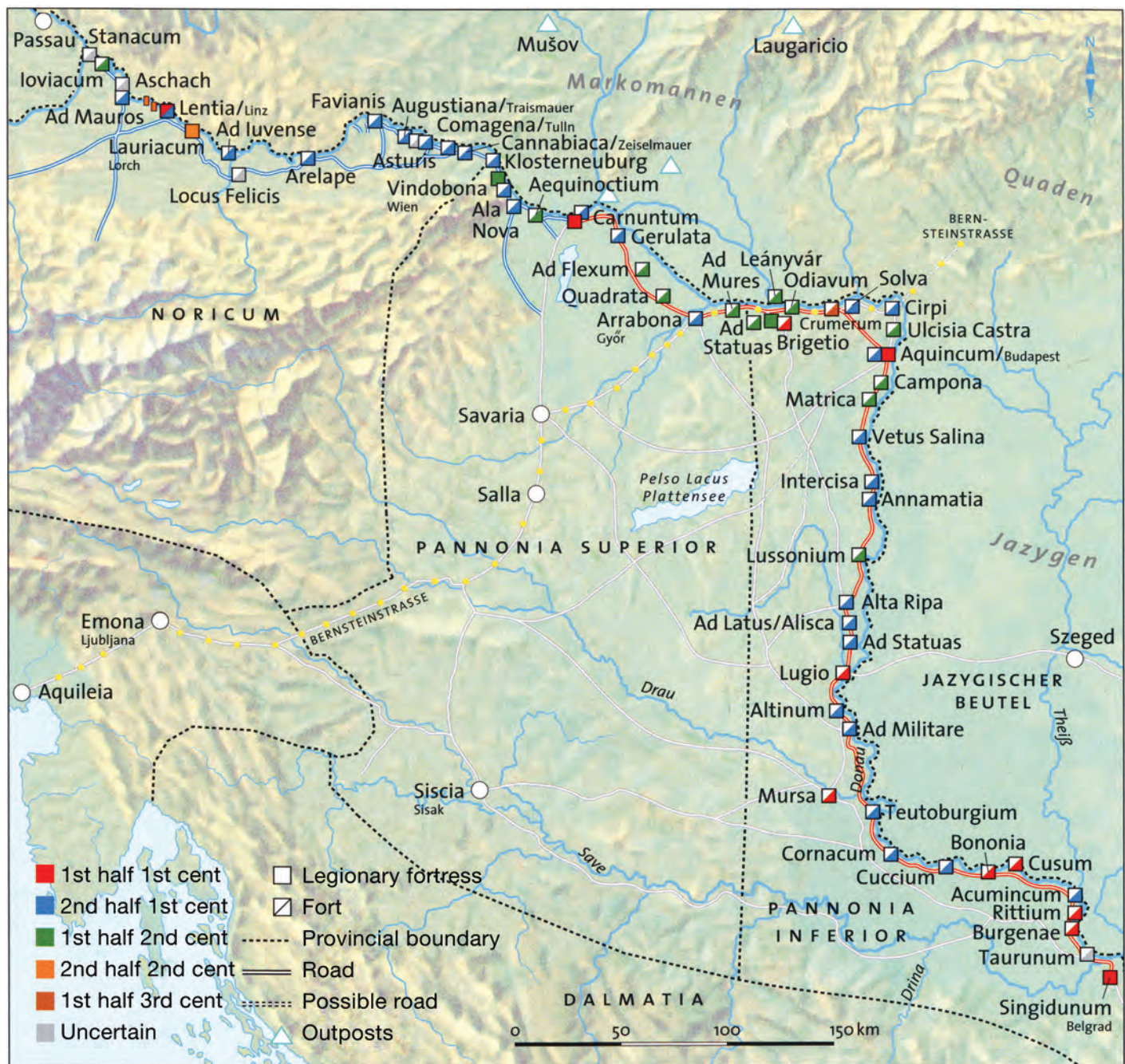


Figure 463 Danube frontier in Noricum and Pannonia (after Klee 2006, Konrad Theiss Verlag)

to defend Italy against the Visigoths, new archaeological discoveries together with some historical passages demonstrate that the organized frontier defence on the Rhine and the Danube did not cease until the middle of the 5th century AD.¹⁴⁶

The Norican Danube limes (Ripa Danuvii Provinciae Norici)

The concept of a river frontier secured with forts only arrived late to Noricum. One reason for this is simply

due to the geography of the area north of the Danube: there was hardly any immediate threat from here. In the northern Danube section, the archaeologically attested German settlement zone only extended to the frontier region in the east. In the section stretching from Passau to the Wienerwald, only the Krems region in Lower Austria had a (limited) strategic importance, while Upper Austria was not really exposed to any immediate, serious danger from the uninhabited regions of the Bavarian Forest and the Bohemian Forest beyond it (Fig. 463).

In addition, for a long time a certain degree of protection was provided by the system of client states practised on the opposite bank of the Danube, especially with the Quadi, Marcomanni, and other tribes. For this reason, until the Flavian period, small military bases seemingly had been sufficient on the northern frontier of Upper Austria, but until now, no reliable evidence has yet been established for this, with the exception of *Lentia*/Linz.

It was not until Vespasian (AD 69–79), in the second half of the 1st century AD, that a real linear defensive frontier concept could be perceived for the first time on the entire Danube section in Noricum. Numerous forts were created, mainly where important connecting routes from the north to the Danube had to be directed and monitored. In a first phase of expansion, forts were built in timber-and-earth on the northern frontier section of the Danube. These are the forts of Linz, Traismauer, Mautern, Tulln, and Zwettendorf. Under Trajan (AD 98–117), there was a further consolidation of this dense chain of frontier forts on the Danube. Since, in addition to Carnuntum, a legionary fortress was also set up in Vienna/*Vindobona*, it is possible to conclude from this close proximity of two legions in the area of Vienna, not far from the north-eastern frontier, that these troops would also suffice to protect Noricum in case of emergency, for the province of Noricum did not have its own legionary garrison until around AD 200.

The rebuilding of the older timber-and-earth bases into stone forts can be observed everywhere in the Upper German-Raetian *limes*, and also occurred in Noricum. While in the west, this expansion mainly happened under Antoninus Pius (AD 138–61), in Noricum it occurred in the reign of Trajan (AD 98–117) and, above all, his successor Hadrian (AD 117–38).

The few stone watchtowers which have so far been identified on the northern Danube frontier belong to the late 2nd century and are explicable in terms of a build-up of the Norican *limes* after the Marcomannic Wars under Marcus Aurelius (AD 164–80).

In the Late Roman period, the old mid-Imperial forts were considerably reinforced by raising the fort walls and by the addition of horseshoe and fan-shaped towers. The new fort of *Boiotro* in Passau-Innstadt is especially worth mentioning among the new installations. In addition, there were numerous *burgi*. The frontier defence of Noricum remained active in certain parts even after the nominal end of the Western Roman Empire in AD 476.¹⁴⁷

Pannonian Danube limes (Ripa Danuvii provinciae Pannoniae)

After the end of the great Pannonian insurrection, which began in AD 6, the area on the middle Danube between Vienna and Belgrade was organized into the province of Pannonia. While the three legions of the early Imperial period were situated in the hinterland (*Poetovio*, *Siscia*), one

legion was moved to Carnuntum under Claudius (AD 41–54), to protect the March valley with the important Amber Road. Since the end of the 1st century under Domitian, this frontier section was subject to extraordinary pressure by Germans, Sarmatians, and other peoples. Therefore, in contrast to Noricum, there was an unusual concentration of legionary fortresses and auxiliary forts here. Around AD 100, the Pannonian army with its four legions was the strongest of the Empire. The legions were located in Vienna/*Vindobona*, *Carnuntum*, *Brigetio* and Budapest/*Aquincum*, three of them on the northern Danube frontier, opposite the German settlement zone. After the conquest of Dacia in the years AD 106/7, Trajan (AD 98–117) divided the province, with Pannonia Superior (capital *Carnuntum*) having three legions, but Pannonia Inferior (capital Budapest/*Aquincum*) only one legion. It was not until Caracalla (AD 211–17) that the *Brigetio* legionary fortress was included in Pannonia Inferior.

On the enemy side of the Danube in the approaches to the Upper Pannonian *limes*, there were numerous short-term marching camps and military posts built in the Marcomannic Wars (Komoróczy 2009). From Commodus (AD 180–92) onwards at the latest, this frontier section was also secured by stone watchtowers, but an older wooden tower destroyed in the Marcomannic Wars is also known. Several identical *burgus* building inscriptions from the time of Commodus are known, such as *CIL* III, 3385 from Intercisa. This records that the Emperor had the border (*ripam Danuvii*) constructed with towers (*burgi*) and *praesidia* (forts) at '*loca opportuna*' (suitable places) to prevent the '*latruncili*' ('bandits') from crossing the river from beyond. The Pannonian fleet also patrolled the Danube. In the 3rd century AD, the forts of the Pannonian Danube line were repeatedly destroyed by hostile incursions. In the Late Roman period, the border was strengthened considerably by inland fortifications in the hinterland as well as by building up the forts, constructing bridgeheads and numerous *burgi*. In addition, there was a wall and ditch system in the lands in front of the Transdanubian *limes*, the date and function of which are still being discussed. In this manner, the frontier of the province of Pannonia could be held until the early 5th century AD, when the rule of Rome was replaced by Huns, Goths, and other tribes.¹⁴⁸

Upper Moesian Danube frontier (Ripa Danuvii provinciae Moesiae superioris)

The province of Moesia was probably established under Tiberius (AD 14–37) as part of the great province of Achaia, Macedonia, and Moesia, after the area had been under Roman control since the time of the late Republic. For the time of Augustus, three legions are assumed to have been stationed there, two after AD 9. This military presence was established with the protection of the

Roman province of Macedonia, which had to suffer repeatedly from incursions by tribes from the territory of the later province of Moesia. However, the early military history of Moesia Superior is largely unknown, since there are still insufficient archaeological data to compensate for the scanty historical tradition. Under Claudius (AD 41–54), Moesia obtained the status of a separate province. Between the legionary fortress at *Singidunum* (Belgrade) at the mouth of the River Sava into the Danube to its delta, Claudius established a frontier control system on the Danube, after the region had two legions stationed there (*legio IV Scythica* and *legio V Macedonica*) since the 20s of the 1st century AD. Whether these legions were already stationed on the river or inside the province is not known.

It is believed there were five legions in the province at the end of the reign of Vespasian (AD 69–79). A military diploma (IMS IV, 184) of AD 75 names 11 auxiliary units in the province. When there was fighting against Dacians and other tribes in this region, under Domitian (AD 71–98), the larger province was divided into *Moesia Superior* and *Moesia Inferior* in AD 85/86, each of which initially had two or three legions (Fig. 464). From AD 92 (military diploma CIL XVI, 37), a *classis Flavia Moesica* is also named. In *Moesia Superior*, there were two legions at *Singidunum* (Belgrade) and *Viminacium* (Kostolac).

With the formation of the Dacian provinces under Trajan (AD 98–117), the river frontier east of *Viminacium* was interrupted and replaced by the Dacian Limes. After the evacuation of Dacia in AD 275, the Danube frontier in *Moesia Superior* was reinstated and then considerably strengthened in the Late Roman period. During this time, areas from the two provinces of Moesia had been dissolved and organized as the new frontier province, *Dacia Ripense*. Currently, there has not been enough research into the question of forts and watchtowers in this sector of the frontier. In the early 5th century, the frontier defensive system of the province collapsed and was probably only restored in the early 6th century AD under Justinian I (AD 527–65).¹⁴⁹

Dacian Limes (Limes Daciae)

With the conquest of Dacia under Trajan (AD 98–117), completed in AD 106/107, the area of Transylvania, the Banat and the land between Danube and the Carpathians was organized as a province of *Dacia*. This territory was of particular importance to Rome due to the rich gold, silver, and salt deposits and other mineral resources. It immediately received a strong military presence with auxiliary forts on the frontier line (the details of which are still under discussion) and in the hinterland. At the beginning of Hadrian's reign (AD 117–38), heavy fighting broke out on the eastern frontier of the province, leading

to the partial withdrawal from the territories occupied by Trajan. As a result, the province was divided: *Dacia Superior* (later *Dacia Apulensis*), *Dacia Inferior* (later *Dacia Malvensis*) and *Dacia Porolissensis*.

The *limes* is best understood in the central northern region, in *Dacia Porolissensis*. It ran along the crest of the Mesec mountain range and is known as the Mesec *limes*. In the hinterland, forts, fortlets, and watchtowers are now relatively well known. The most important frontier garrison post is also here at *Porolissum*, near an important pass. In the hinterland of the Mesec *limes*, the legionary bases of *Potaissa* were located in *Turda/Potaissa* and *Alba Julia/Apululum*. The eastern border of Dacia is still inadequately researched: there are forts and towers in front of the Carpathians, where valleys and thus passes from *Barbaricum* led into the Roman Empire. The eastern *limes* on the Olt (the '*limes Olutanus*') is still difficult to understand. Apparently it was withdrawn backwards under Hadrian, abandoning terrain conquered under Trajan. The date and function of the '*limes transolitanus*' are unclear: here, there is an earthen rampart with wooden towers and, with one exception, only timber-and-earth forts, the dating of which is largely uncertain. In the 3rd century AD, the eastern frontier of *Dacia Malvensis* was apparently withdrawn. After numerous barbarian incursions into the province, the Emperor Aurelian (AD 270–4) took advantage of a respite after a victory over the Goths and Alans in AD 271, and withdrew from the Dacian provinces north of the Danube. After that the military defences of the Danube frontier were restored.¹⁵⁰

Lower Moesian Danube frontier (Ripa Danuvii provinciae Moesiae inferioris)

When there was heavy fighting against the Dacians, Germans, and other tribes under Domitian (AD 71–98), the large province of Moesia was divided into *Moesia Superior* and *Moesia Inferior* in AD 85/6. In *Moesia Inferior*, four legionary fortresses were set up, but they were not all occupied at the same time: *Gigen/Oescus* was garrisoned from around AD 100, was abandoned with the establishment of the Dacian provinces, and was reoccupied after the evacuation of Dacia after c. AD 275. *Svistov/Novae* existed from the 1st century AD up to the Late Roman period. A legion had been garrisoned in *Silistra/Durostorum* from the 2nd century AD into the Late Roman period, and in *Turcoaia/Troesmis* since the time of Trajan. In addition, there is the late legionary fortress of *Arca/Ratiaria*, which belonged to the late province of *Dacia Ripense*, formed from regions that had been taken from the Moesian Danube frontier. In addition, more than 40 forts and military stations are known in the area of the Lower Moesian river basin, some of which were also used as a base for operations by



Figure 464 Frontier on the Lower Danube and Crimea (after Klee 2006, Konrad Theiss Verlag)

the *classis Moesica*. Several complex systems of earthen ramparts located on the approaches to the Lower Moesian Danube frontier are still being debated.

Under the incessantly repeated barbarian attacks, especially from the Goths and Huns, the Danube frontier in the area of *Moesia Inferior* (or the late-antique province of *Moesia Secunda*) practically collapsed in the 5th

century AD. Only after its reconstruction, probably under Anastasius I (AD 491–518), would it be held again until the early 7th century AD, before it was finally overrun by Avars and Slavs.

The frontier defence of the province of *Moesia Inferior* included a control system with fortified ports guarded by the Moesian fleet and vexillations from the Lower Moesian



Figure 465 Frontier in the Caucasus and the eastern Black Sea region (after Klee 2006, Konrad Theiss Verlag)

legions and auxiliaries. It stretched along the Black Sea coast in the area of the province around the cities of Histria, Tomis and Callatis. Moreover, this coastal protection afforded control of the Black Sea as far up as the Crimea,

where the Bosporan kingdom, which was allied to Rome, lay in the 3rd century AD. This military security system was used primarily to secure trade, particularly grain imports from Ukraine and Crimea.¹⁵¹

The limes on the upper Euphrates and in the Middle East

Compared to the frontiers in Britain and on the Rhine and the Danube, the frontier in this region ran through much wilder and more hostile regions: high mountains, deserts, and only rarely temperate zones with more tolerable living conditions, like those that existed on the northern frontiers. There was also really only one relevant opponent here: the Persian empire, whether it was governed by the Parthians or the Sassanids. The nomads of Syria and Arabia did not really play a role as opponents.

In order to be able to assess these frontiers in the East properly, the numbers of troops must also be compared: in the 1st century AD the Roman troops in the East were only about 50% of the troops in Europe. However, of these troops, 20% were not involved in frontier defence, but controlled the restless population of Syria and Judaea. The garrisons of these troops are still little known, although information about the legionary fortresses in the East has been compiled by S. Th. Parker (Parker 2000). The troops in the East were considerably strengthened, especially in the late 2nd and 3rd centuries, without this resulting in more peace on the frontiers. The long-term conflict with the Persians characterized the frontier policies of the Roman and later the Byzantine empires in the region until the 7th century when, after the Battle of Yarmuk (AD 636) under Emperor Heraclius (AD 610–41), the whole region fell under Arab rule.¹⁵²

Limes in Pontus and Cappadocia

The continuation of the fleet-based control system of the western Black Sea coast and the Crimea, organized by the Low Moesian provincial army, can be found in the eastern Black Sea region in the provinces of Pontus and Cappadocia as far as Pythus in the Caucasus. In Trapezus on the Black Sea coast, where the headquarters of the eastern Black Sea fleet lay, a frontier defensive system began across the mountains of eastern Turkey, continuing in the east of Asia Minor and Syria. Here the Euphrates formed a river frontier (*ripa*), which is known as the 'Euphrates limes'. In the last few years, excavations have mainly taken place at Zeugma, which was endangered by the construction of the Birecik dam. There were, however, still no clear traces of the legionary fortress, only temporary early Imperial period timber-and-earth camps.¹⁵³ Otherwise, the Euphrates limes has barely been explored in comparison to the *limites* in Britain, the Rhine, and the Danube.¹⁵⁴

Limes in Syria

In the desert regions of Syria and Jordan, a linear system of roads, towers, forts of various sizes, and legionary fortresses was built on the outer limits between the desert and the fertile land. Its main task was to control the oases, in addition to the important caravan routes into

the desert. A major problem in research here is that Late Roman and Byzantine fortifications overlie most of the older forts, and so far many of the latter have not even been located, much less explored. Systematic research has mainly been done on the Late Roman frontier sector in the northern Syrian desert area, between Sura on the Euphrates and the southern line of frontier as far as Palmyra (Konrad 2001).

As a rule, this frontier fairly precisely separated those areas where precipitation still permitted agriculture from those where only pastoralism by nomads was possible. These nomads were also feared as robbers, especially when there was no rain, and therefore had to be excluded from Roman territory (Fig. 466). The *limes* in Syria, which mostly passed through deserts, did not have to be held by a dense line of forts. Forts are known from the Euphrates to Palmyra, but south of them, in the inhospitable desert region, frontier control markedly diminished. The occasionally strong Roman troop presence in the Syrian hinterland and in Judaea (such as the legionary fortresses at *Cyrrhus*, *Raphanae*, or Jerusalem) had less to do with securing the frontier. Their locations were linked to the control of important trade routes and the troublesome provincial population. A *limes* system postulated in the Negev desert in Israel as a frontier system with fortlets is now interpreted as a network of fortified tower farms, occasionally combined with posts to secure the road system. These facilities probably had nothing to do with a regular *limes*, in the sense of a militarily monitored frontier system.¹⁵⁵

Limes Arabicus

With the conquest of the Nabataean empire in AD 106 by Trajan (AD 98–117) and the establishment of the province of Arabia in the same year, the Syrian *limes* was extended to the Red Sea, and again was fairly densely guarded with forts and watchtowers. In particular, oases or other places where there was water received military garrisons. The task of this frontier was, on the one hand, the control of Arab nomadic tribes, and on the other the control of the caravan trade bringing luxury goods from Arabia (incense!) and from India (spices, silk) into the Roman empire. The backbone of the frontier defences was the *via nova Traiana*, built under Trajan, which led from the legionary fortress of Bosra (*legio III Cyrenaica*) to Aqaba on the Red Sea. It was subjected to a fundamental renewal under Severus. In the Tetrarchic period, the border was reinforced by the legionary fortress at el-Lejjun (Fig. 467).¹⁵⁶

Limes in Egypt

Egypt, which was so important for its production of grain, and also economically very significant for Rome in other ways, had a special settlement structure: the



Figure 466 Syrian and Arabian limes (after Klee 2006, Konrad Theiss Verlag)

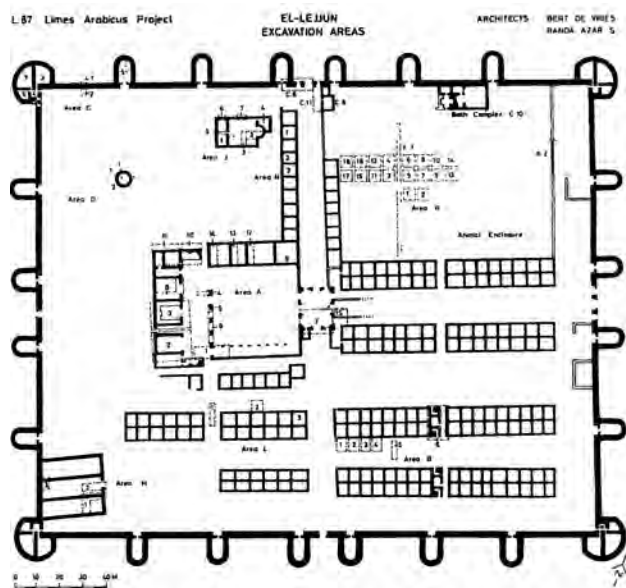


Figure 467 Legionary fortress of el-Lejjun a) plan b) reconstruction (after Parker 1990; Campbell 2009)



Figure 468 Limites and forts in Egypt (after Klee 2006, Konrad Theiss Verlag)

fertile Nile valley with its delta was accompanied by vast deserts. For a long time, however, exploration of the Roman military and the Roman frontier control was not necessarily the focus of attention in Egypt despite intensive archaeological activity.

Consequently we hardly know of any military sites from the early and mid-Imperial periods, for instance. These will have initially concentrated on the control of the densely populated Nile Valley and the delta with its important export ports. The important quarries and mining areas in the deserts of the country were also under military protection (Fig. 468). It was also important to control the ports on the Red Sea, which served the enormously important trade with India. Here troops were stationed in the ports themselves and secured the routes to the Nile valley with forts and watchtowers along the roads. In the west there were garrisons at the most important oases, because here the marauding nomads from the Libyan Sahara threatened the peace.

In the Late Roman period, the threat to the frontiers increased, in particular towards the south and Nubia, and was countered with the intensified construction of forts. Uprisings in the countryside led to the further expansion

of military installations, also in the Nile Valley and the Delta.¹⁵⁷ In recent years it was mainly the Late Roman forts and fortresses which were archaeologically explored. In addition to the legionary fortress built in a temple (Fig. 469) at Luxor (El-Saghir *et al.* 1986), there were the fortifications at Tell-el Herr (Fig. 470) in Sinai (Valbelle and Carrez-Maratray 2000) and Nag al-Hagar (Fig. 471) in Upper Egypt (Mackensen and Franke 2010).

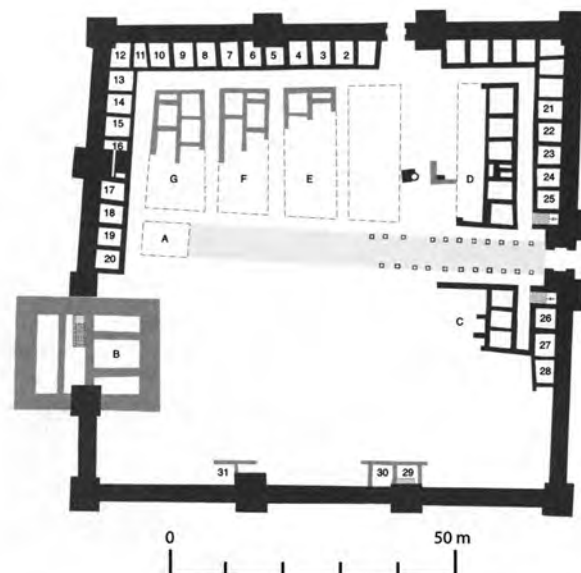


Figure 470 Fort of Tell-el Herr (after Valbelle and Carrez-Maratray 2000). Drawing: A. Smadi, Arch. Institute University of Cologne

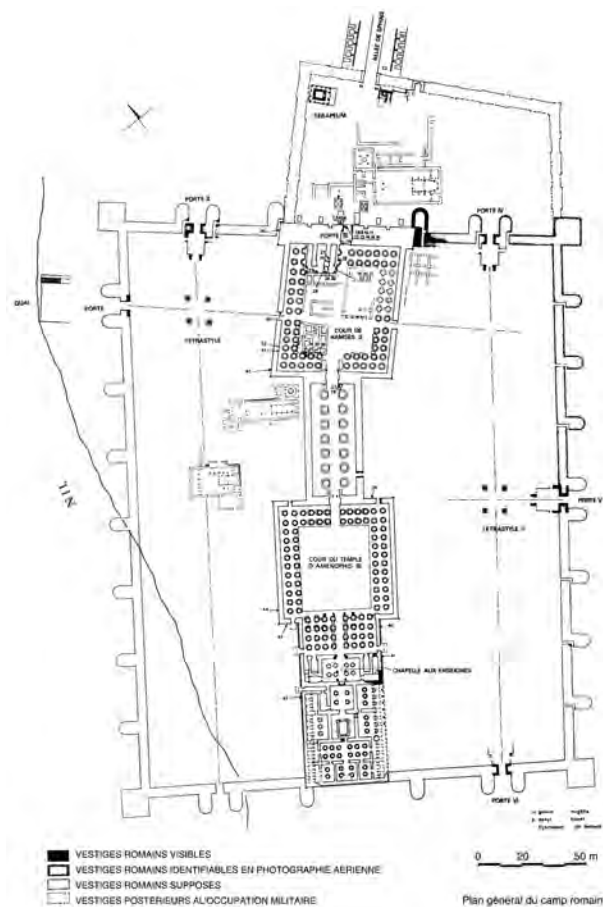


Figure 469 Luxor legionary fortress (after El-Saghir *et al.*, 1986)

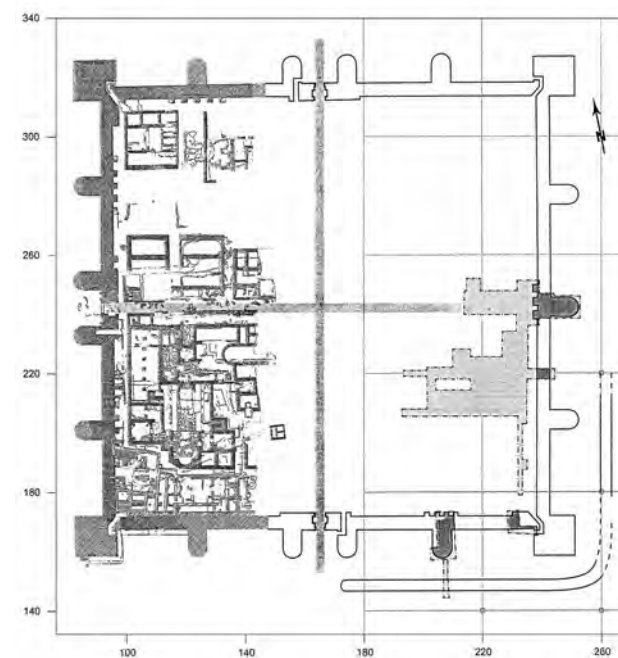


Figure 471 Fort of Nagal-Hagar (after Mackensen and Franke 2013)

The limes in Cyrenaica, Africa Proconsularis, and Numidia

In North Africa, both *Cyrenaica* in Libya and *Africa Proconsularis* and *Numidia* in present day Tunisia and Algeria have a frontier defensive system of about 4,000 km in length, consisting of roads, forts, fortlets, and watchtowers (Fig. 472). For this large region, which was of crucial importance as a granary of Rome, an astonishingly small number of troops was sufficient for a long time: the *legio III Augusta* was first based at Tebessa/*Theveste*, then from Trajan (AD 98–117) onwards in *Lambaesis*, outposting many long-term vexillations in frontier forts. There were only a few auxiliary cohorts and *alae* in addition to it. At the time of the greatest expansion of Roman North Africa under Septimius Severus (AD 193–211), Roman occupation comprised a legion, two *alae*, seven *cohortes*

and two *numeri*. This is all the more remarkable when one compares the forces of Roman North Africa with the enormous concentrations of troops in the provincial armies of Britain and the provinces on the Rhine and Danube! This can only be explained by the fact that, after the civil war under Caesar (49–46 BC) and the suppression of Tacfarinas' revolt under Tiberius (AD 14–37), the period up to the civil wars of the 3rd century AD was relatively peaceful.

The Roman frontier security system in North Africa was concentrated mainly on those regions where there were troublesome tribes on the other side of the frontier, or in the control of caravan routes through the Sahara into central Africa. The oases, with their watering holes, were closely observed.



Figure 472 *Limites in North Africa (after Klee 2006, Konrad Theiss Verlag)*

The limes in the provinces of Mauretania Tingitana and Caesariensis

The limes system in Northern Africa features a local variation: in the most important valleys of the mountain ranges along the border, which formed access routes into the Sahara, short retaining walls with passing gates were constructed in order to be able to control traffic by nomads and their large herds of livestock. Current thinking assumes that they were denied access before the grain harvest. However, the animals were allowed to graze the stubble fields after harvest (and thus fertilising them at the same time). This example demonstrates that Roman border installations were not always purely military installations in the strictest sense. The border zone also saw the occasional creation of fortified farmsteads which were probably, at least partly, integrated into the military control system. This was subsequently intensified in Late Antiquity. With the Vandal conquest of North Africa (from AD 429 onwards) the Roman frontier defensive system in North Africa rapidly collapsed, the short-term Byzantine reconquest under Justinian I (AD 527–565) only affecting part of the former Roman territory.¹⁵⁸

The limes in the provinces of Mauretania, Tingitana and Caesariensis

The territory of the province of *Mauretania*, established under Claudius (AD 41–54), had been a client kingdom allied with Rome since the late Republic. In the Imperial period there existed a form of political abeyance at first: Augustus (27BC–AD14) instigated the foundation of some *coloniae* without formally annexing the territory. Military protection during the Imperial period was also predominantly focused on the towns. The main objective was the protection of the rich cities on the coast and in the hinterland with their fertile environment from attacks by Mauretanian pirates and warlike mountain tribes. Here, the border ran in mountainous territory which was much more difficult to control than the border with the Sahara. Consequently, there is a much lower concentration of forts along this western border section of North Africa, in present-day Algeria and Morocco, than in the *Caesariensis* further to the east. In the *Tingitania*, the city of *Volubilis*, situated in the hinterland, was under strong military protection. Attacks increased during the 3rd century AD, thus forcing Diocletian (AD 284–305) to abandon the city and further territories in the hinterland and to take back the borders.¹⁵⁹

Notes to Part IV

1. On similar frontier guards in other areas and times, see M. Pfaffenbichler, *Grenzen im historischen Kontext*, in: *Grenzen* 2006, 7–13.
2. v. Hesberg 1985; Johnson 1987, 11; Busch 2010, 55.

3. v. Petrikovits 1975, 33.
4. Hyg., *Mun. Castr.* 54; Busch 2010, 55.
5. Johnson 1987, 49ff.
6. *Ibid.*, 51f.
7. *Ibid.*, 52–6; Baatz 1994, 315–25.
8. Johnson 1987, 56ff.
9. Busch 2010, 31, 107ff.
10. Johnson 1987, 59–67.
11. Baatz and Herrmann 1982, 227f.
12. Johnson 1987, 282.
13. *Ibid.*, 70–81.
14. Fischer 2002, 49; 51.
15. Johnson 1987, 76.
16. Baatz and Hermann 1982, 472; 502; Johnson 1987, 83f.
17. Johnson 1987, 76f.
18. *Ibid.*, 88–93.
19. Busch 2010, 31–72.
20. Johnson 1987, 82.
21. Busch 2010, 54.
22. Johnson 1987, 82f.
23. *Ibid.*, 84.
24. *Ibid.*, 86.
25. Dietz and Fischer 1996, 89–93.
26. Busch 2010, 41.
27. Friedrich 2010, 57–60.
28. Johnson 1987, 86.
29. Friedrich 2010, 57–60.
30. Johnson 1987, 93.
31. Flügel and Obmann 2008.
32. Mackensen 2008, 289.
33. Cüppers 1990, 499.
34. Grönke and Weinlich 1991, 40.
35. v. Petrikovits 1975, Plate 12.
36. Mackensen 2008, 288 and 2010a, 425–48.
37. I am referring here to the undergraduate dissertation of E. Krieger, submitted in 2011 at the Archaeological Institute of the University of Cologne, which focused on the ratio of single and double gateways in the forts of the Upper German-Raetian Limes.
38. Johnson 1987, 17; 111.
39. *Ibid.*, 118.
40. *Ibid.*, Fig. 179; Gschwind 2004, 33, Fig. 11; 43–75.
41. Fellmann 1957/58 and 1983; Blagg 2000.
42. v. Petrikovits 1975, 68–75.
43. *Ibid.*, Johnson, 1987, 123–52.
44. v. Petrikovits 1975, 67; Johnson, 1987, 152–61.
45. Sommer 2002, 51–4.
46. v. Petrikovits 1975, 64–7.
47. Pitts and St. Joseph 1985, 129–41.
48. Visy 1985, 83.
49. Pitts and St. Joseph 1985, 151–71.
50. v. Petrikovits 1975, 36–43; Johnson 1987, 188–98; Davison 1989.
51. Johnson 1987, 198–204.
52. Sommer 1999, 84; Scholz 2009.
53. Sommer 1995, 158–65 and 1999.
54. Sommer 1999, 85; Scholz, 2009, 107–12.
55. Busch 2010, 60.
56. Scholz 2009, 107–12.

57. Pitts and St. Joseph 1985, 161f.
58. *Ibid.*, 179–82.
59. v. Petrikovits 1975, 49f; 58f; 143f.
60. Speidel 1996, n.145; 38.
61. v. Petrikovits 1975, 102; Hanel 2000.
62. Johnson 1987, 240–4.
63. Planck 1983, 99–109.
64. Sommer 1984, 18–22.
65. v. Petrikovits 1973, 80f.
66. Pitts and St. Joseph 1985, 123–8.
67. Johnson 1987, 47; 216–22.
68. v. Petrikovits 1975, 82–5.
69. Johnson 1987, 162–79.
70. Pietsch *et al.* 1991, 292–6.
71. v. Petrikovits 1975, 98–102; Johnson, 1987, 179–82; Künzl 1991.
72. Johnson 1987, 183–8.
73. v. Petrikovits 1975, 89–97; Johnson 1987, 204–9.
74. *Ibid.*, 93–7; Johnson 1987, 209–11.
75. Groller v. Mildensee 1901; v. Petrikovits 1975, 73; Johnson 1987, 18; 210f.
76. Johnson 1987, 221f.
77. *Ibid.*, 223–32.
78. *Ibid.*, 232–5.
79. Scholz 2009, 117–22.
80. Jernej and Gugl 2004, 138.
81. Johnson 1987, 211f; 236–40.
82. Kaiser and Sommer 1994, 388–92.
83. Grote 2006; H. Becker and G. Rasbach in Wiegels 2007, 98f; Moosbauer 2009, 40ff; 68; Grothe 2012.
84. Johnson 1987, 57; 61; Czysz *et al.* 1995, 520.
85. Luik 2002; 2009.
86. J. K. Haalebos in Trier 1991, 97–107; F. Kemmers in Lehmann and Wiegels 2007, 183–99.
87. H. van Enckefort in Kühlborn 1995, 42–58; J.-S. Kühlborn in Wiegels 2007, 67.
88. Förtsch 1995, 629f.
89. Kühlborn 1992; *idem* in Kühlborn 1995, 103–24; J.-S. Kühlborn, in Wiegels 2007, 71–7; *idem* in Lehmann and Wiegels 2007, 201–5.
90. Pietsch *et al.*, 1991; M. Pietsch in W. Czysz *et al.*, 1995, 475–9.
91. v. Petrikovits 1975, 154; G. Mueller, in Horn 1987, 583–6.
92. v. Petrikovits 1975, 152.
93. *Ibid.*, 149; Pitts and St. Joseph, 1985.
94. Boon 1972; V. Petrikovits 1975, 152; Johnson 1987, 291f.
95. v. Petrikovits 1975, 159f; M. Németh in Visy 2003, 99–101.
96. v. Petrikovits 1975, 158; Kronberger 2007.
97. Gudea 1997, 109–11.
98. v. Petrikovits 1975, 160f; Johnson 1987.
99. v. Petrikovits 1975, 157.
100. Fingerlin 1971/1972; 1981; 1986 and 1998.
101. J.-S. Kühlborn in Wiegels 2007, 80–6; Fischer 2009a, 505–9.
102. Velleius Paterculus 2.120.4; Zonaras 10.37; Cassius Dio 56.22; Tac., *Ann.* 2.7; Claudius Ptolemaios, *Geographia* 2.11.14.
103. v. Schnurbein 1981, 53–78.
104. Jütting 1995; Fischer and Riedmeier-Fischer 2008, 111f.
105. Schönberger 1985, 428; J. S. Kühlborn in Kühlborn 1995, 130–44; J. S. Kühlborn in Wiegels 2007, 86–93; J. S. Kühlborn in Lehmann and Wiegels 2007, 205–9.
106. Förtsch 1995, 621–6.
107. Glüsing 2000, 120f.
108. Schönberger 1976; J.-S. Kühlborn in Wiegels 2007, 98f; Fischer 2009a, 503f.
109. Fischer and Riedmeier-Fischer 2008, 116–19.
110. In addition, Fischer and Riedmeier-Fischer 2008, 179–81.
111. Fischer and Riedmeier-Fischer 2008, 208f; Prammer 2010.
112. Johnson 1987, 292f.
113. Marcu 2009, 137ff.
114. Hanson *et al.* 2007, 655.
115. Gudea 1989; Marcu 2009, 88–101.
116. H. H. Wegner in Cüppers 1990; 501ff; Jost 2007.
117. Baatz 1973; Schallmayer 2010, 104ff.
118. Mackensen 1987, 129–35.
119. Zanier 2006, 102–19.
120. Jones and Mattingly 1990, 102; 108f.
121. Fischer and Riedmeier-Fischer 2008, 70.
122. Busch 2010, 13.
123. *Ibid.*, 31–72.
124. *Ibid.*, 94.
125. *Ibid.*, 94.
126. *Ibid.*, 72–5.
127. *Ibid.*, 75–84.
128. *Ibid.*, 84–90.
129. *Ibid.*, 95f.
130. *Ibid.*, 91–4.
131. Johnson 1983 *passim*; Fischer 2002, 134.
132. Gschwind 2004, 76–86.
133. Overbeck 1973 and 1983; Gilles 1985; Ciglenecki 1987; Steuer 1990; Fischer in Czysz *et al.*, 1995, 366–70.
134. Konrad 2001, 100–4.
135. *Ibid.*
136. Pekáry 1968; Rathmann 2003, 40f.
137. Suet., *Claud.* 1; Tac., *Ann.* 13.53.2; Hanel 1995, 107.
138. Tac., *Ann.* 11.20.2; Cass. Dio 60.30.6; Hanel 1995, 107.
139. On the *limites* in general, see Bechert and Willems 1995; Breeze and Dobson 2000; Schallmayer, E. in Fischer 2000, 123ff; French and Lightfoot 1989; Friesinger and Krinzing 1997; Gudea 1997 and 2001; Kennedy 2000; Parker 1987; Ruprechtsberger 1993; Visy 2003; Klee 2006; Grenzen 2006; Breeze 2011; Reddé 2014. For further information on research on the *limites* of the Roman Empire, see the congress proceedings of the International Congress on Roman Frontiers (*Limeskongress*).
140. See for example E. Schallmayer in Fischer 2001, 123.
141. Klee 2006, 8–31; Grenzen 2006, 98–104.
142. J. Kunow in Horn 1987, 27–109; Bechert and Willems 1995; Klee 2006, 33–40; Grenzen 2006, 123–32.
143. ORL; Beck-Planck 1980; Jost 2006; Klee 2006, 40–52 and 2009; Schallmayer 2006 and 2010; Grenzen 2006, 112–22; Steidl 2008.
144. Beck-Planck 1980; Klee 2006, 52–9; Grenzen 2006, 112–22; Fischer and Riedmeier-Fischer 2008.
145. Schönberger 1985, 401–24; Reuter 2007.
146. Garbsch 1988; T. Fischer in Czysz *et al.* 1995, 358–411; Fischer 2009.
147. Genser 1986; Friesinger and Krinzing 1997; Fischer 2002; Klee 2006, 61–5; Grenzen 2006, 133–9.

148. Visy 1985; Friesinger and Krinzinger 1997; Visy 2003 and 2003a; Klee 2006, 65–71; Grenzen 2006, 133–56.
149. Gudea 2001; Summer von Bülow 2006; Klee 2006, 71–82; Mirkovic 2007.
150. Gudea 1997; Klee 2006, 82–7; Grenzen 2006, 163–8.
151. Gudea 2005; Klee 2006, 78–82; Grenzen 2006, 169–80.
152. Marek 2003, 59–62; Klee 2006, 89–121; Grenzen 2006, 51–61.
153. Speidel 2010, 138–46.
154. Klee 2006, 89–96; Grenzen 2006, 53–8.
155. Konrad 2001; Klee 2006, 101–11; Grenzen 2006, 58f.
156. Parker 1990; Kennedy 2000; Klee 2006, 111–21; Grenzen 2006, 59f.
157. Klee 2006, 123–30.
158. Mackensen 2006; Klee 2006, 130–47.
159. Boube-Piccot 1994; Klee 2006, 147.

(*opposite*): Remnants of Camp F, one of several legionary camps outside the circumvallation wall around Masada, Israel (photoshooter2015/Shutterstock.com)

