

0:00 – 0:39

## OPENING CREDITS

Narrator:

A small settlement in the middle of a swamp became the largest and most impressive city of the ancient world: Rome. 2000 years ago, the people, who named themselves after this city, set out to conquer the world - including large parts of Germany, which they called Germania. They got as far as the Rhineland to the west and up to the Danube in the south. And they left their mark. Many clues have already been deciphered, but others still remain a mystery.

0:42

Narrator:

Alexander Zimmermann is a blacksmith, but above all he's an experimental archaeologist. He's trying to recreate a very small, which isn't to say unimportant, piece of equipment of the Roman legionnaire. In his opinion, a world empire was created with these tiny objects.

1:02

Narrator:

It's often the inconspicuous details that are responsible for success: hobnails covered the sole of the caliga, the Roman military boot, which is similar to a soccer cleat. But how significant were the tiny iron nails? And were the laced "sandals" even suitable for fighting, especially in the rough terrain of northern Germania?

1:29

Narrator:

One thing's clear: the soldiers' feet bore the brunt of the Roman conquest. Ninety-five per cent of the approximately 300,000-strong army were foot soldiers.

1:42

Narrator:

Not all were Romans. Let's take the fictitious Germanic Flavus. He enlisted because of the regular meals, the chance to use the most modern equipment. And... money!

1:59

Narrator:

Some of this was payed to replace the worn out hobnails: Flavius receives the so-called "nail money." One Roman secret of success was to be well-equipped.

2:13 (Map of the Expanding Empire)

Narrator:

What began as a swampy city-state called Rome became the largest Empire in the ancient world within six centuries. Many provinces were conquered with weapons, soldiers and military discipline: from North Africa to Britannia, from Spain to Anatolia – the Roman Empire. All this thanks to the sandals?

2:36

Narrator:

Could an empire really be built wearing these sandals? Alexander Zimmermann and his assistants test the shoes.

2:50

Narrator:

The first stop: the soccer field, where the nailed sole of the shoe also seems to hold up well.

3:02

Narrator:

Next to a more rigorous test in the forest. The shoes have good grip, but are they comfortable? There aren't many complaints after two hours once the muscles get used to the heelless soles. The test results: the caliga was the high-tech military boot of the ancient world.

3:26

Narrator:

Flavius had to rely on his shoes, especially when carrying 30 kilograms of equipment through the forests of Germania. Besides weapons and armour, he also had to carry tools, provisions and cooking equipment. So

the Roman soldiers were independent and could be ready for action at a moment's notice.

3:51

Narrator:

The limes along the border of Germania was a sophisticated fortification. First and foremost it was a highly effective control and communications system. Enemies were spotted from the watch towers and the information was relayed to others. During the night, torch signals were used to call for backup from the distant military camps.

4:15

Narrator:

Reliefs show the standard weapons of the Romans: the sword and the spear - the pilum. Attached to a one meter-long wood shaft is a similarly long iron rod with a four-cornered tip. Even ancient authors like Julius Cesar attested to the extremely high penetrating power of the pilum. And Alexander Zimmermann wants to put that on the test.

4:50

Narrator:

The pilum, like every other weapon, only becomes dangerous once it's used.

5:00

Narrator:

That's why the legionnaires carried out military drills every day.

5:07

Narrator:

The Fraunhofer Institute for Ultrafast Dynamics in Kandern. Modern weapon technology is normally researched here. But today the focus is on the Roman shield, which was made up of several layers of bonded wood covered by leather, fabric or felt.

5:25

Narrator:

The intelligent lightweight construction was extremely resistant. But was it a match for the pilum? Special slow-motion cameras were used to document the experiment by the millionth of a second.

5:41

Narrator:

Preparations are on the way for the first throw.

6:01

Narrator:

The pyramid shaped tip easily penetrates the shield. And Alois Staudhammer soon discovers that it's hard to pull back out.

6:12

Narrator:

And another try.

6:20

Narrator:

The throwing technique is perfectly captured in slow motion. The three-kilogram pilum hits its target at a flat angle...

6:31

Narrator:

...and then behind the mounted shell into another piece of armour. What were the consequences of a person getting hit by a pilum? The specialists can see that the long iron tip penetrated the shield easily. At the very least, there would be some bodily harm done. But what's even more fascinating is that because the heavy spear gets stuck in the shield, it basically makes the shield useless. The weight of the penetrated spear makes the shield too heavy to use for protection.

7:10

Narrator:

That was the Roman strategy. March in formation up to 20 meters from the enemy line, then prepare for the pilum volley.

7:28

Narrator:

For those who survive the spear, at least their shields become useless. Then out comes the short sword, which, with its short length, is ideal to use in formation. The enemy doesn't have a chance.

7:44

Narrator:

The Romans practiced special formations: the "turtle" was especially effective for example against attacks from above and sieges. But these formations only worked with unconditional discipline: Discipline - a word invented by the Romans.

8:01

Narrator:

Taking orders obediently in a clearly structured hierarchy, was how each legion was built. One-hundred soldiers made up a centurie, two centuries equalled a maniple, and three maniples were a cohort. Every legion had ten cohorts up to 6,000 men. The clear command structures were often a decisive advantage in the heat of battle.

8:37

Narrator:

And another thing is clearly regulated: when Flavus' and his troop were on the march, temporary fortifications were built every day to protect them from surprise enemy attack.

8:50

Narrator:

A Roman chronicler once wrote: "More wars were won with the spade than with the sword."

9:00

Narrator:

A tent crew, called a contubernium, was the smallest organized unit of the army. The eight men weren't only a fighting crew, but also shared a common household. They marched, dug trenches and prepared meals

together. Flavus was the best fire maker, a skill he had learned as a child in Germania.

9:28

Narrator:

Each contubernium had its own hand mill for grains. Since they were self-sufficient, the soldiers were relatively independent out in the field, which was a crucial military advantage. They often ate the infamous puls, a grain pulp mixed with any other available food.

9:55

Narrator:

Life out in the field was modest, but not in the fortified military camps, the castra. Once a region was conquered, a castrum was built according to standardized plans: be it in North Africa or in the Eifel, all Roman castra basically looked the same everywhere.

10:17

Narrator:

A golden statue of the emperor stood in the principia, which was the power center of every castrum. The enshrined heraldic flags, as well as the treasury, were kept safe in the standard's shrine.

10:37

Narrator:

The castra were the cornerstones of power in the provinces. This is also where the Romans stored their formidable long-range weapons: arrow ordnance and catapults.

10:51

Narrator:

The troops within the castra defended the area along the borders. If there was an attack from Germania, troops could be quickly deployed from here to defend the lines. Entire legions were stationed in camps like Mainz and Regensburg for the larger battles. These military bases gave rise to important cities.

11:15

Narrator:

Roman superiority was also aided by its military technology. About 2,000 years ago, the scorio was considered a high-tech weapon. Alexander Zimmermann recreated the arrow ordnance and is able to test its performance.

11:33

Narrator:

Using a winch, the bowstring is pulled back into position. The 120-gram arrow can hit its target dead on from a great distance.

11:47

Narrator:

The high-speed camera shows the the scorio's penetrating power of.

12:03

Narrator:

The shield is no match for the arrow and is only stopped by the supporting wall. Now Zimmermann wants to know what happens when it's shot at a Roman helmet.

12:19

Narrator:

After a few moments the weapon's ready to be fired again.

12:28

Narrator:

Does the person wearing the helmet even have a chance to survive?

12:39

Narrator:

The strong penetrating power is based on the weight of the arrow and the speed, over 50 meters per second. The psychological effect of the shot is also impressive, since the arrow's nearly invisible and silent when it kills.

13:00

Narrator:

Flavus has worked his way up through the ranks. As a scorio operator he's pretty much part of the elite crew now. The possibility of promotion kept the soldiers motivated, despite their 25 years of military service.

13:18

Narrator:

"Faster, higher, further." Zimmermann's team wants to see how far the scorio can shoot its arrow with an optimal angle and maximum tension. The experiment is conducted in an empty field, (but the assistants really want to make sure it's actually empty).

13:42

Narrator:

Over 200 meters. You could really keep the enemy at bay with a group of scorio operators. The tests have proven that the Roman's technical and organizational skills made them superior to any enemy – no matter how brave.

13:59

Narrator:

The giant Roman catapults were even more impressive and intimidating: a technical marvel and a further demonstration of supremacy. We're not sure whether Flavus was able to experience their mighty fire power before he completed his 25 years of military service. But afterwards he was rewarded with citizenship and a piece of land to further strengthen the Roman Empire.