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Julius Caesar's assault ramp at the *Oppidum* of *Avaricum* in 52 BC

Sophie Krausz

1. Introduction

This article follows up on a study that Ian Ralston and I published in 2009 on the siege of *Avaricum*. The Association Française pour l'Étude de l'Âge du Fer (AFEAF) conference at Bourges in May 2008 provided us with the opportunity to materialise the idea, and the chance to re-read Caesar and re-examine Vercingetorix's actions. We shaped the article during long and impassioned discussions at my home near Levroux and Ian's house in Kinross. Re-reading Caesar over and over, trying to decrypt the grey areas that remain concerning the siege is what historians have done for centuries. To try to move the discussion forward, we attempted to add an archaeological dimension. Data compiled by archaeologists on Late Iron Age fortifications especially in Berry are essential to an understanding of how the Gauls defended themselves against the Romans. From Neung-sur-Beuvron (*Noviodunum*) to Sancerre (*Gorgobina*) by way of of Levroux, Châteaumeillant or *Argentomagus*, the historical and literary data can be compared with the field evidence, contributing to a clearer picture of what happened at the capital of the Bituriges.

In March 52 BC, after storming the *oppidum* of *Cenabum* (Orléans) on the Loire, Caesar led his army towards the chief city of the Bituriges. The *Commentaries* relate the siege of *Avaricum* in sixteen chapters of book VII (16–31). At this juncture in the war, tensions had risen dramatically in Gaul because numerous *civitates*, including that of the Bituriges, had rallied to Vercingetorix's league. Outraged at the slaughter of Roman traders in *Cenabum* at the end of the previous year, Caesar set about a harsh campaign of repression that was to culminate six months later at *Alesia*. The massacre of the population of *Avaricum* after 25 days of siege was among the bloodiest and most violent episodes of the Gallic War. Much has been written about

the massacre since the 19th century, but there are still many grey areas, particularly since late La Tène remains at Bourges are singularly inconspicuous. The archaeological gaps are, however, largely a function of poor preservation because the structures of the Gallic *oppidum* were largely destroyed by the foundations of first the Roman and then the mediaeval city.

Militarily, one of the peculiarities of the siege at Bourges was Caesar's construction of an assault ramp or *agger*. By his own account, the *oppidum* of *Avaricum* was naturally well protected on a high promontory surrounded by marshland, leaving only a narrow passage on one side. This arrangement prevented him from building a circumvallation and so, to take the town quickly, he opted to erect an assault ramp against the Gallic rampart (*BG*, VII, 17). The purpose of the *agger* in ancient siegecraft was to serve as a runway for war machines. This type of construction was certainly the most spectacular embodiment of Roman warfare under both the Late Republic and the Empire. The assault ramp at *Avaricum* was the fourth built by Caesar during the Gallic War. He only used this impressive tactic five times as in all the other confrontations with the Gauls he attempted to take the cities by storm. The first ramp was built in 57 BC outside the capital of the Suessiones (II, 12), the second against the Atuatuci (II, 30) that same year; the third was for the siege of the Sotiates in 56 BC (III, 21), the fourth at Bourges in 52 BC (VII, 17), and the fifth at *Uxellodunum* the following year (VIII, 41). We have details only for the last two, *Avaricum* and *Uxellodunum*, for which Caesar and Hirtius give precise measurements for the engineering works. In all five cases the ramps were built for assaults on major *oppida*, some of which, including *Avaricum*, were capitals of *civitates*. This was no coincidence; Caesar specifically manoeuvred to conquer the leading *oppida* in an emblematic demonstration

of Roman power. Like the use of the circumvallation with which it may be combined, the assault ramp provided a spectacular show of the might of the *imperatores* and of the technological prowess of the Roman army. The use of ramps cannot be dissociated from the use of assault towers that together were the showcase of Roman warfare and at one and the same time grandiose, radical and theatrical.

2. The *agger* at *Avaricum*

The first mention of the ramp at *Avaricum* comes in book VII, 17. Caesar would doubtless have preferred a circumvallation and a blockade but the topography of the *oppidum* prevented him from implementing such a tactic. The place he made camp was probably opposite the main gate of *Avaricum* where there was a narrow passage overlooking the marshland and a large cleared space for manoeuvring troops (Krausz & Ralston, 2009). This might have been located at what is now Séraucourt, where ditches possibly belonging to the Roman camp were discovered in the 19th century (Troadec, 2006: 126). Being compelled to give up on the idea of encircling and blockading the city, Caesar had a runway (*agger*) built in order to reach the Gallic rampart. This was to enable two towers (*turres duas*) to be wheeled up and to set up mantelets or screens (*uineas agere*). Caesar gives precise measurements for the mound: 330 Roman feet (97.80 m) for a height of 80 feet (23.70 m) and states that it took his soldiers 25 days of hard toil to construct it (*BG*, VII, 24). According to the Latin manuscripts, the 330 feet were sometimes the length of the *agger* (*longum*),¹ sometimes the width (*latum*). This difference probably comes from misreading of the Latin over time. It unfortunately introduces ambiguity about the direction of the *agger* relative to the rampart. Irrespective of whether the measurement applies to the length or the width of the mound, Caesar does not say if it was built side-on to the rampart or perpendicular to it.

Much has been written on this question since the 19th century and many reconstructions proposed, drawing the *agger* in various positions with respect to the line of the rampart. Victor Duruy imagined a sort of boulevard parallel to the rampart, referring to it as an ‘*agger cavalier*’, 100 m long by 15 m wide, filling in a ravine he pictured in front of the Gallic enclosure (Duruy, 1881: T.III., 199). However, it is unlikely that the *agger* would have been parallel to the rampart because the work site would have been extremely exposed and the men would have been just at the bottom of the city walls when constructing the ramp. In VII, 24, Caesar writes that the *agger* almost reached the enemy wall, plain evidence that the construction began away from the wall and that the objective was to advance closer to it. This detail suggests the *agger* was indeed perpendicular and not parallel to the line of Gallic fortifications. If this is accepted, the 330 feet correspond to the length of a construction that measured almost 100 m head-on to the rampart of *Avaricum*.

Caesar failed to mention the third measurement of the mound, its width, an oversight that makes it difficult to estimate not just the volume of the mound but also its overall shape.

Although the construction of assault ramps is nothing exceptional in Roman siegeworks, it is always a problem to reconstruct them when they are not precisely described and no traces remain at the site of the siege. Very few ancient ramps are still extant and only two examples can be cited by way of comparison: the famous Roman assault ramp at Masada of AD 73 and the ramp at Europos-Dura on the middle reaches of the Euphrates (now Syria) built by the Persians to attack the Roman city in the 3rd century AD.

In a 1939 article, Robert Mesnil du Buisson,² who was familiar with the Europos-Dura site, having excavated there in the first half of the 20th century, proposed a judicious comparison with the ramp at *Avaricum*. He imagined an *agger* perpendicular to the Gallic rampart at Bourges, suggesting it was 100 m long and 10 m wide, based on comparison with the width of the rampart preserved at Europos-Dura (Fig. 3.1). In his article, Mesnil du Buisson questions the hypotheses of Camille Jullian who had taken up the model proposed by Napoléon III for *Avaricum*: a construction composed of an ‘*agger cavalier*’ (parallel to the rampart) and an ‘*agger viaduc*’ (perpendicular to the rampart), a sort of boulevard the mass of which would come to 250,000 m³. Unfortunately Jullian does not give details of how he computed the volume of the *agger* (Jullian, 1920: 448), but this figure is undoubtedly excessive! Even estimating a width of 20 m, the volume of Caesar’s ramp must have been at most 24,000 m³ of material,³ a long way short of the hundreds of thousands of cubic metres estimated by Jullian. This nevertheless is a not inconsiderable mass, and Caesar provides an indispensable figure, that of the time it took to build: 25 days during which the legionaries worked night and day without let-up (*BG*, VII, 24).

The Roman general was in command of at least six legions at Bourges (Le Bohec, 2001: 258), but we do not know their strength at this point in the war, perhaps they were undermanned. Caesar writes that he assigned two legions to guard the camp at all times, while other troops worked in shifts on the construction site (*BG*, VII, 25). So more than two legions, at least three and perhaps as many as four, worked on building the assault ramp. Early in 52 BC Caesar had some 25,000 Roman soldiers plus possible *socii* including perhaps the 400 Germans who had been at the battle of *Noviodunum* against the Bituriges some weeks earlier (*BG*, VII, 13; Krausz, 2015).

Caesar says it took 25 days to build the ramp, *i.e.* 24,000 m³/25 days = 960 m³ of earth moved per day. Taking a mean figure of 1 m³ per man per day and a single legion working on the ramp, then 5,000 men could move 5,000 m³ of material per day. It would then in theory have taken 4.8 days for 5,000 men to move the 24,000 m³ of the ramp. This estimate covers only the time to erect the ramp, taking no

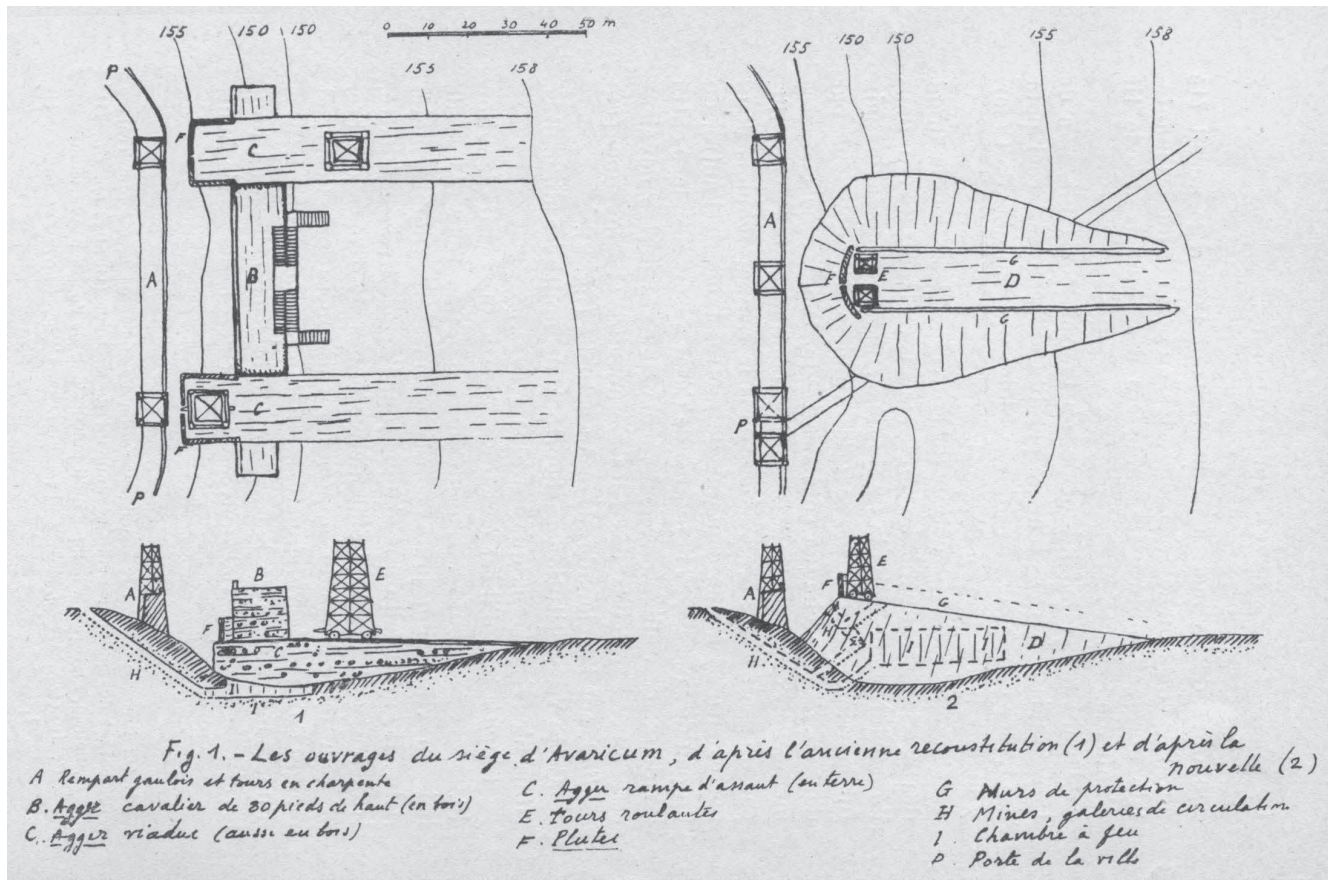


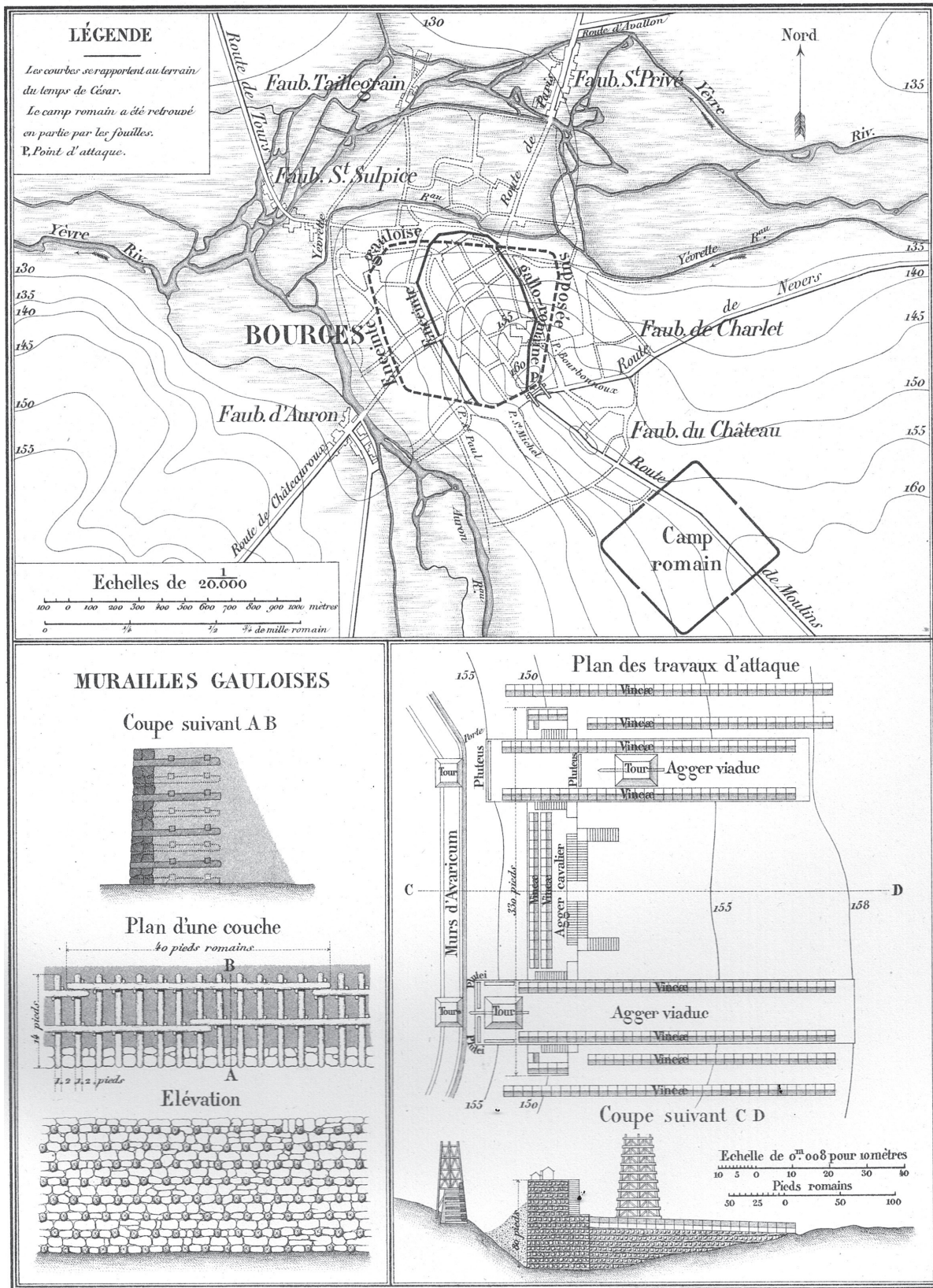
Fig. 3.1: Two reconstructions of the agger at Avaricum. Left (1), Napoléon III's conception; right (2), R. Mesnil du Buisson's proposal (Mesnil du Buisson, 1939: 61, Fig. 1)

account of the time needed to collect the resources (earth, sundry materials and timber), a job that might have been performed in parallel by another legion. This evaluation of the time and resources shows that the construction of an assault ramp was not an insuperable undertaking for a Roman army with thousands of soldiers trained in this kind of exercise. Construction of the ramp at *Avaricum* was completed in 25 days, during which time two assault towers were also engineered. The workers were protected during construction by mantelets (*uineas* or *plutei*), a sort of shield of planking or wickerwork that the soldiers pushed ahead of them for cover. This kind of protection could be covered with animal hides soaked in water or vinegar so they could not be set alight. However, the Gauls of *Avaricum* continually attacked the mantelets on the assault ramp and managed to burn them (*BG*, VII, 25).

Much has been written about the mention of *apertos cuniculos* in book VII, 22. Some writers have suggested that Caesar dug galleries under the ramp to move about beneath it and to save on materials. This is most unlikely because the time taken to dig the galleries would have extended the construction period and they would also have seriously weakened the ramp.⁴ It was the Gauls who dug galleries

beneath the ramp to set fire to it (*fumare aggerem*, *BG*, VII, 24). For Walter Wimmel, the *apertos cuniculi* were rows of *uineae*, small sheds placed end to end to form a long corridor running from the back of the *agger* towards the front (Wimmel, 1974: 29–30). The Roman soldiers sought protection in this gallery when constructing the assault ramp, but the Gauls hurled all manner of projectiles into this structure before they had time to cover it (*BG*, VII, 22). The preparatory stages of the siege were affected by a number of events that must have slowed the work, such as complications in collecting the various materials and the particularly inclement weather that Caesar stresses (VII, 24). These difficult conditions were compounded by the relentless attacks by the Gauls. They obstinately impeded the organisation of the siege, which must have taken longer than Caesar initially planned. The Gauls set about destroying the ramp as it grew, forcing the Romans to begin again many times over and to carry out constant repairs. It can be imagined, then, that the construction of the ramp, which could have been a matter of 5 to 10 days, actually took 25 days because of the adverse weather and the Gauls' persistent endeavours to destroy it.

Ever since the 19th century, Napoléon III's model of an assault ramp has been the preferred one and continues to



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Fig. 3.2: The ramp at Avaricum, Napoléon III's hypothesis (Napoléon III, 1865: 255; atlas 1865: plate 20).

be even now (Fig. 3.2). The work of Mesnil du Buisson seems to have gone completely unnoticed, or at any rate has not been read as attentively as it deserves to be. Camille Jullian thought that the assault ramp had been built between the rampart and Caesar's camp (Jullian, 1920: 451) and might correspond to what is now the Esplanade Marceau in Bourges. This hypothesis, largely inspired by the work of Napoléon III, was taken up unchanged by L.-A. Constans (*BG*, édition de 1981: 227, note 2). Despite the absence of any literary or archaeological evidence, these writers suggested the *agger* had been built between the two gates mentioned by Caesar (*BG*, VII, 24), infilling a ravine at the location. But Caesar mentions no ravine and gives no indication about the location of the *agger* relative to his camp, nor about its relationship with the gates mentioned in book VII, 24.

Ian Ralston and I showed that the assault ramp could not have been built where Napoléon III and his successors assumed (Krausz & Ralston, 2009). Excavations by J. Troadec at the top of rue Moyenne in 1987 demonstrated that a massive dump rampart stood at this spot at the end of the La Tène period. In front of it lay a V-shaped ditch 25 m wide and 10 m deep. This massive bank must have overlain the *murus gallicus*, locally reinforcing the main gate of the *oppidum*. The bank is not preserved in Bourges today and the line of the ditch is only partially known. It is likely, though, that this fortification formed a barrier in the southeastern part of the *oppidum*, where the narrow passage described by Caesar was a weak spot in the natural defences of the promontory. Caesar's account of the *agger* and the tactics he used (mining and sapping) suggest that the assault ramp was built against a *murus gallicus* and not a dump rampart. Accordingly, we sought an alternative location to that traditionally proposed ever since the time of Napoléon III. Close examination of the topography led us to think that Caesar's *agger* had been erected on one of the long sides of the *oppidum*, to the west or east. Although there is no definitive argument in favour of either, if we take the west side of the *oppidum* as an example, it can be seen that the profile of the present-day rue d'Auron has a 20 m rise between its lowest point in the valley and the top of the promontory. If we add to this the 4 m for the mean height of the *murus gallicus*, we reach a total of 24 m (Krausz & Ralston, 2009: 154). This justifies the height of the *agger*, and Caesar's 24 m does not seem to be particularly exaggerated⁵ (Krausz & Ralston, 2009). Little is known about the layout of the immediate environs of the Bourges promontory in the 1st century BC, but judging from the modern topography, there is a space some 400 m in length between the river Auron and the top of the *oppidum*, with a height difference of 20 m over this distance, an average 5% gradient that steepens markedly towards the top. Caesar's *agger* could have been built in this space, more specifically in the 100 m running up to the *murus gallicus* which must

have run unbroken on this side of the promontory apart from the two gates.

3. The way the assault ramp at *Avaricum* was built

Observation of the ramps preserved at Masada (Israel) and Europos-Dura (Syria) reveals they were made of various materials, mostly earth but also wood (Figs 3.3 and 3.4). Timbers were still visible in the ramp at Masada⁶ (AD 73) in the 1960s when excavated by Yigael Yadin (1966: 226) but they had already been observed in the 1930s by the German archaeologist Schulten (Campbell, 2006: 198). The Israeli archaeologist reported 'timbers emerging from the white earth', visible on the left when going up the pathway that leads to the top of the assault ramp at the citadel of Masada. The use of wood is confirmed in many ancient ramps both on the ground and in writing, for example at Jerusalem (63 BC), *Avaricum* (52 BC), *Uxellodunum* (51 BC), Marseille (49 BC), and Jotapata (AD 67). Indeed, the major weak point of assault ramps is precisely the wood that the besieged endeavoured to burn so the construction would collapse. The finest example is that of Marseille, which had rallied to Pompey's party during the civil war and was besieged by Julius Caesar's supporters in 49 BC. Caesar's legate C. Trebonius built a first ramp 24 m high in front of the city rampart but the besieged managed to burn down all the Roman siegeworks: the assault ramp, the mantelets, tortoise, towers and siege machinery (*BC*, II-2, 14). Trebonius thus had a second terrace built, this time made of brick (*BC*, II, 3-15). Caesar relates that he did this because all the trees around the city had been felled to build the first *agger*, and timber was in short supply (*BC*, II, 2-1) although it is likely that, disillusioned with how fragile wooden structures were, Trebonius chose to erect a new ramp with fire-proof materials.

Timber was, therefore, an essential component of ramps,⁷ as attested by Caesar's descriptions and the fires started on several occasions both on and beneath the *agger* at *Avaricum*: the Gauls not only hurled torches onto the terrace but also pitch to spread the fire to anything that was combustible (*BG*, VII, 24). They also dug a mine to set fire to the terrace from below, proof that the structure was indeed made of wood (VII, 24). As a ramp of this kind formed a runway for the assault towers, its composition was of little importance so long as it could be raised as quickly as possible and provide enough stability not to collapse while the towers were being wheeled up and for the infantry to move around on the ramp. It is easy to imagine that all the materials that could be collected on the spot went into building the ramp: timbers taken from demolished buildings (or buildings demolished for the purpose), tree trunks felled in the surrounding forests, earth from the ditches, stones or

other material to make up the bulk of the construction. If the Romans had time, they could have reinforced the sides of the ramp with supports like an armature of stacked timbers⁸ (Stoffel, 1887: 357). There remains the question of how stable and how vulnerable such a composite construction would be. We have seen that the *agger* was indeed vulnerable and the Gauls made the most of this by setting fire to the inflammable materials on and beneath the ramp. As concerns stability, a construction of this size and height in theory requires a stabilisation period for the materials to become compacted.⁹ In wartime, it is easy to imagine that there was no question of waiting for the ramp to settle, particularly as Caesar describes a construction site relentlessly attacked by the Gauls day and night. Building the ramp left the attacking troops in constant danger and the attack had to take place as early as possible.

We do not know what the ramp surface was like. It may have been deliberately laid and so be suitable for wheeled vehicles, to facilitate the movement of the heavy rolling towers. It had to be possible to move them without sinking into the mud or getting stuck. At Europos-Dura, the Persians paved the surface of the ramp with large terracotta slabs that were thick and sturdy enough for machinery to be moved over them (Mesnil du Buisson, 1939: 65). At Masada, the Roman general had the assault ramp surface covered with earth from a nearby rocky spur known as Leuké, ‘The White Rock’ (Josephus, VII, 8, 5). This sediment must have had mechanical properties suited to the traffic of towers and troops on the assault ramp and it is likely the general had it tamped down before use.

At Masada, the *agger* was 210 m long and the difference in height between the base of the ramp and the top of the promontory was 100 m. Josephus says the Roman engineering work did not reach the top of the rocky promontory but stopped some 20 m below the casemate rampart.¹⁰ As at *Avaricum* and Europos-Dura, the Masada assault ramp was not built against a gate but against the curtain wall of the rampart. It can be inferred that assault ramps were adapted specifically for attacking ramparts rather than gates.¹¹ To crown the top of his ramp, Silva



Fig. 3.3: The assault ramp at Masada, Israel (Yadin, 1966: 208).

had a mound installed. This platform, designed to support siege machinery, measured 25 m wide and 25 m high and its surface was made up of large stones tamped to stabilise it. The mound had to support an iron-clad assault tower 60 cubits (27 m) high. An enormous battering ram also set up on the mound constantly hammered the rampart, but Herod's stout casemated wall held out for a long time. After seven months of siege, the rampart eventually yielded to the battering ram, opening up a breach that can still be seen. The next morning, general Silva ordered the assault and entered a ghost town where 960 Zealots, men, women and children, had taken their own lives during the night.

A major difference between the sieges of Masada and Bourges is that the former lasted for seven months, during which time the Roman general set up a circumvallation 3470 m long, with 12 towers defended by two large and six small camps. Setting up this gigantic siege with the assault ramp, which was undoubtedly the most spectacular in the Roman Empire, was dependent on the time and troops



Fig. 3.4: Remains of the assault ramp at Europos-Dura, Syria, looking south (©MFSED).

available. Silva had at least 10,000 men at Masada – the *Legio X Fretensis* plus six cohorts of auxiliaries.

At *Avaricum*, Caesar gives little indication of how the 25 days of the siege were spent. But within this quite short time span, the ramp was judged operational for the assault towers to be rolled up. Stable or not, the machinery had to be moved up to the rampart in order to take the city. Even if the ramp was not entirely stable, Caesar's engineers managed to make it solid enough to hold for the time it took for the assault and for the towers not to collapse whilst they crossed the 100 m to the *muris gallicis*. But if stability was not their main concern, which is very likely, the legionaries coped with its flaws and rolled the towers up as best they could, probably in difficult conditions under fire from the Gauls.¹² At the moment of the assault, the defenders tried to prevent the towers from reaching the rampart, just as they had impeded the construction of the ramp for 25 days. Of the two towers built by Caesar, only one ultimately reached the rampart (*BG*, VII, 27). Caesar does not say what happened to the other, but it can be assumed that it was burnt down by the Gauls or that it collapsed before it could serve its purpose.

4. Conclusion

Close scrutiny of Caesar's text enables us to determine the volume of the ramp of *Avaricum* and some of the technical and material conditions within which it was constructed in the late winter of 52 BC. Comparisons with ramps preserved at Europos-Dura and Masada give some idea of its morphology and appearance. We must abandon Napoléon III's reconstruction, which was far too complex with its two parallel roadways and *agger* cavalier, as Walter Wimmel had already clearly argued (Wimmel, 1974). Napoléon III's reconstruction of a military engineering work of over-complicated design relates to an image of Roman genius as it might have been perceived in the 19th century. The proposal was unrealistic in that an assault ramp was not built to last, it was not a monument. On the contrary, it was thrown up for a practical goal and had to fulfil an immediate

function, facilitating the movement of siege machinery and reaching the top of the ramparts to invade the city. In the perspective of a rapid and effective siege, despite the unfavourable conditions and the relentless defence of the Gauls, Caesar's army had to use diverse materials, in fact whatever the soldiers found to hand, to construct the ramp. It must have looked like a large embankment made up from accumulated sundry materials including tree trunks and pieces of timber that provided an armature, with the rest being a filling of earth and stone.

Julius Caesar, the nephew of the famous general Marius, was considered by his contemporaries to be a great thinker and a powerful wartime leader. When he undertook the Gallic War in 58 BC, Caesar was 42 years old and already had both practical and theoretical military experience. In the course of his career, he conducted seventeen sieges, a number of them in Gaul. When embarking on this campaign he probably had in mind a number of models of siegecraft including those that were the hallmark of the Roman Republic. Perhaps he drew inspiration from the works and tactics of Sylla at Athens and then Piraeus in 86 BC, Lucullus at *Themyskira* (Pontus), or Pompey at Jerusalem only nine years before *Avaricum* (63 BC). The *imperatores* of the Roman Republic had won fame by deploying military strategies using a particularly successful form of siegecraft throughout the 1st century BC. Finally, Caesar probably served as a model for the generals who succeeded him at the head of the Roman army. No doubt those generals drew inspiration from Caesar's strategies and tactics derived from his famous *Commentaries*. Analogies can be seen between the siege of *Alesia* in 52 BC and that of Masada over a century later, with its circumvallation and large and small camps. Similarly, the sieges by Vespasian at Jotapata in AD 67 and then Titus at Jerusalem three years later included one or more *aggeres* that are reminiscent of the sieges of *Avaricum* and Marseille.

Acknowledgements

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Notes

- 1 *aggerem longum pedes CCCXXX*, in the version translated by L.-A. Constans: *BG*, VII, 24, p. 227 (édition Les Belles Lettres de 1981).
- 2 Count Robert Mesnil du Buisson was born in Bourges in 1885 and died in Caen in 1986. A historian and archaeologist, he is best known for his excavations at Europos-Dura, especially the discovery in 1932 of the synagogue in the Hellenistic and Roman city. This version of the site name is used here.
- 3 Detail of the calculation: length = 330 feet or 97.80 m; height = 80 feet or 23.70 m. That is, 100 m (length) × 24 m (height) × 20 m (estimated width) = 48,000 m³. This must be divided by 2 since the ramp slopes (the hypothesis is based on an angle

- of approximately 45°), thus making up half of the rectangle computed: *i.e.* $48,000 \text{ m}^3/2 = 24,000 \text{ m}^3$.
- 4 For the detailed argument of these hypotheses, see Rice Holmes, 1911: 599–607.
 - 5 Note that the height of the ramp at *Avaricum* given by Caesar (80 feet or 24 m) is identical to that of the ramp at Marseille in 49 BC (*BG*, II, 2–1).
 - 6 The siege of Masada took place in AD 73. L. Flavius Silva Nonius Bassus led the expedition against Masada at the head of the X *Fretensis* legion. The Jews led by Eleazar held out for seven months and eventually killed themselves inside the citadel the night before Silva's assault.
 - 7 I shall not comment here on the representations of *aggeres* in several places on Trajan's column but it should be noted that logs or tree trunks formed the armatures of the constructions depicted.
 - 8 Both sides of the assault ramp at Europos-Dura were reinforced by a cladding of unbaked brick (Mesnil du Buisson, 1937: 17).
 - 9 Compaction might take several weeks or months, the duration dependent on the types of material used, their resistance to precipitation, frosts and the vicissitudes of the weather.
 - 10 The casemate rampart was built by King Herod of Judea between 36 and 30 BC.
 - 11 The tactic generally used by Romans against gates was to burn them and/or batter them in with a ram.
 - 12 Inside the *oppidum* of *Avaricum*, the besieged used machinery to counter the siege (*tormentis*: *BG*, VII, 22) and nooses to divert the wall hooks (VII, 22) (Krausz, 2018).

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