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Jan Niemyski

THE *GLADIUS HISPANIENSIS* REVISITED — A SMALL SWORD WITH GREAT IMPLICATIONS

Abstract: The following paper discusses *gladius Hispaniensis* — the Roman short sword. It concerns the weapon's history of research, properties, manufacture, techniques of combat as well as the theories concerning the development of the weapon with the inclusion of known examples of *gladius*.

Keywords: *gladius Hispaniensis*, Roman sword, Roman army, Roman military equipment, ancient Rome

Introduction

The Roman civilization — the foundation of modern European civilization, a military power which, throughout its millennia long history rarely found its match on the battlefield, dominated its enemies in most of their encounters due to their ingenuity, adaptiveness and perseverance. Much of Roman military success can be attributed to one of the most iconic weapons in history — the *gladius*. However, throughout its 600 year history *gladius*, just like Rome itself, would change in its proportions and structure. The main focus of this research paper is the very first of the *gladius* family — *gladius Hispaniensis*, which can be dated from the third century BC to early first century AD. The weapon's history starts with the second Punic War — perhaps the most important conflict in the Roman history, for it would position the victor as the main and unmatched Mediterranean power. It is also around that time, when the Romans adapted the weapon used by the Celtiberian mercenaries, who were employed by the Carthaginians, based upon which they produced a sword to suit their needs and brought it to every corner of the Mediterranean [Fig. 1].

History of research

The very first mention of the term *gladius Hispaniensis* can be found in Livy's *Ab Urbe condita* (Liv. 7.10). However it is not Livy who would first describe the weapon itself, as that falls to Polybius' Book 6 of *Histories*, when explaining the sword's employment in the army in the second century BC, as well as some aspects of its manufacture. Livy would limit his comments to the employment of the weapon on the battlefield. It is important to note however, that Polybius in his work uses the general Greek term for sword *makhaira* and it was Livy who used the Latin word *gladius* for the first time in our written sources. While the two ancient historians are key to understanding the history of the weapon, it is the work of modern-day researchers to discuss its

properties, composition and employment in the Roman army. We would not know much about these if it was not for researchers such as Janka Istenić, who thoroughly investigated the weapons found in Šmihel (Slovenia);[1] Mike Loades, who put a lot of replicas to test in order to test their properties;[2] Adrian Goldsworthy for comprehensive study on the Roman army equipment,[3] with which we can summarise the data about the Roman sword and check it with the rest of the infantryman equipment throughout the ages. The study on *gladius Hispaniensis* would not be complete if it was not for the work of Fernando Quesada-Sanz, who managed to find possible candidates for the ancestor of the *gladius Hispaniensis*,[4] going so far as proving the entire history, which led to the creation of the tool with which the Romans carved their civilization.

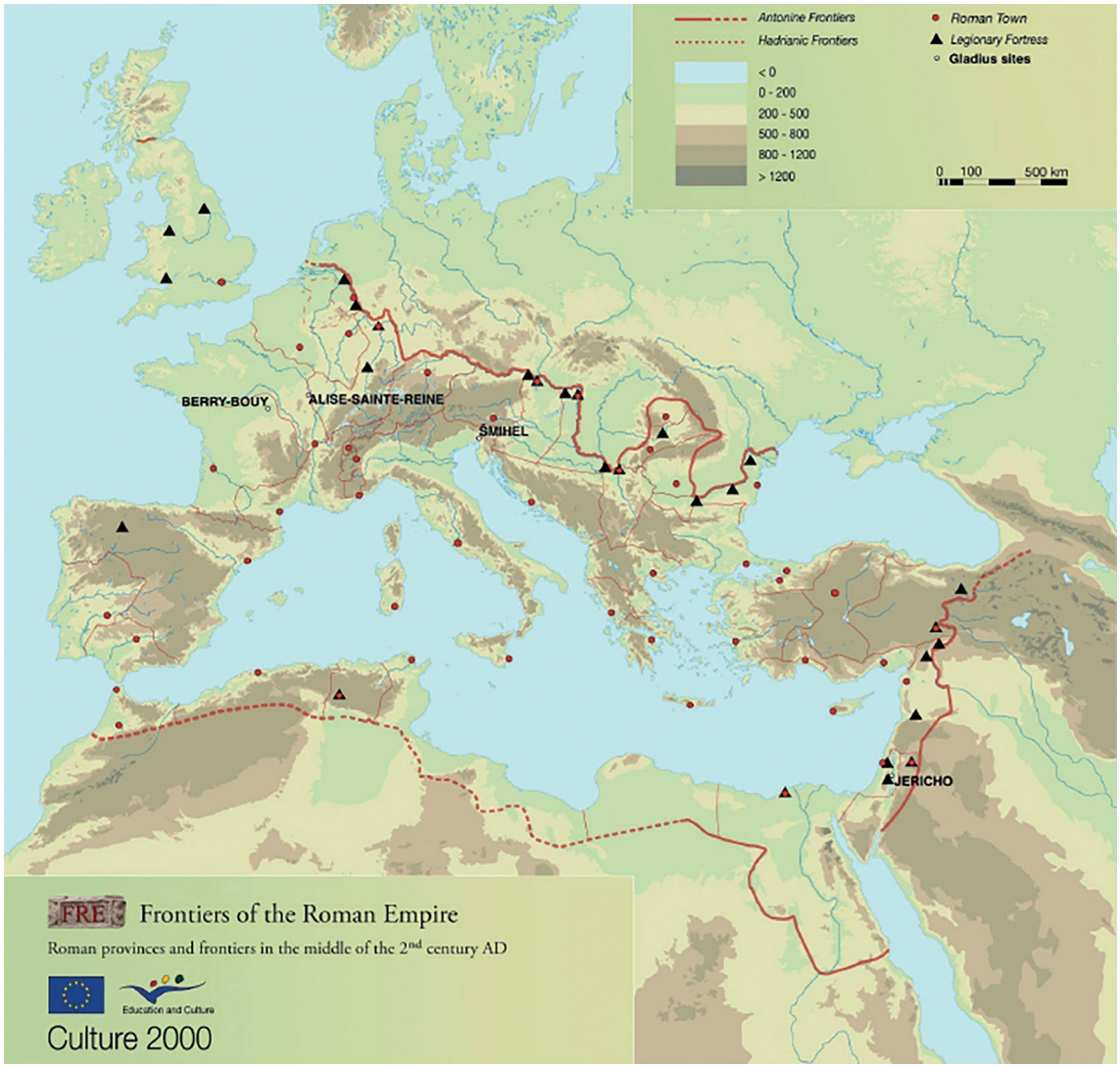

Fig. 1. Map with sites which contained *gladius Hispaniensis*
(adapted from http://www.museen-mainlimes.de/content/6-media/pdfs.en.php)

[1] Istenič 2019, pp. 30–40.
[2] Loades 2010, pp. 61–74.
[3] Goldsworthy 2003, pp. 118–140.
[4] Quesada Sanz 1997, pp. 251–270.

Roman military structure and equipment

Today the Roman army is associated mainly with its later, imperial appearance, with each soldier proudly standing in armour known as *lorica segmentata* bearing a heavy shield in one hand and a leaf-shaped *gladius* in the other. However, at the time when the Romans started using the *gladius Hispaniensis*, the army structure was much more complex. In his *Histories* (Polyb. *Hist.* 6.22), Polybius thoroughly describes the formation known to us as the manipular legion, divided into various types of units. First are the youngest conscripts known as the *velites* — the light, skirmish infantry. They hardly wore any armour with the exception of a bronze helmet known as the *galea* over which some of the soldiers wore wolven skins in order to let their officers know of their courage. The rest of their equipment included a shield, a sword and javelins. The *velites* are the only ones in the manipular formation to not use the heavy shield known as the *scutum*. Instead, they used a small shield measuring at most 90 cm in diameter (Polyb. *Hist.* 6.22). If we are to believe Livy, the sword employed by the *velites* is the topic of this paper — *gladius Hispaniensis* — but he is the only one suggesting this connection.[5]

The next unit were the *hastati*. Their name may be an implication that earlier they bore the heavy spears known as the *hasta*, however Polybius (Polyb. *Hist.* 6.23) does not mention any kind of spear as part of their equipment. Instead the *hastati* were equipped with a large shield (*scutum*), sword (*gladius*), two javelins (*pilum*), a brass helmet and greaves (*ocreae*). The *scutum* was about 76 cm wide and 1.2 m long (Polyb. *Hist.* 6.23) with an umbo in the middle in order to defend its wielder against projectiles such as arrows or javelins. The sword in question is dubbed by Polybius as the Spanish sword (*gladius Hispaniensis*) [Fig. 2]. Unlike in the image to which we are accustomed to nowadays, it hung in a scabbard on the soldier's right side, not the left (with the exception of certain officers such as *centuriones* or *aquiliferi* who wore it on the left side in order to promote their status[6]). Polybius also mentions that the sword was double edged and had an excellent point (Polyb. *Hist.* 6.23). Such description may lead us to believe that the sword could be used for thrusting as well as for cutting. The *pila* were the ingenious Roman javelins, which were supposed to decimate the first wave of enemies charging towards the Roman position. These weapons, due to their construction, were hard to use in any other way, which proves that at this point in history, the Spanish sword became the main weapon of the Roman infantryman. Polybius also mentions the armour employed by the *hastati* which is described as mail armour, worn by the more wealthy of the soldiers and known to us today as *lorica hamata*, adapted by the Romans from the Celts.[7] Otherwise the *hastati* would wear a bronze pectoral, covering their upper body, which they could not protect with their shields alone.[8] The defensive equipment of these soldiers was completed with a Montefortino type helmet — a common helmet in this area of the Mediterranean.[9]

The final types of units were the *triarii* and the *principes*, which Polybius does not differentiate based on their equipment. They were the most senior members of the army and the most distinct element of their equipment was them carrying a heavy spear (*hasta*) instead of a *pilum*.

After the Marian reforms of *ca.* 107 BC, the structure of the military changed, with a shift from a conscription-based army towards a professional one.[10] Now the legion consisted of a uniform type of soldier — the Roman legionary, with much more standardised equipment. The soldiers were clad in state-provided *lorica hamata* and sometimes the scale armour version, the *lorica squamata*.[11] In the early imperial times, a new type of armour would become popular

[5] Fields, Ó'Brógáin 2012, p. 41.
[6] Connolly 1998, pp. 395–396.
[7] Bishop, Coulston 2006, p. 63.
[8] Fields, Ó'Brógáin 2012, p. 31.
[9] Campbell 2013, pp. 418–437.
[10] Fields, Ó'Brógáin 2012, p. 21.
[11] Goldsworthy 2003, p. 127.

— the *lorica segmentata*, which was a bit lighter than the *hamata* weighing about 9 kg. It also put more emphasis on the protection of the soldier's upper body, while retaining the ability to be easily fixed after suffering damage during the battle, just like the *lorica hamata*. Adrian Goldsworthy points out that while the *segmentata* was able to deflect or stop projectiles and spears,[12] it possibly limited the soldier's movement as well as possibly restricted heavier breathing. All these armours put a lot of stress on the arms of the wearer, thus additional undergarments had to be worn in order to use the armour longer, with the exception of the *hamata* which could be tied with a belt to spread the weight a bit.[13]

The *gladius Hispaniensis*

The physical structure of the *gladius Hispaniensis* is very complex. This sword needed a perfect alloy for the blade, which the Romans found in steel — carbonised iron. But not any steel sufficed to make a good weapon. Generally, the more carbon steel contains, the better, for the material gets harder and more capable of holding sharp edges. However carbon also makes it brittle and more prone to breaking while hammering, which could mean that also upon hitting a piece of armour, the sword could break.[14] Pure iron could not be used for that weapon, for it is too flexible and instead of breaking, it could bend upon impact. During the early periods of iron-working, craftsmen mostly used bog iron ore, which was almost free of slag. Because slag has a higher temperature of melting (1200°C) than iron (700–800°C) it allows a smith to separate the two. Iron harvested in a bloomery hearth is in turn known as "wrought iron".[15] However it was hard to achieve the needed temperature to separate slag from iron, because of that iron had to be beaten into shape instead of being cast. Beaten iron is also much harder than cast iron.[16] The Roman smiths managed to forge objects weighing about 1–2 kg from a bloom of 3.8–6.5 kg which was enough for the army's purposes of forging arrowheads, *pila*, nails, swords or other objects, such as fittings.[17] In the case of the *gladius Hispaniensis*, various parts of a given weapon had a different microcomposition of steel used. A metallographic analysis of the Roman republican swords from Grad near Šmihel, conducted by Jana Horvat, Dimitrij Kmetič and Franc Vodopivec shows that the cross section is different to the blade's surface. The surface is richer in iron, for the presence of carbon is under 0.01% (soft steel), while the core has a higher rate of carbon, amassing to up to 0.3% (hard steel).[18] The microstructure also varies, as the core is composed of ferrite pearlite, while the edge is more ferrite meaning that the edge is softer and the core is much harder.[19] But the blade, while the most important, is not the only part of the sword — the hilt and pommel also were made intricately. They were made out of ivory, bone (mostly cattle metapodia[20]) or wood in order to not offset the balance of the weapon. Sometimes the spherical pommel was replaced by a trilobate pommel, however the handle would remain the same for all weapons, being ribbed in order to secure a better grasp.[21]

A given sword's measurements vary depending on the found examples. The ones found in Šmihel are the shortest, being at most 68 cm long, while an example found in Jericho is the longest found to date, measuring in total 76 cm.[22] The width of the weapons also varies greatly, for the Šmihel weapons it can be as narrow as 4.7 cm, however the sword from Jericho at its broadest

[12] Goldsworthy 2003, p. 129.
[13] Goldsworthy 2003, pp. 127–129.
[14] Loades 2010, p. 76.
[15] Williams 2012, pp. 12–13.
[16] Connolly 1998, pp. 92–93.
[17] Williams 2012, p. 16.
[18] Kmetič, Horvat, Vodopivec 2004, p. 294.
[19] Kmetič, Horvat, Vodopivec 2004, pp. 295–296.
[20] Greep 1989, p. 20.
[21] Loades 2010, p. 67.
[22] Stiebel 2004, p. 229.

point is about 5.9 cm wide, although its narrowest point measures 5.2 cm to broaden to 5.3 cm near the point.[23] Due to the Šmihel weapons not surviving completely intact to this day, we cannot be certain about their complete breadth, as only one of the cutting edges remained, but it probably did not exceed 5 cm at its waist. Summarising these examples, the *gladius Hispaniensis* measured 60–70 cm in length with some examples being somewhat longer, and were about 5 cm wide. Regarding the sword's thickness, the Jericho sword is 1.5 cm thick overall and 1.2 cm at the waist.

Two characteristic technical attributes of these weapons are the cross-section, which is always diamond shaped, as well as the sloped, round shoulders — a feature well visible on the *gladius* found in Šmihel [Fig. 3].

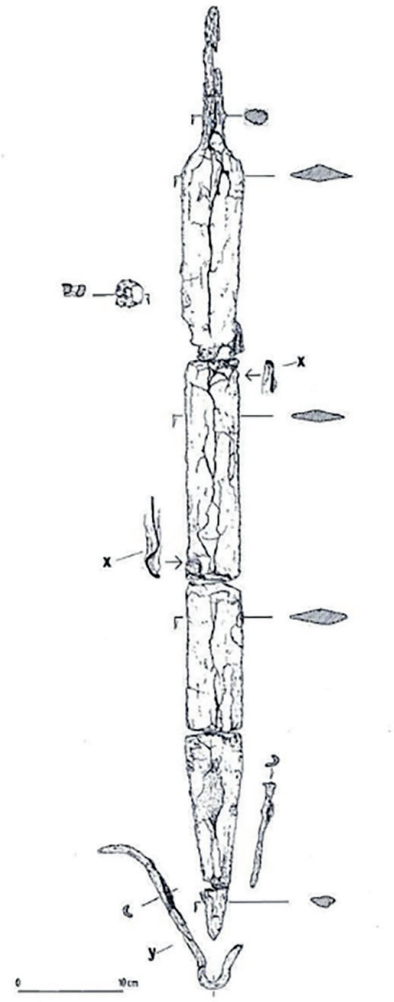

Fig. 2. *Gladius Hispaniensis* from Jericho with cross-sections of various sword's parts (Stiebel 2004, p. 229, fig. III.266)

Fig. 3. *Gladius Hispaniensis* from Ljubljanica. This object has very well visible rounded shoulders, as well as the waisted feature halfway through the sword's blade (Istenič 2019, p. 264, fig. A4.1)

[23] Stiebel 2004, p. 229.

Because of many *gladii Hispanienses* being found in poor condition, it can be sometimes hard to differentiate them from the celtic La Tène sword[24] with which it shares many similarities. While both weapons are very similar in structure, these two can be differentiated because of their scabbards. The scabbard of the Celtic swords were almost entirely made out of metal, while those of the *gladii* only had metal fittings on them, with the main body being composed out of wood.[25] One example of a *gladius Hispaniensis* scabbard was discovered together with a late-republican *gladius* from the Ljubljanica river [Fig. 4], preserved almost entirely. The scabbard is made out of maple or nut wood with traces of leather. It is composed of two wooden parts held together by a brass frame (copper with 14.9–20.4% zinc),[26] manufactured by joining together 5 to 7 brass pieces. The frame is joined by 8 crossbars with a brass chape with a terminal knob at its end.

Fig. 4. *Gladius Hispaniensis* in a scabbard from the Ljubljanica River (Istenič 2019, p. 264, fig. A1.1)

The suspension bands [Fig. 5] were attached with copper rivets at the back of the bands to the scabbard. The rivets did not go through and did not touch the upfront part of the band.[27] Most of the crossbars were created using a guttering technique with the exception of the two of them, which were made separately and soldered with a tin alloy. This "elongated" scabbard measures 65 cm total, which is characteristic for late-Republican *gladii Hispanienses*.[28] This feature can be

[24] Istenič 2019, p. 30.
[25] Istenič 2019, p. 30.
[26] Istenič 2019, p. 172.
[27] Istenič 2019, p. 270.
[28] Istenič 2019, p. 175.

also observed in the sword from Magdalensberg (65.2 cm) along with a similar structure of the scabbard. Both scabbards have another feature typical of Roman swords, which are loops for the suspension rings, which allowed the soldier to carry the weapon by his side. Overall this scabbard is very characteristic for a *gladius Hispaniensis* from the late-Republican period[29] including the use of brass, which the Celts were not able to manufacture and only worked with after melting down other brass objects.[30]

Fig. 5. *Gladius Hispaniensis*' scabbard's guttering with an iron ring (Istenič 2019, p. 270, fig. A3.1)

The manufacture of the weaponry varied depending on the period in the history of the Roman Republic. The production mostly took place in civilian workshops: Polybius notes that Scipio Africanus had the inhabitants of Carthago Nova work at the workshops "in order that there should be no lack of weapons for practice and for real warfare"[31] and there is also Cicero's account (Cic. *Pis.* 87), who mentions his father's weapon workshop. This would be subject to change in the imperial period, when it was the army and state-owned specialists that forged the military equipment. However, civilian workshops were still around at that time, as Mike C. Bishop suggests, for there are many private producer's stamps reappearing on some of the swords.[32]

Roman battlefield tactics

Throughout their history, the Romans used various tactics, which depended on different pieces of equipment. Before settling with the *gladius Hispaniensis*, their own invention, they experimented with other types of swords adopted from other cultures. As is commonly known, the Greeks had a massive influence on Roman culture in general and the Romans would also adapt Greek art and technology — sometimes enhancing it. The same applies to the military, for before coming up

[29] Istenič 2019, p. 273.
[30] Istenič 2019, p. 34.
[31] Polyb. *Hist.* 10.20.5.
[32] Bishop 2016, p. 46.

with the manipular legion, the Romans fought in the Greek phalanx formation.[33] Because of that they also used similar equipment. The Greeks used two kinds of swords — the curved *makhaira* and the straight, double-edged *xiphos*. The *makhaira* [Fig. 6], sometimes referred to as *kopis* (probably a word used to describe any curved sword, not necessarily a Greek one[34]), as suggested by its shape, was a cutting weapon. But it could also be used for stabbing because of its point. Xenophon recommended its use for cavalry, as its shape allowed for the cut to slide on the body of the enemy without the need to stab them from the rider's elevated position.[35] It allowed the charging cavalry to pass through the enemy units without the need to stop on them. This tactic and the use of curved blades by the cavalry would still be employed for many centuries to come even up to the twentieth century. The *makhaira* had an intricate construction, the blade being about 65 cm[36] long with the narrowest point being near the handguard. The cutting edge is on the inside and it broadens about ⅔ towards a very broad point. It then goes outwards until the tip of the weapon. The cross section is very uncommon for such a weapon, as it is in the shape of a wedge with a flat back. The end of the hilt does not have a pommel, instead the *makhaira* has an "L" shaped handle ending in order to prevent the hand from slipping during cuts. Such construction was supposed to imitate the movement of swinging an axe.[37] It was possible due to the fact that the front of the sword was heavy and outweighed the handle substantially.

Fig. 6. Greek *makhaira* from Paphos, Cyprus
(Museum of Paphos District, photo by J. Niemyski)

The other Greek sword — the *xiphos* — is completely different from the *makhaira*. While we may not be certain whether the numerous *xiphoi* found in Italy were Roman or not, we can be sure that Romans used them at some point, as we can find a *xiphos* depicted on an *aes signatum*.[38] This sword was straight, double-edged, measured up to 60 cm and had been a popular Greek and Macedonian side weapon. Its distinct leaf shaped blade can be found in later versions of *gladii*. The way it was supposed to be used was to thrust with the sword's acute point and strike with the broad part. This duality — the capability to both cut and thrust — is of course present also in the *gladius Hispaniensis*. Another characteristic feature of the *xiphos* were the tang and crossguard. The tang is very broad and the crossguard was put in place in order to prevent the soldier's hand from slipping onto the blade. Mike Loades suggests that the crossguard could have derived from Bronze Age Mycenaean swords and was meant to be held with one finger across it to secure a better grasp on the weapon.[39] As we know, the *xiphos* would not last for long in the Roman army. While both *xiphos* and *gladius* have a similar shape and both swords can perform cuts and

[33] Fields, Ó'Brógáin 2012, p. 11.
[34] Loades 2010, p. 43.
[35] Loades 2010, p. 43.
[36] Connolly 1998, p. 63.
[37] Loades 2010, p. 43.
[38] Bishop 2016, p. 8.
[39] Loades 2010, p. 33.

thrusts, the general usefulness of the weapons varies. As aforementioned, *xiphoi* were merely side weapons for the Greeks and Macedonians, as their main weapons were spears (Greek *dory* and Macedonian *sarissa*). Swords would only be used once the spear formation was broken apart. Loades also conducted an experiment with a *xiphos* to check its capability for thrusts. Thrusting it against an armour he found very "painful" because of the crossguard.[40] This means that such weapons could not be used for long, especially not after the maniple was introduced in the late fourth century BC, when swords became the main weapons.

In summary, the *makhaira* could not be used by the Romans because of its poor capability for stabbing and the incompatibility with the limited movement of an individual soldier in a tight formation employed by Romans. Similar problems to the *makhaira* can be assumed for its cousin, the Iberian *falcata*. The *xiphos* in turn, while capable of both cutting and thrusting motions, was too inconvenient for continuous use upon the field of battle as a main weapon.

Another family of swords which did not last in the Roman army were the Celtic swords. Polybius describes one of them in *Histories* 2.33. There, he mentions that the swords of the Celts were heavy and unsuitable for thrusts, for they had "no point". Another claim he made was that they were easily bent upon impact to the point of being bent "to the shape of a strigil" which rendered them useless until straightened (Polyb. *Hist.* 2.30.8–2.33.5). Dionysius of Halicarnassus (D.H. 14.10.3) mentions how they were easily "blunted or broken or no longer serviceable". Loades conducted an experiment during which he struck a wooden log with a replica of such weapon. After many strikes it finally bent and he had to straighten it out, concluding that the words of the historians could be exaggerated.[41] With this experiment he also contradicted the statement of Polybius (Polyb. *Hist.* 2.33.3) about taking a longer break to straighten the sword, for it took him mere seconds to do so. Of course, during battle, even the shortest of breaks could prove fatal to a warrior with an incapacitated weapon. The swords described by Polybius are today believed to be swords of the La Tène II period. Both the time period and the description match. La Tène II corresponds to the third–second centuries BC.[42] The length of the blade measured about 75–80 cm and the weapon weighted around 1 kg.[43] The weight around the cross section made it hard to defend with this weapon, and its length was the reason behind the sword's tendency to bend, which is not found among shorter weapons. The weapon could not have been employed by the Romans due to its incapability of stabbing, for these swords had blunt points. While later during La Tène III (120–50 BC) some pointed blades occurred, most still remained rounded or blunt.[44] As mentioned early, these swords were holstered in a scabbard made completely out of metal, on the right side of the body, with a unique suspension system. It had two rings attached to the back of the scabbard, which were suspended with an iron or bronze chain. The chain itself was attached to the belt with clasps. Most hilts of La Tène swords have an "X" shaped ending, a probable leftover from the Hallstatt culture antennae swords. These swords would not be used by Romans for two main reasons, The first of which being the length of the sword. It was almost impossible to wield them efficiently in a tight formation, especially considering the size and weight of a very heavy *scutum*. The Romans had no use for swords as long as these, being much more efficient with swords measuring around 60 cm. Another reason was the lacking stabbing ability of these weapons. While the *gladius* was capable of doing both, it was mainly used for thrusting with slashing being its "secondary" ability. Polybius notes that relying on thrusting attacks might have been the reason behind the Roman victory over the Celts at Telamon as they "instead of slashing continued to thrust with their swords [...] Thus, striking one blow after another on the breast or face, they slew

[40] Loades 2010, p. 32.
[41] Loades 2010, pp. 48–49.
[42] Connolly 1998, p. 116.
[43] Connolly 1998, pp. 115–116.
[44] Connolly 1998, p. 116.

the greater part of their adversaries". It is not until the first century AD, when the Romans would start using longer swords, known as the *spatha*, but the weapon would be limited to cavalry and employed by the infantry only in Late Antiquity.

As stated already, the reason for creating the *gladius Hispaniensis* was the necessity of having an appropriate weapon for the Roman formation. In formation, movements were restricted by both armour and the density of soldiers. Polybius claims that the Roman soldier covered merely "three feet in breadth" (around 90 cm) with the same distance between soldiers both in a row and between two rows (Polyb. *Hist.* 2.30). Such intervals would not allow for a full swing with a 60 cm sword. Adrian Goldsworthy, citing Vegetius (Veg. 3) claims that this distance could have been even smaller.[45] That does not mean however, that *gladii* were not used for slashing. We can find evidence for this practice in Livy, who mentions that the Roman sword was capable of hacking off limbs and body parts. In case of archaeological evidence, there are skeletons from Cerro de la Cruz and Valencia from the second and first centuries BC with limbs cut off by downward blows.[46] Bishop suggests that it might be due to the widespread use of torso armour which did not protect the limbs at all.

More commonly we find evidence for thrusts. The already quoted Polybius is one of the sources and another notion stems from Dionysius of Halicarnassus who stated that whenever the barbarians held their weapons high, Romans would deflect their strike with their shield and then proceed to thrust their swords into their groins. If the opponent wore any kind of armour, then the thrust would be directed towards the enemy's legs (D.H. 14.10.2). The built of the Roman Coolus and Montefortino helmets suggests that the Romans preferred a crouching combat stance during battle.[47] Vegetius, who arguably lived a few centuries later than when the *gladius Hispaniensis* was used, wrote that the Romans were drilled into using thrusts over slashes because these were more fatal and less tiring. It was also crucial for disciplined Romans to hold a tight formation without stepping outside of it, and for that reason they had to restrict their use of slashes, which required making a step forward. Vigillius suggests that thrusts were supposed to be quick and shallow, as shallow as "two inches".[48] Such attacks were also encouraged by the sword's construction. The round handguard did not make it painful for the wielder to stab their opponent, while the ridged handle prevented the hand from slipping and the diamond-shaped cross section allowed the weapon to pierce through the enemy's armour.

Origin of the *gladius*

The discussion on the origins of the *gladius* is still ongoing. Out of the weapons known to be employed by the Romans earlier, we can certainly discard a few of them as possible blueprints. The *falcata* and *machaira* were surely not predecessors of the *gladius* due to their construction — a curved, single blade with a "C" or "L" shaped handle does not resemble the *gladius* at all. One could argue that the *xiphos* could have been an ancestor of the *gladius*, however this does not seem too likely due to the lack of similarities between the tang of both weapons, as well as the *xiphos* having a cross guard. The aforementioned leaf-shape of the blade would not have been adapted by Roman swords until the *Mainz gladius*, therefore it seems unlikely that the *xiphos* influenced the *gladius Hispaniensis* in that regard.

Therefore the evidence points towards the Celtic swords. Etymologists suggest that the Latin word *gladius* itself could be of Celtic origin, since the Gaelic word for "a sword" is *klaydos*. This

[45] Goldsworthy 2003, p. 179.
[46] Bishop 2016, p. 36.
[47] Bishop 2016, p. 37.
[48] Loades 2010, p. 64.

can be further supported by the fact that in Latin there is another word for "a sword" (*ensis*), which could have been used for all swords in general, while *gladius* could have been used for this particular weapon. The full name by which we know this weapon today — *gladius Hispaniensis* — however obviously points towards the region, from which the Romans at least believed that it had originated.[49]

The *frontón* matches the *gladius* in its ability to cut and thrust, has a wide blade with a waisted section, however they do not match the chronology of the *gladius Hispaniensis*. This type of sword was scarcely used by the time Romans started using the *gladius*, with this weapon's prime being the fifth–fourth centuries BC. The fronton swords also have a different width to length ratio, as well as different, oval-shaped tang.[50]

Other candidates were the Celtic antennae swords, particularly the Arcóbriga type.[51] These weapons were, however, much too short in comparison to the *gladius*, being only 35 cm long with the longest known examples measuring 50 cm, which is still 10 cm shorter than the shortest known examples of the *gladius*.[52] This weapon also has a much different tang than the *gladius* — being an antennae sword with the characteristic "X" shaped handle. While this weapon was not the *gladius*' predecessor, it did have many similarities: the waisted blade capable of both thrusts and cuts with a similar scabbard composed out of leather and metal frame. These weapons also share a similar suspension system based on rings (although the Romans used four, whereas the Arcóbriga had only three).

La Tène type II are another group of somewhat similar swords, which fit chronologically, but — as mentioned earlier — due to their inability to thrust they could not be the *gladius*' ancestor. However, the La Tène type I swords had a long point and their duality in terms of use matches the Roman weapon. These swords in turn do not fit the chronological data, because by the time the Romans had met the Celtiberians, the La Tène type II was already used in Iberia.[53] There is also the matter of the scabbards — those for the La Tène swords were made completely out of metal. However, the aforementioned Arcóbriga, *machiera*, antenna sword and *frontón* were all placed in a scabbard similar to that of the *gladius Hispaniensis* — made out of wood, leather and an iron frame with rings as a suspension system.

All this data led Fernando Quesada Sanz to propose an evolution of the Celtic weaponry from the La Tène era into a local Celtiberian version and eventually a transformation of those weapons into *gladius Hispaniensis*, in a process that can be divided into three steps. The evolution began with a type represented by the sword from Quintanas de Gormaz (late 4th c. BC).[54] It has a scabbard made out of iron sheet with a characteristic suspension system. In addition to the Celtic loops, it also uses rings for the first time, which are attached to the scabbard by the means of two metal clasps. These rings are put only on one side of the weapon, for they were most likely attached to a baldric and not to the belt, as was traditional in Iberia at that time.[55] Afterwards only the Celtiberian suspension system remains for these weapons. The last step includes a sword dating to the third century BC, which represents the formation phase of the Celtiberian swords. The specimen found in the La Osera burial has a scabbard made with two metal clasps, but it lacks the metal sheet present in the earlier versions[56] with the rest of the scabbard being made out of wood and leather which decomposed. The rest of the sword's composition includes similar features to the La Tène type I: 60–70cm length, double edged, long point and a midrib, all of which correspond to the Republican *gladius*.[57]

[49] Polyb. *Hist.* 6.23.
[50] Quesada Sanz 1997, p. 255.
[51] Quesada Sanz 1997, p. 255.
[52] Quesada Sanz 1997, p. 256.
[53] Quesada Sanz 1997, p. 266.
[54] Quesada Sanz 1997, p. 263.
[55] Quesada Sanz 1997, pp. 255–256.
[56] Quesada Sanz 1997, p. 264.
[57] Quesada Sanz 1997, pp. 255–256.

Out of *gladii Hispanienses* examples we have, the earliest are the ones from Šmihel which are dated to the second century BC.[58] They share a similar structure with just a few minor differences. Both have sloped, rounded shoulders, a diamond shaped cross section and share similar materials, as well as similar technique of craft (wrought iron).[59] The Šmihel *gladii* reach up to 68 cm in length corresponding well with the Celtiberian sword which ranges between 60–70cm. The scabbards are also of similar construction, including the net-like fitting near the front tip of the scabbard, which was made out of brass. The upper body of the scabbard features two brass suspension bands which form loops for suspension rings.[60] We can observe a similar construction to scabbards from Magdalensberg, Kalkriese and Comacchio[61] which come later than the Šmihel swords. As mentioned earlier, the use of brass indicates that the craft is of Roman origin, because Celtiberians used iron.

The Romans would not stop perfecting their weaponry, eventually developing the *gladius Hispaniensis* into the *Mainz gladius*, which becomes shorter, measuring at maximum 60 cm in length and 4.5 cm in width.[62] Later examples of the *gladius Hispaniensis* such as the examples from Es Soumâa (118 BC)[63] or Delos (1st c. BC) show that the change was gradual.

Conclusion

The *gladius Hispaniensis* may have been an overall small sword, but it carried great implications. Livy claimed that the mere fame of this weapon was enough to win a battle (Liv. 31.34). The blade was made out of wrought iron of various compositions, with the edge being lighter and the core harder. It had a straight, simple tang, sloped rounded shoulders and long pointed, double edged, waisted blade. The entire sword measured 60 to 70 cm in length, 5 to 6 cm in width and about 1 cm in thickness. Due to the sword's primary function being thrusting, a round handguard was put in place, to make it convenient for the wielder. The handle was made out of light materials — bone, ivory or wood to not offset the balance of the entire weapon, which was finished with a round or trilobate pommel and had a ridged handle to secure a stronger grasp on the weapon. As mentioned earlier, the most important factor in deciding whether a particular weapon is indeed a *gladius Hispaniensis* or not is the scabbard, which was made out of wood and leather with a brass or iron frame and some fittings possibly made out of tin or bronze. The metal frame has two metal clasps with loops for rings in order to attach them to a baldric. An important distinction is a net-like fitting at the tip of the scabbard with a terminal knob.

As discussed, there were several candidates for the primary sword of the Roman army, but none could match the *gladius Hispaniensis* which was devised with the Roman battlefield tactics in mind. While the main emphasis was put on thrusts, it was able to deal cuts just as well — a feature not represented by many contemporary swords used by other cultures, such as Greeks, Macedonians or various Celtic cultures.

Unfortunately, due to the scarcity of artefacts, we cannot be certain about the predecessor of the *gladius Hispaniensis*. The most probable theory is the abovementioned one proposed by F. Quesada Sanz — that the *gladius Hispaniensis* evolved from the Celtiberian version of La Tène swords, for they have similarities in their shape, use, materials and scabbards. There is also the unfortunate scarcity of literary sources. Researchers, who study early Roman weaponry have only Polybius' account, for Livy wrote when the *Mainz gladius* was already in widespread use. For

[58] Istenič 2019, p. 32.
[59] Istenič 2003, p. 272.
[60] Istenič 2003, p. 272.
[61] Istenič 2003, p. 272.
[62] Bishop 2016, p. 11.
[63] *Ibidem*.

now, aware of the plausible theory of origin, more artefacts and new data should be hoped for in order to confirm, whether the two abovementioned swords were connected, or if we should look for the answer to the question of the *gladius Hispaniensis*' origins elsewhere.

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