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SÉBASTIEN LE PRESTE DE VAUBAN, THE VAUBAN APPROACH AND SLAVONIA

Sébastien Le Preste De Vauban, Vauban Yaklaşımı ve Slovenya

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Absrtact: This paper approaches Sébastiena Le Preste de Vauban as an individual who was a part of a group of professionals in King Louis XIV's France and analyzes elements enabling his actions. It also defines his influence on a group to which he belonged, in France, but in Europe of his time, as well. This paper especially highlights the trend he set when building forts and defining alternative routes and attempts at answers by rivals. In the end, the influence that the Vauban approach had on fortifications in Slavonia, Slavonski Brod, and Gradiška is presented.

Keywords: Vauban, fort, siege, military engineers, Slavonia

Öz: Bu makale, Sébastien Le Preste de Vauban'a, Kral XIV. Louis Fransasındaki bir profesyonel grubun parçası olan bir kişi olarak yaklaşmakta ve eylemlerini mümkün kılan unsurları analiz etmektedir. Ayrıca, zamanının Fransası ve aynı zamanda Avrupasında bağlı olduğu bir grup üzerindeki etkisini de tanımlamaktadır. Makale özellikle onun kaleler yaparken ve alternatif yollar saptarken belirlediği eğilimin ne olduğunu izah etmekte ve rakipleri tarafından verilen karşılıklar üzerinde yoğunlaşmaktadır. Sonunda Vauban yaklaşımının Slavonya, Slavonski Brod ve Gradişka'daki tahkimatlardaki etkisi sunulmaktadır.

Anahtar Kelimeler: Vauban, kale, kuşatma, askerî mühendislik, Slovenya

1. Story About an Individual

At the beginning of May 1633 in the village of Saint-Leger-de-Fourcheret, about 20 kilometers southeast of Avalon in the northern part of Burgundy, the first son of the squire Urbaina Le Prestrea, a small rural nobleman, and his wife Edmeé de Carmignolle was born. The parents christened the boy on May 15th in the village chapel and named him Sébastien. Urbain inherited a small portion of land in the village about 30 kilometers to the east, Bazoches du Morvand, which was bought by his grandfather back in 1555.[1] The land carried the name of Vauban, a name that the Le Prestre family took in order to mark their belonging and origins. However, it was small and meaningless in many ways, but it was perhaps the most that a squire from northern Burgundy could hope for. Little is known of how the days and years of the Le Prestre family went by during the next decade. On the other hand, the situation in which France was since their entrance into the Thirty Year's War in 1635 is much clearer. A young family of nobles could not escape the vortex of war which went on for the following 18 years.

While the war brought destruction, death, and horrors to many, it was an opportunity at a career and advancement to some. Precisely the chaos of civil war caused by the Fronde rebellion presented an amazing opportunity for social mobility – both upwards and downwards. The son of Urbain Le Prestre, Sébastien, is an example of a young man who joined the vortex of war with only 17 years of age. Growing up in the village, in humble conditions, the chances for

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[1] Jean-Denis G.G. Lepage, *Vauban and the French Military under Louis XIV*, McFarland 2009, p. 7.

advancement in society were minimal. However, a talented young man managed to gain certain predispositions and knowledges up until that fateful moment. He received his basic education from his parents and he was later sent to the Carmelites college in Semur-en-Auxois,[2] only about 30 kilometers northwest of his home village. A college of this kind served more to educate the local *gentleman* than being appropriate to enable a certain kind of staff or expert. Namely, Sébastien spent his time learning social and cultural manners while receiving real knowledge in languages, history, and mathematics was secondary. It is indicative that he had a reputation of a man with *poor manners* his entire life, while his *mathematical fumblings*[3] opened every door of society for him.

The young Sébastien Le Prestre de Vauban began his career as a cadet in the army of the rebel prince of Condé, the master of Burgundy. He ended up in the rebel camp more by accident than by personal beliefs – the geographic-political determination played a crucial role. Even though he had little knowledge in fortifications, even in the *Frond* army he began to express his interest in them. His first experience was taking part in projecting the defense of the Clermon-en-Argonne town in Lorraine, and he was especially noted in the siege of Saint-Menehould. The cadet Vauban received a promotion into a cavalry commander for his services. As commander, he took part in several military operations, several of which resulted in his wounding.[4]

The fortunes of war turned against the rebels in 1652 with the break of the Parisians and the arrest of cardinal Retz, while the prince of Conde, Vauban's supreme commander, deserted to the Spanish and left the remains of his army in shambles.[5] In the spring of 1653, the royal patrol caught the rebel cavalry commander, who negotiated the conditions of his surrender on horseback and with a gun in his hand. Hearing of this anecdote, cardinal Mazarin invited Vauban for a talk. It did not take long for the experienced politician to talk the young officer in whom he saw potential into serving a legitimate king.[6] Thus was born one of the pillars of the mighty military machine of Louis.

Vauban started his career of servitude to king Louis XIV under the command of the general, later general commissary for fortifications - Louis-Nicolas de Clerville. The experiences he gained serving *on the other side* proved to be vital because the first military action he was involved in was the siege of Saint-Menehould, the very same town he took two years prior. Knowing the town well enabled him to be noted in the siege, drawing Clerville's attention. After victory, Vauban was entrusted with the duty of restoring the damaged fortifications. The following year, he became assistant general and took part in the siege of Clermon-en-Argonne, a town which he himself helped fortify. The advantages of such a turn of events lead to Vauban being named *royal engineer*. With this new position in the army, he took part in many of the sieges in the French-Spanish war, where he was mostly in charge of repairing the damage to fortifications. However, the following year he was already noted by marshal de La Ferté and Vauban received a promotion to company captain for his regiment. And so, Vauban became a royal engineer, company captain, and an esteemed soldier for his superiors in only five years of his military service.[7]

With the Piece of the Pyrenees in 1659 and the death of Mazarin in 1661 a new phase in France began, but also in the life of captain Vauban. The state was at peace, the king reigned absolute, and the captain spent his time in the garrison thinking about the improvements to the

[2] J.-D. G.G. Lepage, *Vauban* and.., p. 7.
[3] This is exclusively about the level of mathematical knowledge he had at the end of his "formal" education in college. During his career, he perfected that knowledge to a very high level.
[4] J.-D. G.G. Lepage, *Vauban* and.., p. 8.
[5] Louis II de Bourbon, Prince de Condé. http://www.britannica.com/biography/Louis-II-de-Bourbon-4e-prince-de-Conde (accessed 5.2.2016.).
[6] J.-D. G.G. Lepage, *Vauban* and.., p. 8.
[7] J.-D. G.G. Lepage, *Vauban* and.., p. 9.

siege methods. At the start of 1660 he received a short leave to perform an arranged marriage to Jeanne d'Osnay, daughter of the baron Epiry. Sébastien and Jeanne had three children in marriage: a boy who died early, and two girls. Upon returning to Nancy, where his garrison was stationed, he received the task to bring down the city walls. This not so honorable task was another turning point for the young engineer – he drew the attention of king Louis XIV himself. By performing the task given to him by the king, Vauban received command of the company in the prestigious regiment of Picardie, bringing him significant revenue.[8]

At the suggestion of minister Colbert, Louis entrusted the renewal of the Brisach in Alsace to Vauban. During the construction, he became involved in the only scandal of his life – he was accused of attempting personal gain by overestimating prices. After a long trial, he was proven innocent in 1671, but the background of the affair is unknown to this day.[9] The important thing in the entire matter was the support he gained from Colbert and Louis XIV, clearly positioning him within the social hierarchy of France. However, the support did not come without a reason. In the war between France and Netherlands in 1667/8, Vauban became famous with his extremely successful sieges. The matter was all the more important because of the personal presence of the king, who rewarded his engineer virtuoso plentifully. Thus, the renewal of the fortifications of Lille, the most important newly acquired town of the Sun King was entrusted to Vauban. The controversy of this action lies in the fact that this task was supposed to go to Vauban's superior, who was also his mentor and the general commissary for fortifications – Clerville. Louis XIV agreed to go over his commissary at the benefit of the student, upon the insistence of the minister of war, Louvois. Although Clerville kept the title of general commissary until he died in 1677, Vauban was in charge of all the work and fortifications under the jurisdiction of the ministry of Louvois.[10]

In the following four decades, Vauban was involved in every war of his king, leading dozens of successful sieges and receiving honors and governorships. As the main royal engineer, he was responsible for the total fortification defenses of the great French kingdom. He invented the *pré carré* territorial system, a line of defensive fortifications protecting the *natural* border of France, on which he worked relentlessly. He brought the art of fortification warfare to a new level, setting a high standard which the other European forces could not match for decades to come. This was all possible due to his high position within the social hierarchy of the *most advanced* European state and the special personal trust he enjoyed from key people – king Louis XIC and the ministers Colbert and Louvois. In the case of young Sébastien, we may conclude that the war of the thirties, forties, and fifties in the 17th century were extremely beneficial for his social mobility.

The life story of this extraordinary engineer has an end that is not so glorious. Even though his work and reputation remained long after he died, he lived the fate of heroes *who live too long*. Namely, in the last war he was involved in, the last for his king as well, The War for the Spanish Heritage, he was pushed out by a young generation of ministers and commanders who did not appreciate the work of an engineer. Only Vauban's personal reputation and the respect he had with the king gave him legitimacy in the entire corps of engineers. Even though the king appreciated him, resulting in Vauban getting a promotion into *marshal of France* at the age of 70, sick and old, he represented a living *artifact* of past, glorious times. However, in that time and unfortunate war, only Vauban and Louis XIV remained of the *old guard* which built that powerful France war machine which now faced total annihilation. Sébastien Le Prestre de Vauban died on March 30th 1707, aggrieved, sick, and cast out by everyone but his king.[11]

[8] J.-D. G.G. Lepage, *Vauban* and.., p. 11.
[9] J.-D. G.G. Lepage, *Vauban* and.., p. 11.
[10] J.-D. G.G. Lepage, *Vauban* and.., p. 12-14.
[11] J.-D. G.G. Lepage, *Vauban* and.., p. 15-27.

2. Enabling Vauban

Reviewing Vauban's social rise and his work gives ground to understand the individual amidst the intertwined social groups of the 17th and the beginning of the 18th century and opens several questions about the creation of trends. Vauban was a small village nobleman, a rich marquise, cadet and captain, military commander, general, marshal, military engineer, architect, inventor, and social theorist (he was also admitted into the Royal Academy of Science in 1699). His social mobility is the result of his successful 50-year career. He made the biggest impact in the area of military fortification architecture and siege warfare, as a leader of the royal engineer corps. However, several elements influenced his creation, most of which surpass the basic abilities of an individual or a group.

The first element was Louis XIV: The king embodied the absolutist system oriented towards war in his person. During his 77-year long life, Louis XIV spent only 17 years in peace. The rest he spent in war with almost every state in Europe. The other element is France itself, a homogenous and great kingdom for its time. The potential in human and economic resources was vast, and the geographical position not so favorable. Surrounded by powerful traditional enemies, primarily the lands of the Habsburgs, France *asked* for an advanced system of defense in order to ensure survival. The third element is the human resources which influenced the development of France positively in many ways in the second half of the 17th century. With the break of Fronde, the power and the influence of the magnates was suffocated and commanders and capable individuals are now highlighted. We can place Vauban in the last category as an individual who managed to realize his social position using is craft. Apart from the individuals, it is doubtless that France had a summative human potential at the time. The fourth element is the art of war developed from the introduction of artillery and firearms. The old-fashioned fortifications became a nuisance and the new ones were extremely expensive and complicated. The result was that certain towns, regions, and magnates could no longer finance the building of effective defensive fortifications. Therefore, without the first two elements – an absolutist king investing extremely high resources into warfare and a powerful, large, and well-organized France, Vauban's achievements would simply not be possible. In Hegel's terms, Vauban was one of the final expression of the *spirit of the times* resulting in the creation of *Pré Carré.* His own capabilities, France, as well as the absence of competition from the enemy – the fact that no other European state of the second half of the 17th century managed to mobilize its own potentials like France did – simply *beheaded* every attempt by other rulers and engineers to keep up with the mighty Louis and Vauban.

The military supremacy of France was also owed to the talented military commanders such as Turenne, Condé, and Luxembourg, as well as the equally talented administrators – Colbert and Louvois, who enabled the infrastructure for war. It was they who ensured the money for soldiers, ships, cannons, supplies gunpowder, and fortifications. Vauban was half-way between military commanders and administration, taking part in the military actions but also organizing logistics and building forts.[12] He personally commanded the army only one time – in 1693 at Camaret. However, he had 53 successful sieges as a military engineer and worked on roughly 160 fortifications, which means that he made a larger defense project once every four months.[13] In most cases, his plans to improve fortifications and build new ones were generously, even ludicrously, funded by the government. The cost of building was extremely large: 76% of the total budget of France went to the military, and 17% out of that was only for Vauban's projects. In terms of numbers, Louis XIV spent up to 1705. 220 000 000 livres on fortifications.[14] Even though he was aware of the enormous costs and high taxes, Vauban would always decide on building a *larger fort with a few additional hornworks for good luck.* For

[12] Paddy Griffith, Peter Dennis, *The Vauban Fortification of France*, Osprey Publishing, 2006, p. 4.
[13] P. Griffith, P. Dennis, *The Vauban...*, p. 8.
[14] Saul David (ed. cons.), *War - From Ancient Egypt to Iraq*, London 2009, p. 152 - 153.

comparison, the Habsburgs, the greatest rivals of the house of Bourbon, barely managed to save their forts on the border with the Ottomans from complete destruction,[15] while the ones in Spanish Netherlands were in such a condition that they gave no strategic advantages or had any significant defensive function.

3. Discovering the Vauban Approach

Having in mind the background factors opening a great spectrum of possibilities to Vauban in building fortifications, we can ask what a *Vauban fortress* is. It is a notion which is leisurely *tagged* onto numerous (almost all) bastions of France and wider. If we start from the ground up, we can state that it is each fort designed and whose construction was personally overseen by Vauban. Taking into consideration the number of such forts, especially if we take into consideration the forts he only made modifications and improvements on, they can form a separate category and a style. Along those lines, UNESCO enlisted the Vauban forts on a world heritage list in 2008 according to four criterions of universal values. 12 complexes / fortified towns Vauban projected and personally oversaw were listed.[16] The second definition of the *Vauban fort* may be the one on which Vauban at least partially worked, projected some of its parts or it was built by his most trusted cooperators and/or students. This definition would encompass most forts in the area of France and Belgium of today from the second half of the 17th and the beginning of the 18th century. Similarly, but in an expanded manner, a *Vauban fort* may be defined as a fort built by the engineer corps Vauban founded and who faithfully continued their master's tradition up until the middle of the 19th century.[17] Perhaps no less legitimate than that would be to say that each fort following his style i.e. a *trend* set in fortification architecture would be a *Vauban fort*. Apart from the Vauban (French), we are familiar with at least the Dutch (old and new), Italian, and German styles. However, due to the influence and glory gained by Vauban, all forts of the bastion type are labeled as being *Vauban's forts* because he built them or, perhaps more importantly, he popularized the building of such fortifications from a micro-level to a general defensive system.

Such *popularization* lead to new trends in the art of war and, therefore, the 17th and 18th century are considered to be the classic period of fortification warfare. Siege war became a war of money and resources exclusively, and the purpose of the fort was to simply *buy time.* The goal was to defeat the enemy with long-term starvation. Due to weather limitations of possible military operations within the year, forts were designed to keep a large (and very expensive) army in place for as long as possible.[18] In this way, large scale decisive open field battles lost meaning because the fate of entire kingdoms were not decided within a few hours of combat any more. However, it is prudent to state that this primarily related to France and the wars it lead and that there was a significant difference between the way the Habsburg Monarchy lead the war on the Rhine or Sava or Danube. Large battles still played a key role in the southeastern part of Europe because there were only a handful of more significant forts.

[15] For the upgrade of Osijek and Petrovaradin, strategically very important places for the Habsburg Monarchy, into somewhat modern forts after they were liberated, it allegedly took around 300 000 Florins, an amount it took the Court two decades to collect. In the mean time, both forts were in a crumbling state and had to be satisfied by the fortifications on the level of wooden palisades. Mira Iljanić, Marija Mirković, „Prilog dokumentaciji o građevnoj povijesti osječke Tvrđe na prijelazu sedamnaestog u osamnaesto stoljeće", in: *Godišnjak zaštite spomenika kulture Hrvatske (4/5)*, Zagreb 1979, p. 98.

[16] More on the criterion and the Vauban determinations connected to the UNESCO at - http://whc.unesco.org/en/list/1283 (visited 6.2.2016.).

[17] Vauban trained a large number of engineers who were the key to spreading and understanding of his ideas after he died. The 18th century engineers and military authors had to come into contact with Vauban's legacy, whether in acceptance or rejection of it. In France, Vauban's legacy was tracked through the 18th century with very little variation. Back in 1840, at the dusk of the new military revolution, the French engineers asked themselves: "What would the great Vauban do?" instead of "How can we adapt to the future?" Jamel Ostwald, *Vauban under Siege*, Leiden, Boston 2007, p. 11.; P. Griffith, P. Dennis, *The Vauban...*, p. 31.

[18] J. Ostwald, *Vauban under…*, p. 17.

For the influence of his style, the so-called *Vauban trend*, the important characteristic would be the base in the form of an already mentioned advanced theoretical idea - *Pré Carré*. With a mere sequencing of forts according to the need of the time, by investing ludicrous amounts into their construction or by advancing certain fortification elements and style of construction would never reach such a high level of efficiency. The basis of the *Pré Carré* idea, which literally translates to *a squared meadow*, was in the organization of a total system of defense, which was revolutionary for the 17th century. Forts no longer served primarily to defend a certain town or area, an important trade route or large port, but they were built according to a pre-existing schematic which ensured the impenetrability of the territory of the state. An individual fort is no longer observed in isolation but in relation to other forts as well, thus creating a system in which the fall of one fort does not leave a lot of room for enemy advancement. *Natural borders* of France had to be additionally secured in key spots and where there weren't any (primarily in the northwest), a double line of forts was needed. In that way, Vauban hexagonally surrounded his king's land with fortified complexes,[19] surpassing traditional construction towards only current enemies or in currently necessary strategic places. France was a state with a plan and program of a wholesome and permanent state defense[20], protected from all sides. This system proved effective and impenetrable even in the darkest days of the reign of king Louis XIV when the allied forces beat his army and threatened to invade Paris. Eugene of Savoy, a virtuoso of warlords and the leader of the allied army got lost in the *Vauban network* and suffered defeat.

For a basic trend analysis i.e. a surface check of the possibility to define the *Vauban approach* as a wider European phenomenon which engulfed the space of southeastern Habsburg Monarchy as well, at least a principle and basic style of his construction needs to be set, as well as the potential competitive styles of the time. Given that Vauban did not give any particular attention to writing and thinking up a system,[21] a certain *Vauban* style may be deduced only by analyzing his actual creations. The lack of a written theoretical system of construction leaves a limited possibility of a more significant immediate influence on engineers in other states who had to witness the French fortifications first hand in order to be able to *keep up*. The greater possibility in this sense is presented by getting information second-hand i.e. from Vauban's followers who did write numerous tractates in half-way attempts to make their teacher's work *systematic*. However, immediate witness accounts are not to be neglected as well, because precisely Eugene of Savoy lead numerous sieges and battles attempting to penetrate the *Pré Carré*. He was one of the founders behind the idea to have a more organized fortification systems on the border towards the Ottoman empire, as well as a multiple accounts witness of the great need for a more capable engineering staff like France had.[22] With such a setting, the *Vauban* trend could have had three levels: construction of each single fort according to the principles used by Vauban, organizing a more complex system of defenses and the partial adoption of the *Pré Carré* idea, and the founding and greater reliance on the engineering corps and the engineer type siege war..[23]

[19] P. Griffith, P. Dennis, *The Vauban...*, p. 12.

[20] And, of course, rich enough to finance such an expensive project. One must never lose sight of the connection of elements enabling the realization of *Vauban* as we know him today.

[21] Even though it was thought that Vauban built his forts according to his "tripartite system", all the modern experts of today insist that he would never accept such a rigid patent of a fortification style. J. Ostwal, *Vauban under…*, p. 9.

[22] At the beginning of the 18th century, France had an entire generation of engineers *raised* by Vauban at its disposal, while the Allies relied on strangers who were often unstable, demoralized, and bad. This is also the time when the allied military commanders stopped immediately handle sieges which they let precisely to the aforementioned engineers. The best example of this is Eugene of Savoy who understood that he cannot follow the advanced fortification war trends himself, and that he lacked a quality engineer corps. P. Griffith, P. Dennis, *The Vauban...*, p. 40.

[23] During this entire period, there was a latent conflict between engineers and military commanders on the approach to a siege. The former promoted mechanics, mathematics, inertia, and rationality, while the later despised it as boring, without honor, glory, and heart. Military commanders looked for spirituality and heartiness, not science and mechanics. It was precisely Vauban who understood that he could foresee each phase of a siege , and reduced the

Therefore, how are we to determine the concrete style of fortification construction for Vauban? Firstly, he was a pragmatist and rejected each system born solely from studying (theoretical). His pragmatism was most apparent in the fact he used different variations of fortification elements according to the need of local conditions. He worked according to what he thought and felt was the best for a given state of affairs.[24] Secondly, one of the important characteristics of his style was in-depth defense, on a micro, as well as a macro, plan. On a macro plan that meant the creation of two lines of fortifications making up a double defense. In the case of an individual fort, he gained depth by adding outer standalone fortifications, especially hornworks and ravelins, or even advanced towers. This gave him additional flanking protection for each fortification, which significantly made enemy advancement more difficult. Apart from that, the fort had multiple *layers* – behind one fortification there was always another. This kind of practice of adding separate fortifications soon became widely expanded and soon *fortification clusters* took the place of an individual *enciente*.[25] Even though neither of these elements is an innovation by Vauban, the specialty of his system resides in the quantity of using them for adding a new effect. This segment was important for two reasons: the purpose of the fort was to keep the enemy there as long as possible and, by doing so, slow them down because, in the words of Vauban himself, "a capable attacker may take any fort, all that varies is the number of days in which he does so.''[26] He personally calculated that an optimally designed and organized fort should resist for 48 days.[27] The second reason is a generally accepted rule of war that a commander of a fort may declare surrender with no shame once the inner wall is breached and a practically pathways is created. [28] This is precisely how most sieges ended, with charges and resisting *to the last man* were a rarity. The conclusion is that in-depth defense *buys time* and slows opponents down when they are advancing ot the inner walls, which were the ultimate goal for ending the siege. Thirdly, the *Vauban approach* needs to be sought in even the most basic fortification solutions – individual elements. For instance, he built bastions to be *pleasant to look at* – they were not dull and enormous like the Italian ones nor precise and pointy as the Dutch, with the sides sometimes being flat and sometimes tucked in.[29] In the area of bastion building he made his greatest fortification innovation by designing the bastion towers. It was more advanced than the classic land-filled bastions because it had casemates and could serve as a standalone fortification which could continue to give resistance even when other bastions would fall or the nearby wall would be breached.[30] However, as a later innovation of his, the bastion towers made up a minority among the bastions of his creation. Using the casemates is one of the more doubtful items in Vauban's work. For instance, his final and most magnificent building, Neuf-Brisach[31], was filled by casemates – bastion towers, casemate redoubts within ravelins, casemates on inner walls etc. This would not be so strange if France didn't have a certain resistance towards casemates which were almost completely rejected during the 18th century by his very students as *smoky* and *German*.[32] This proves his flexibility and

defense and attack of every fort onto *double bookkeeping* where both the pillars were in perfect balance. The goal was to invent a military machine which would function on its own and with maximum efficiency. J. Ostwal, *Vauban under…*, p. 9, 11, 314, 318.

[24] P. Griffith, P. Dennis, *The Vauban...*, p. 24-25.

[25] P. Griffith, P. Dennis, *The Vauban...*, p. 29.

[26] P. Griffith, P. Dennis, *The Vauban...*, p. 36.

[27] Andrej Žmegač, *Bastioni kontinentalne Hrvatske*, IPU, Zagreb 2000, p. 15.

[28] Simon Barrass, "An Introduction to Artillery Fortification", u *Fortlet*, no. 1., 2011, p. 3-4.

[29] Christopher Duffy, *The Fortress in the Age of Vauban and Friedrick the Great 1660 – 1789*, Routledge & Kegan Paul, London, Boston, Melbourne and Henley 1985, p. 81.

[30] However, it was a lot more expensive than a classic bastion. P. Griffith, P. Dennis, *The Vauban...*, p. 21.

[31] The city on the border of France and Germany today, the building of which began in 1698 during the peace of Ryswick. Numerous corridors and casemates made its construction far more expensive than other, also strong, forts of similar dimension. 2 916 565 Lyre were spent on Neuf-Brisach up until 1705 alone. C. Duffy, *The Fortress…*, p. 84.

[32] The fact that French engineers asked for a certain dogmatism speaks plenty on the *conflicts* of styles and a search for authenticity and identity, and also the existence of significant differences in building forts among the leading

pragmaticism, but often also the elusiveness of the *Vauban approach*. When he approached the improvements of already existing forts, he preferred to add another enceinte and new towers or other standalone outer fortifications to add depth and complexity to the exiting line. He also mostly went away from the use of the old *fausse*[33] in the base of the main ramparts for the benefit of the *tenaille* [34] in front of the mantel and/or protected patrol passes. As the inventor of the *ricochet firing*,[35] an important ace in the siege, he tried to evade all open surfaces on the ramparts by adding additional mounds and dams which could absorb fire. [36]

Despite the readiness for the pragmatic adjustment to the local terrain and conditions, Vauban still relied on various standardized practices met in the majority of his fortifications, regardless whether they are in the meadows, mountains, or the shoreline. The most obvious practice was to build three-storied barracks for 144 soldiers organized around the central staircase. A story consisted of four rooms with four beds each. One bed was used by three soldiers divided into shifts of 8 hours each. Any number of barracks (or staircases) could be continuously built in order to provide lodging for the needs of the garrison. These barracks were built in the foothold and parallel to the outer mantel, which meant that the soldiers lived as close as possible to their place of work.[37] Along with the standardized barracks, Vauban used a similar practice in building and designing squares, gunpowder stockyards, and even churches within forts.[38] Even though they aren't fortification elements in the narrow sense of the word, these buildings enabled the total functioning of the fort. They also spoke a lot about Vauban's attitude towards the military crew and their relation to the fort itself. Here, with a slight digression from the narrow subject of fortifications, I would like to mention Vauban's management of human resources. The soldiers had to be disciplined professionals, as separated as possible from civilian population and dedicated to matters of war. As an inseparable element of the fort, the role and use of soldiers in defense often varied. The widely accepted practice was that the soldiers defended the obscured procession, which was most often the highest defensive line. Even though their gunfire was of secondary importance compared to the rear cannon fire, it was very important to maintain a strong defense on this line to prevent a charge or quick advancement by enemy miners. The more problematic was the role of the soldier in the defense of the main walls, where there were several approaches. However, even though he sometimes used the *tenaille* as a station for soldiers and/or built a patrol line on the main walls, he mostly completely moved the soldiers from the frontline and hid them behind the main walls or in casemates, where they readily waited to repel a charge.[39] This was the more significant step back from the conventional approach which often used soldiers in active defense. Even though each kind of defense demanded a high number of infantry, this item relates to the usage of soldiers as cannon fodder. Vauban was extremely considerate to his soldiers and tried to minimize bloodshed in both defense and attack.[40] His work generated war which spent

powers of Europe. This goes to the benefit of the thesis that one cannot simply ascribe the term *Vauban* to each bastion fort of the 18th century.

[33] The lower outer ramparts which were between the main wall and the mote served as a double wall. Stephen C. Spilteri, "Illustrated Glossary of Terms used in Military Architecture", in: *Fortresses of the Cross*, Malta 1994, p. 9.

[34] Small outer fortification placed within the mote and between two bastions. It served to protect the main wall and it was mostly standalone. S. C. Spilteri, "Illustrated...", p. 15.

[35] Vauban invented the ricochet firing and first used it efficiently during the taking of the Ath fort in 1697. By reducing the charge, he gained the jumping effect with cannonballs, which he used to *jump over* hideouts and attack the defenders in an enclosed procession and main ramparts. In only six hours, he *cleared* the enemy from those key defensive positions. C. Duffy, *The Fortress...*, p. 30.

[36] P. Griffith, P. Dennis, *The Vauban...*, p. 24.

[37] This was a significant departure from the usual practice of placing soldiers with the local population and a way towards the professionalization of the standing army.

[38] P. Griffith, P. Dennis, *The Vauban...*, p. 48-52.

[39] P. Griffith, P. Dennis, *The Vauban...*, p. 40.

[40] Time, money, and life are the materials of war. However, Vauban placed the lives of his man as the most important with a statement that "a siege may be considered successful only if those who lay the siege had fewer losses than the besieged". When talking about the defenders, the situation is different primarily because the defense had a more

maximum amounts of money and minimum amounts of human life. Due to that attitude and approach, he came across harsh criticism of military commanders, war theorists, but also rival engineers.[41] It is also important to, along the lines of managing human potentials and setting priorities, look at Vauban's relationship towards fort builders and construction financing. Some data on the amount of money Louis XIV spent on the costly forts of his engineer has already been stated, so the look will be limited to the micro level in this instance. Vauban had a firm attitude that payment must be fair and regular in order to attract capable and expert workers who were the only ones who could execute the necessary construction feats with quality and speed. The lack of sufficient starting funding, reducing pay, breaking the deal and elongating work ultimately lead to a low quality of the building and far greater total expenditure because poor materials and *desperate men* were used who were forced to work in poor conditions. Low quality caused continuing additional expenses which would have been avoided had quality work been used from the start – therefore, Vauban's theory was that "the greatest value you can find is to give honest compensation to the performer fulfilling his duties".[42]

Bearing in mind all this, what would be that distinctive characteristic of the *Vauban approach*? To describe the *elusive* in short, it is best to start from the fact that a Vauban fort was part of a whole, with a clearly defined passive and active role.[43] That fort is maximally adapted to given local conditions, whether they be geographic or existing fortifications and/or town. In-depth defense is highlighted and, therefore, it has a complex system of outer fortifications. The bastions are numerous, usually filled with land or casemate towers, under a 75 to 80 degree angle, and the *fausse-braye* was left out for the benefit of the *tenaille.* The weight of the defense was on artillery, while the soldiers were often in the back and kept for repelling the charge. Despite that, special care was taken for maximum quality soldier covers to avoid the greater erased surface on the fortifications. The construction itself was carried out by experts and they strived for a high level of quality, efficiency and *baroque* – the price was tertiary. The inside of the fort was standardized according to military regulations, depending on barrack blocks, protected gunpowder stockyards, a parade square, and key administrative buildings in the center. All of the elements stated were subject to numerous variations, so this list is truly superficial, lacking and needed – superficial because numerous more or less important elements are missing, as well as statements of specific fortifications and certain solutions, lacking because a generalization without a satisfyingly high percentage of alignment with facts is

favorable situation regarding life safety, but ultimately an unavoidable fate – they had to lose. Therefore, the defensive rule was "to hold out as longer as possible with as few losses as possible". J. Ostwald, *Vauban under…*, p. 48-53.

[41] Here I would place the quote by Carl von Clausewitz who clearly depicts the ones who criticized Vauban: "We are not interested in military commanders who win without human blood. If bloody slaughter is a scary sight, then that should merely be an encouragement for wars to be taken more seriously...". Carl von Clausewitz, *O ratu*, Školska knjiga, Zagreb 2010, p. 187.

[42] Vauban's letter to minister Louvois on honest prices, sent July 17th 1683 (http://www.tallbridgeguy.com/2012/02/15/sebastien-le-prestre-the-marquis-of-vauban-1633-1707/, accesed 12.2.2016.).

[43] Carl von Clausewitz elaborated on the theory of the passive and active roles in his famous work *On War.* Even though he was a big proponent of great battles in the open, by criticizing the *calculated approach* which ruled up until his time, he gave a *sober* description of the role of the fort. Clausewitz's theory on war and forts is one of the bases of this paper because it gives a view of the problem from another, but a very important, angle – one from a Prussian military commander from the beginning of the 19th century. By using his work, I gain a step back from the 17th and 18th century French discourse, as well as the modern interpretations and papers of the experts from the English and German speaking area. One could raise the question of how does Clausewitz's theory fit into the *Vauban* fort? The answer is simple – the Prussian elaborated in his work what the Frenchman created: "This again had to lead to the idea that forts were meant to immediately protect civilian populations and their property according to the other idea that forts are a *mediatory* protection of the land which is derived from their strategic meaning as means of holding the strategic fabric." C. v. Clausewitz, *O ratu*, p. 308.

drawn[44], and needed because it gives a basis for comparison – it is a step further from prescribing the epithet of *Vauban* to each *mighty* bastion fort of the 17th and 18th century.

4. Defining the non-Vauban and Rival Trends

Apart from what is the *Vauban approach*, the *non-Vauban* must also be identified. It would be simple if we determined that everything that is not *Vauban* may be *non-Vauban*. However, due to the uncertainty of the *Vauban approach*, the numerous elements taken into consideration, potential direct and indirect influences etc., we may conclude that almost every larger fort has something of the *Vauban approach*. Furthermore, very few forts are determined by their *purity*, even the biggest achievements by Vauban. The always problematic fact is that Vauban was not as successful in innovation as he was in popularization. Therefore, the source remains outside of the category which makes identification of the genesis of a certain fort more difficult. A typical example is the elementary bastion fort invented by the Italian builders back at the end of the 15th century.[45] This first *renaissance* style of construction became rather influential and had numerous followers and theorists.[46] The most famous example of such a fort in Croatia is Karlovac.[47] In France, the leading followers in the area of bastion forts were Blaise de Pagan, Antoine de Ville, and Jean Errard. Most elements he used in his projects, Vauban took precisely from their work.[48] However, the way of adapting existing elements into a logical and homogenous whole gives specialty and recognizability. Therefore, we cannot say that each bastion fort is a *renaissance* one, nor that Vauban's forts are *Pagan's*, even though they were the followers of them. Alas, we must not state that all forts which were built after or during Vauban's time are *Vauban forts*, even though they preceded Vauban's forts, inspired them and/or set a need for them. For example, we may state that the Dutch, between the 17th and the 18th century, built *Vauban forts*, if we take into consideration the fact that one of Vauban's engineers went to work for them in 1678,[49] that they had a complete breakdown with their former forts and that they *turned the page* and increased the expenditure for fortifications significantly and started to apply new, contemporary, even successful methods. The fact is that Vauban set very high standards in the art of war by the way he built (as well as the money he received), and primarily by his innovative techniques of attacking forts, which directly threatened the national security of Netherlands. By doing so, he set a trend and started a reform of the Dutch school of fortification building by pushing them *into the fire* and a battle for survival. However, despite a direct influence by Vauban, the war and the border to France, by laying siege to *Vauban* forts and by being besieged by Vauban himself, the Dutch developed an authentic style of fortification building embodied in the person of Menno van Coehoorn. Therefore, the Dutch did not make *Vauban*, but rather *Dutch* forts by following the French trend of high standards. The high standards of fortification war significantly hit the Germans as well, because they had significantly worse forts with a complete lack of capable engineers. Although heterogenous and technically lacking, the small German states were characterized by a certain style of building decorated by roughness and favorizing certain elements with a common lack of

[44] Due to large variations in his work, various solutions and a high degree of pragmaticism, trying to tie everything down to a single common denominator is an ungrateful task. However, it is possible to read out certain elements which exist in his work in several places.

[45] As the first possible example of fortifying a city with a bastion system, Žmegač states Firenzuola in 1495. The following decades were the time of various individual solutions, searchings, wanderings, and gradual forming of what was confirmed as a new way of fortification in the 16th century. A. Žmegač, *Bastioni*..., p. 14.

[46] The bastion style of construction spread through Europe during the 16th century because of Italian builders. However, the new technical and shape solutions were already used there and were adapted to the conditions. Even within Italy, certain parts varied in their affinity to accept and develop this new way of fortification. A. Žmegač, *Bastioni*..., p. 14.

[47] John Harris takes his to be an example of an *ideal city* of renaissance middle Europe. In the Habsburg Monarchy of the 16th century, most builders were Italian while the local engineers often resisted such practices. John Harris, „Karlovac: the Renaissance Ideal City in Central Europe", in: *Fort*, vol. 38, 2010, p. 56, 63.

[48] J.-D. G.G. Lepage, *Vauban* and.., p. 65-73.

[49] C. Duffy, *The Fortress*..., p. 13.

lucidity. Their adaptation to new standards went two ways – importing French or Dutch engineers and making new *mix*. Apart from the principal identification of basic fortification paths in the wars of Louis XIV, one needs to say something more about each of those. The area of the border between the Habsburg Monarchy and the Ottoman empire will be left for last, as the final goal of *testing* the aforementioned trends in building style.

Let us start with the *big* rival, Menn van Coehoorn. The Coehoorn family emigrated from Frankfurt on Maine to Netherlands in the time of Wiliam I, and Menno was born in March of 1641. He got his education from a private tutor and joined the infantry regiment of his father with a rank of captain when he was eleven. He showed a special interest in mathematics and military drawings during his stay in the army and was noticed in science in his early days. However, it took him a long time to get a chance to show his true talent in the area of military engineering. The thirties and forties of his life he spent as an infantry commander, observing the crumbling of the defense system of his country and the general incapability of allies in laying siege.[50] It took him several years of dedicated work to set himself up as the natural successor to foreign experts, especially the Huguenots who flooded the Protestant Europe after 1685. He started his career in siege warfare only in 1689 by taking command of the siege of Bonn. The great elector of Brandenburg was impressed by the engineers abilities and offered him the place of general, which Coehoorn refused. The reward for servitude and loyalty came in 1691 when Wiliam III entrusted him to restore the complex of Namura. It did not take long for the allies to see the great importance of capable engineers and Coehoorn received a series of important titles and acknowledgments in the following five years. What is important for this paper is the fact that he was assigned to work on refortifying the state, which he did at the turn of the century. However, the years when Coehoorn was in a position of power were short – in 1702 his king died, which practically meant the end of his career. Only two years later, he died almost in poverty.[51] Despite that, in a short time when he enjoyed authority, he gained glory in Europe and had a strong influence on fortification warfare, even though it is unjust to compare him to Vauban in regards of numbers.[52] The way we can definitely compare them is by their style of constructing forts, tracking, and creating trends. The basis, in this case, is their immediate relationship, setting of challenges and the finding of solutions. The matter, then, may be set in this manner: advanced Vauban forts set a high standard for defense and the Dutch responded, when attacking, by *a la Coehoorn*; *a la Vauban* set high standards during siege and the Dutch responded with a *Dutch* style of building forts. *A la Coehoorn* was the first way of laying siege which was effective in taking Vauban forts so the taking of Namuro in 1695 was a great shock for the French and a blow to Vauban and his reputation – the enemy easily took a stronghold of his. This is precisely the title Vauban gave for a *crazed* frontal charge on the fort because Coehoorn used it often during his attacks. Unlike most generals relying on charges during sieges, Coehoorn knew exactly how to prepare and set up that charge.[53] Apart from the charge, this style of attack was marked by well coordinated bombing for the purpose of breaching the inner wall and breaking the defender's morale. Personally, he was a great opponent of bombing towns and he directed the bombing to fortifications by using his authority in a time when spectacular and non-selective bombing was rooted in the practice of northern Europe. One of the reasons why Coehoorn used such a style, unlike Vauban's mote approach, is the fact that the soldiers he had at his disposal were largely Germans, *incapable* in all matters regarding fortification warfare. Besides, the Frenchman enjoyed unlimited authority when forming sieges while the Dutchman had heterogenous troops of various princes at his disposal.[54] Along with successful sieges, a successful engineer corps must also be observed. Prior to Coehoorn's time,

[50] The Dutch forts during the war of 1672 were in a catastrophic state, even though the state had money. C. Duffy, *The Fortress...*, p. 8.
[51] C. Duffy, *The Fortress...*, p. 64.
[52] Vauban had a far better patron and a service record which was several times longer.
[53] P. Griffith, P. Dennis, *The Vauban...*, p. 36.
[54] C. Duffy, *The Fortress...*, p. 65.

Netherlands had a practice of hiring a large number of engineers at the start of each war and to disband all survivors at the end. Coehoorn introduced a large number of engineers into his service and managed to keep them during peace time, creating an engineering *establishment* on the other end, as well. France directly influenced this practice because the allies say the superiority of Vauban's engineers and a great handicap of not having capable engineering corps to rely on themselves. These elements are part of a *Vauban* trend to which the Dutch successfully responded. However, the central theme of this paper is the construction of the fort. Coehoorn, as the main engineer who modernized the Dutch school and built forts on the level of Vauban's, had somewhat different visions and solutions than his French rival, as was the case in laying siege. According to Christopher Duffy, Coehoorn's principles in building forts may be summarized into the following: 1. A mighty close-quarter defense made by hollow redoubts, land *fausse-brayes* and double bastion wings to give a continuing crossfire; 2. Active infantry and cavalry defense; 3. Digging additional levels of more narrow moats; 4. Economic building – Coehoorn stated that his forts took two thirds of the materials needed for the French construction and that they are also at least the same in their fortification and quality.[55] While Vauban relied on in-depth defense and building outer fortifications, Coehoorn thought that those fortifications are useless, too expensive to build and maintain and that they dangerously erode the defensive potential of the defender. The hornworks, which Vauban especially liked, he criticized because of the small number of cannons which could be carried by his half-bastions and the long portions exposed to enemy fire. The role of such hornworks and crownworks he saw primarily as frightening the enemy, not objectively strengthening the defenses. He also highlighted that such outer fortifications were also very often counterproductive because the soldiers defending them had extremely low morale,[56] while their fall meant the taking of cannons and materials by the enemy. On the other hand, Coehoorn transferred the weight of defending his own forts to an obscured procession and motes, some of which he left dry and some he filled with water. The enemy received fire from his fortifications by a combination of frontal and sideways fire during the approach to the procession, outer additions and the main ramparts. The enemy could not track the activities of the crew of the fort which enabled the crew to effectively lay fire on the field and to suddenly come out on the esplanade to fight in front of the fort. Coehoorn was not rigid in his application of principles, nor was Vauban, but rather attempted to adapt them to the conditions on the field.[57] For instance, in most of his works he had to settle only on strengthening the existing forts because speed and economics were of vital importance due to the constant expectance of war. In these conditions, he used the *tenaille* and outer fortifications which he despised in his tractates. Bergen op Zoom was the only new, first-class fort,[58] which he adapted to the demands of the field maximally. He used a combination of massive hollow and pointy bastions of a 50 to 120 degree angle, connected curtains with a *fausse-brayen* in front where the ravelins were. The space between the ravelins and the bastion was further enforced by a casemate redoubt, and it was all together followed by a spacious obscured procession, a system of canals and glacis. The application of these fortification elements meant that Bergen op Zoom was significantly different from Neuf-Brisacha, perhaps the most representative Vauban fort built in the same time. The difference in their styles was conditioned, apart from a division in the theoretical approach, perhaps mostly by a different terrain and materials available (money, time, manpower, and construction materials). Numerous factors resulted in reforms in the Dutch school and the creation of a new, authentic style of fortification construction.

[55] C. Duffy, *The Fortress...*, p. 66-69.

[56] There was a general resistance with soldiers against such fortifications because the soldiers were placed in such positions that they had a feeling they were left *out to dry* or sent as a sacrifice. Such a negative morale could mean that the defenders would retreat without giving significant retreat. J.-D. G.G. Lepage, *Vauban* and.., p. 115.

[57] Some of Coehoorn's fortification achievements are:: Nimwegen, Namur, Gröningen, Breda, Mannheim, Zwole, Naarden, Bergen op Zoom etc. Josip Kljajić, *Krajiške tvrđave na Savi u 18. i 19. stoljeću*, Zagreb 2001, p. 78-79.

[58] C. Duffy, *The Fortress...*, p. 64.

After Coehoorn and the Dutch, I would like to shortly address the Germans. The larger and smaller forces of the Empire had a significant number of authors in the field of fortification architecture, as well as a large number of practical engineers and gunners. However, none of them was an equivalent to Pagan, who would transform most of what was useful of old innovations into a new harmonious whole. So, they came into the era of Vauban in an out-of-date chaos. They inherited bastions from Italy, and the *fausse-braye* from Netherlands (which they continued to use even after they went out of style in their own country). Apart from bastions, they also imported the *tenaille* direction of construction from Italy, which soon became *German* considering the dose of enthusiasm they used in that area. The *teinalle* path was the simplest of all and consisted completely of straight ramparts connected in a zig-zag manner (thus making a sharp star shape). The advantage of this was the fact it was extremely cost-efficient and that it gave an efficient manner of defense against direct assaults, but it was the most vulnerable to side fire. The elongated faces ending in a point deep in the area of fire were an easy target for the siege in which the enemy could completely destroy the ramparts in less than a day of bombing by setting batteries parallel to the face.[59] Another one of the German specifics was an attempt to improve the system of inner defenses, primarily by applying casemate galleries the French experts thought to be non-functional.[60] However, geometry and theories were worth little in the case of Germans because there were no political conditions to create an effective defense system, like in the case of France and, to some extent, Netherlands. Taking Philipsburg and Kehl out of consideration, all forts were directly maintained by the towns or local princes. The fact that Louis XIV ensured unlimited resources to Vauban lead to the fact that all small local and regional players were out of the game. The small German states attempted to respond to Vauban in various ways, but their attempts were futile. The example of Würzburg draws a dimension of the problem – they built their defense against the French with the same intensity as against Bavaria and the Protestant states. His bishops were prepared to spend extremely high sums on ramparts made from beautifully ornamented stones, rustic doors, baroque portals etc. The result was the creation of forts such as Rothenberg, the high white walls of which are imposing and insane in a military-tactical sense.[61] In another case, the Palatine elector received plans to build forts by foreign engineers and literally applied them with no regard to the nature of the land. The consequence of such an approach was the fall of the Palatine forts against Vauban within 36 hours.[62] The three leading forces of the Empire started to advance their fortifications slowly, at the beginning of the 18th century, primarily under the direct influence of the French and Dutch engineers. The Huguenots, chased out of France in 1685, were often the axis of engineering in German countries, while the Dutch influence spread based on alliances in the wars against Louis XIV. The case of Bavaria is special. In the War for the Spanish Heritage, it decided to ally itself with their *mortal* enemy and got Vauban's engineers as a rewards for their service.[63] However, it would take decades for Prussia, Bavaria,

[59] Forts such as these were often built as smaller objects in front of the main fort, which is the case in several Prussian forts of the first half of the 18th century such as Magdeburg, Settin, Glogau, Neiss etc. Grzegorz Bukal, "Prussian Star Forts in the 18th Century", in: *Fort*, vol 39., 2011, p. 3

[60] The main ramparts consisted of a series of casemates on one or several floors which housed cannon batteries and they were protected from a direct assault using counter-guards and other outer fortifications. This way, the entire defense system was founded on the principle of opening as hard of cannon fire as possible from the casemates. J. Kljajić, *Krajiške...*, p. 84. Vauban used casemates relatively freely in his forts, while his successors almost completely threw them out. Therefore, the *Vauban trend* does not include greater reliance on casemates.

[61] Rothenberg probably served as more of a transmission of the prince's power to the area in the foothold than for a military purpose.

[62] Just like the fierce critique Vauban laid at their doorstep. C. Duffy, *The Fortress...*, p. 17-19, 31.

[63] The Frenchman Jean de La Colonie entered the Bavarian service as the main engineer in 1702, consider that the elector Max Emmanuel did not have an engineer who could do anything more than copy fort plans. In previous wars he relied almost exclusively on engineers of his allies. The last local Bavarian engineer was Christoph Heideman who died in 1684. The trend continued, so the Bavarians hired Pierre de Coquille with a team of Frenchmen in 1730 to lead the Rothemberg fort. They finally founded a professional engineer corps only in 1744. J. Ostwald, *Vauban under…*, p. 129; C. Duffy, *The Fortress...*, p. 18, 24.

and Austria to get their engineer corps and quality domestic builders. This was first done by Prussia. They gained a maker for their fortification system, as well as the first commander of the engineer corps founded in 1729, in the person of Gerhard Cornelius Walrave (who served as an engineer since 1718.). The Walrave style was a combination of the *Vauban* and the *Dutch* based on German tradition. It was characterized by combining the bastion and tenaille paths, numerous separated and outer fortifications, such as the tenaille forts serving instead of the hornworks and crownworks, lunettes, ravelins etc. and by casemates and highlighted obscured processions. Outer fortifications made an envelope so that the weight was on in-depth defense while the main ramparts were secondary.[64] Austria, although a leading force of the Empire which significantly contributed manpower and excellent commanders in the War for the Spanish Heritage, was completely deprived of capable engineers. Low status, no organization, and a lack of funding were just some of the ailments of the Vienna engineers. The situation hit rock-bottom in 1706 when the Vienna court left the charge of engineers to local and state authorities because of a lack of funding.[65] Only a few years later, in 1710, the virtuoso Eugene of Savoy wrote to the emperor that he had no engineers who knew how to make a proper fort and that engineers are either broken by despair and misery or deserted to avoid doom. In that he saw the reason that it was impossible to create an engineer corps and a school of military architecture, which proved to be key in the art of war.[66] The example of Osijek of that time clearly paints the bad picture which prince Eugene articulated. In 1695 we have the account of engineer Beaulaincourt who wrote to Ludwig of Baden from Osijek that since May 1st 1694 he "received not a penny of pay, nor is he familiar with when and who will provide it".[67] The fact that a city in which the Headquarters for newly acquired areas was (soon to be the Slavonian military border) and the most important strategic point and fort at the crossing of the rivers Sava and Drava all adds to the difficulty of the problem, especially if we take to account that even a decade after that Osijek still did not have a military engineer. Despite this, the Court Military Council and the Chamber brought a decision to continue working on a fort in 1798,[68] and so the commander of Osijek at the time, general Creutz, started his work while sticking to the old plan of engineer Kayserfeld from 1693.[69] The situation became better for Vienna after the Peace of Utrecht when new territories were acquired in Netherlands from which they gained more expert engineer staff. During the siege of Belgrade in 1717, Eugene of Savoy ended up having 41 engineers of Flemish origin, which is even more indicative if we take into consideration that Austria had a total of 27 officers in its service in 1687. The organization of an institutional framework for military engineers was done only in 1747,[70] even though an engineering academy was founded in 1717, and we can track the emergence of esteemed names in military construction, such as Nikola Doxat, since 1720.[71]

5. At the border of 'worlds' - Slavonia

In the end, I would place focus on the case of local forts created in the area of former Kingdom of Slavonia and the Slavonian military border, which would fit the area of the eastern part of Republic of Croatia and Eastern Srijem in Vojvodina, Republic of Serbia. The basic question is can we talk about the *Vauban* influence when we observe Habsburg forts built to

[64] Walrave was a successor of the French engineers who were in the Prussian service from the end of the 17th century, like Pierre de Montaruges and Jean de Bodt. G. Bukal, "Prussian...", p. 4-10.
[65] J. Ostwald, *Vauban under…*, p. 133-134.
[66] C. Duffy, *The Fortress...*, p. 25.
[67] Ive Mažuran, "Na pragu novog doba", u *Od turskog do suvremenog Osijeka*, Osijek 1996, p. 10.
[68] Darko Vitek, *Osijek u XVIII. stoljeću - Od zasebnih gradskih jedinica do jedinstvenog grada*, PhD dissertation, Faculty of Humanities and Social Sciences in Zagreb, Zagreb 2004., p. 110.
[69] Ive Mažuran, *Grad i tvrđava Osijek*, Osijek 2000., p. 69.
[70] J. Ostwald, *Vauban under…*, p. 134. - 135.
[71] A Swiss by birth, he studied war architecture in Netherland. It was there that he met the legacy of Coehoorn, but also Vauban. Đurđica Cvitanović, "Dopuna proučavanju djela i života Nikole Doxata de Démoreta", in: *Rad. Inst. povij. umjet.*, vol. 17., 1993., p. 57-58.

oppose the Ottoman empire or is it the case of a dominant influence of some other centers, or even an original style. Due to the complexity of this approach, I would currently limit myself to Osijek, Slavonski Brod, and Gradiška. This question was generally touched by Andrej Žmegač in his monograph titled *The Bastions of Continental Croatia* where he stated that in the Austria at the beginning of 18th century (as well as the rest of Europe) the highest reputation was had by the French military organization and their successes in the time of Louis XIV. Under the impression of these successes, Eugene of Savoy encouraged the foundation of an Austrian engineer academy in 1717,[72] which could be interpreted as a direct influence of Vauban's legacy. This created engineering standards and a staff of young engineers was schooled, which results in the disappearance of improvisation replaced by exactness (primarily relating to the standards and the following documentation).[73] While this case with engineers is directly in line with the *Vauban approach*, the other side of the coin still added a certain portion of *backwardness* in the area of military construction. The case was that the commanders of forts were directly involved into professional matters and thereby subverted the construction of forts to their interests and ambitions, even though they were prohibited from doing so.[74] However, considering that there were constant pieces of information and encouragement from other sides, especially from the area of Netherlands, and the fact that Austria did not have its own fortification tradition at the time, there was a mix of primary knowledge about building fortifications which actually became a public good. In the case of the three largest forts in the area of eastern Croatia today, Osijek, Brod, and Gradiška, there are three different paradigms. Žmegač sates that the Osijek fort did not have significant connections to a dominant school of the 17th and 18th century in its long process of construction because its fortification solutions belong to a general repertoire present in many forts of the time, with perhaps a distant relation to the Dutch tradition.[75] However, due to the definitions of the *Vauban* and *Dutch* I offered in this paper, I would be more inclined to ascribe a certain influence of the *Vauban* concept to the case of Osijek. I would start from the very accepted concept of construction and the plan for Osijek. Even though the 1680s and 90s were more about the lack of financial means in rejecting the construction of a new fort of "perfect" symmetries suggested by Ludwig of Baden than an application of certain concepts, improvising with the current state and achieving *the best you can with as little as possible* is one of the characteristics of the *Vauban approach.* Along with the improvement of the Ottoman fort in place, the adaptation of local conditions were also ongoing, proved by the multiple phases of construction dedicated to *fitting* the fort according to the river Drava, especially because the riverbed changed its shape. The river was used as a strategic advantage of the fort and a determinant of its development. The second important argument for this thesis, also a continuation of the first, lies in the crownwork on the left bank of Drava. The crownwork was mostly finished in 1721 and it had only one full bastion, two curtains and two half-bastions,[76] and it was protected by the river Drava on one side. So the main complex of the fort on the right side of Drava, within which the city of Osijek was, had a separated large fortification on the opposite side of the river. These large outer fortifications were despised by Coehoorn, and preferred by Vauban. The fact that the crownwork was made at the direct request of Eugene of Savoy may also serve the *Vauban* trend because he witnessed many similar buildings in his campaigns, personally projected by Vauban. The third argument for the benefit of the *Vauban* would be the existence of the rafter on the eastern part of the Osijek fort on the right bank of the river Drava. Similarly as in the case of crownworks, the hornworks were an indispensable item in Vauban's projects, while Coehoorn avoided and

[72] A. Žmegač, *Bastioni...*, p. 44.
[73] J. Kljajić, *Krajiške...*, p. 280.
[74] They were in charge of surveillance of the construction and were, in principle, subordinated to the constructional directors and engineers in spite of the ban to get mixed into their professional business. J. Kljajić, *Krajiške...*, p. 280.
[75] A rich cluster of outer elements of simple shapes. A. Žmegač, *Bastioni...*, p. 45.
[76] Vlastimir Kusik, "Spomenička i funkcionalna obnova Krunske utvrde osječke Tvrđe", in: *Godišnjak zaštite spomenika kulture Hrvatske*, (4/1978. - 5/1979.), Zagreb 1979., p. 110.

fiercely criticized them (even though, out of necessity, he sometimes used them himself). The fourth argument relates to the inner organization where we find typical elements of a baroque military town with a practice started by Vauban. The interior was separated into blocks, and the blocks with military buildings were placed next to sacral buildings or they made up an envelope around the fort walls. Out of the severan barracks, three were in the rafter, and the remaining four were in the immediate vicity of the main ramparts. In the middle of the fort-town was the Parade square surrounded by a central military building like the General Headquarters and the military guard.[77] Such an approach, the special exclusion from the civil corps and placement to the barracks next to the ramparts, contributed to the professionalization of the army in a way set by Vauban in the army of Louis XIV in the 17th century. Based on the stated, and considering that most of these came to be in a decade or two after the Peace of Utrecht (precisely the time when the influence of the French and Dutch schools took swing in Austria), I consider that the *Vauban* trend was at least partially influential to the Osijek fort as well, perhaps even more than the Dutch school. The case of Slavonski Brod is somewhat different. Žmegač states that the influence of Menna Coehoorn's school, mediated by Nikola Doxat (a Dutch student who directed the construction of the fort in Brod in the middle of the 1720s), is more apparent. The characteristics of the *Dutch* school are recognized in the mushroom-like lunettes, a cluster of outer elements (narrow and long counter-guards, a tendency to connect the lunettes and counter-guards into a singular belt), casemate curtains and an upgrade to the low flanks next to bastions.[78] A certain influence of the same tradition is found also in the case of Stara Gradiška, where the concave flanks on ravelins have the characteristics of Coehoorn's style. Žmegač concluded this section by stating that it is very hard to speak of national or author markings in the 18th century when the undreamt intertwining and combination of elements of different origins occurred.[79] Josip Kljajić follows a similar logic concluding on the influence of the *Dutch* school on the forts next to the river Sava, primarily relying on the personality of Doxat and certain constructional actions and solutions.[80] On the other hand, the existence of the rafter in the case of Slavonski brod and a barrack with a capacity of 140-150 soldiers may also be interpreted as a *Vauban* tradition. However, the arguments are significantly weaker here than in Osijek, even though the fort of Slavonski brod shares some characteristics with the one in Charleroi.[81] Even though, in some of these cases, the influences of *Vauban* may be found, there are more *non-Vauban* elements which were particularly found in the impossibility to meet the high standards: limited funding, a small and middle number of bastions, a lower level of expertise of builders, reliance on *working men*, a dominant influence of commanders and the lower status of engineers, the lack of *tenaille* as well as *fausse-braye*, a most often lack of greater outer fortifications, the presence of one rafter at the most, limitations of the in-depth defense, lack of separated bastions, a wide use of casemates, limited strategic interaction of forts, weaker adaptation to local conditions, non-standardized character of inner space etc. The stated is true only in a direct comparison with the French forts and putting everything not present in these forts as compared to the French under the same common denominator. By taking only a single glance on, for instance, the layout of Gradiška in 1774[82], the entire story changes – the Habsburg fort becomes *Vauban* and the Ottoman one becomes *Palatine.*

[77] Ive Mažuran, *Urbanistički razvoj i spomenički značaj osječke Tvrđe*, Osijek 2005., p. 32.
[78] A. Žmegač, *Bastioni...*, p. 45.
[79] A. Žmegač, *Bastioni...*, p. 45-46.
[80] J. Kljajić, *Brodska...*, p. 63.
[81] Vauban's fort was built in similar local conditions, determined by a river and tributaries. It has six bastions instead of four, one hornwork, two motes, and four ravelins instead of three. The similarity is also apparent in the correct geometrical shape and placement in relation to local conditions set by the rivers, position and appearance of the hornwork which, in case of Chaleroi, was about 45 degrees separate from the river, unlike the one in Slavonski brod, which is vertical towards the river, with double motes and ravelins, while the biggest difference is the existence of the *tenaille* and separated bastions in the case of Chaleroi, as well as various separated fortifications. However, there is an equal chance that this is a coincidence as well as there being a direct influence.
[82] KA, Inl C VII *Alt Gradiska* 16 (1774.), taken from A. Žmegač, *Bastioni...*, p. 159.

Therefore, the description of *non-Vauban* elements, with a mostly negative sign, certainly sounds unjust. By setting the Habsburg forts into a concrete context of the conflict with the Ottomans, they gain a new, correct perspective and meaning. The fact that neither of the aforementioned forts was ever conquered by the enemy they were made to repel is a witness on the complete fulfillment of its purpose (at least the narrow, defensive one). Why then to build *another hornwork just for good luck*?

Conclusion

Instead of a conclusion, I would state that Sébastien Le Prestre de Vauban set trends. While some followed him blindly, other fought him fiercely and tried to oppose him with different, also advanced, methods. In both cases, Vauban was the initial spark. Reach of his work, methods and trends was significant and also present on a certain level in the 18th Century Slavonia. However, the *advanced* nature of the fortification system was in direct connection with the benefactor, escaping the grasp of certain towns, classes, and smaller rulers. The famous Sébastien, therefore, played a main role in the articulation of the French strivings to create a state-wide defense system directed by Louis XIV. In this manner, the concluding statement of this review goes by a quote: "...each individual is the *child of it's time*...". [83]

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[83] G. F.W. Hegel, *Osnovne crte filozofije prava*, Sarajevo, 1989., p. 18.

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