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Naučno društvo za istoriju zdravstvene kulture je svojim osnivanjem 2010. uspostavilo kontinuitet s nekadašnjim Savezom naučnih društava za istoriju zdravstvene kulture Jugoslavije.

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A BRIEF LOOK AT THE DISCIPLINARY ISSUES ON THE UPPER RHINE FRONT DURING THE NINE YEARS' WAR 1688-1697

Abstract: The issue of discipline was very important for early modern armies. Considering the usual social background of soldiers, them being a surplus of the rural population, social outcasts, criminals who joined the army as a way to commute their sentences, or other “undesirables”, the discipline was very harsh, sometimes bordering on inhumane. On top of that, the harsh conditions of the 17th century warfare led to further brutalisation of soldiers, which in turn necessitated tighter control over them. In this paper, we will analyse the disciplinarian problems faced by the Imperial forces on the Rhine front during the Nine Year's War (1688-1697), especially during the period of command of Prince Louis William, Margrave of Baden-Baden (1693-1697).

Keywords: warfare, soldiers, Holy Roman Empire

Non MeSH: Louis William, Margrave of Baden-Baden, Rhine, discipline, Nine Year's War (1688-1697), control

Introduction

One of the most important aspects of the warfare in the 17th century was the maintenance of cohesion and discipline among the armed forces. We shall approach this issue by observing the disciplinary situation faced primarily by Imperial, but also French forces, on the Upper Rhine during the Nine Years‘ War (1688-1697), in order to demonstrate the necessity for imposing discipline and strict regulations by contemporary commanders. Additionally, we shall explore how the introduction of the light infantry and cavalry (haiduks and hussars) from the Hungarian theatre of war and their practice of “little war” or *Kleinkrieg*, at the same time improved battlefield

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efficiency of the Imperial forces, but also worsened disciplinary aspect and increased difficulties of maintaining control over troops.

Military discipline in the 17th century

Ever since human societies have engaged in organised warfare, the issue of discipline in the armed forces – whether they were warbands, citizen-militias or larger armed forces of the empires of Antiquity – was of paramount significance. For example, Roman commanders went to great lengths to instil and maintain discipline among the ranks – a wide array of punishments and disciplinary actions were envisioned to keep soldiers in check. This was especially evident when the Roman army found itself on enemy territory: the commander had the authority over life or death of the legionnaires (*sacramentum*). It was not uncommon for them to execute their own sons for disobedience. Also, even whole units could face punishments for cowardice or disobedience, such as banishment, decimation or discharge from service. [1 p68]

If we advance into the future for some 1600 years, we could see that – *mutatis mutandis* – the core issues had remained the same. Of course, Europe and the Mediterranean of the 17th century were vastly different from the Roman times, however, the question of military discipline essentially remained the same. Military theorists of the late 17th century were well aware that for an army the quality of recruits was of utmost importance, as well as maintaining discipline. For example, Raimondo Montecuccoli advocated that soldiers must be healthy, bold, strong, in the prime of their age, used to fieldwork or laborious handcraft and by no means lazy, effeminate or dissolute. [2 p3] He further noted that the needed qualities for both officers and soldiers could be divided in two groups: natural and acquired. The natural qualities are bravery, a healthy and strong temperament, well-developed body, being spirited, courageous in danger, well-mannered on occasions where one must be presentable and tireless at work. Men must be of appropriate age, because young people lack wisdom and experience; on the other hand, those too old are not sufficiently agile and lively. Also, those of higher birth are more respectful towards authority. The acquired qualities are wisdom, justice, steadfastness and temperance. [2 p7]

However, if taken at face value, treatises such as this would imply that only fit and responsible men were recruited for service in various campaigns. This is mirrored in the older literature, which, admittedly, brings the financial and organisational difficulties of recruiting to the fore, but just glances over the quality and human potential of soldiers-to-be, accepting that they indeed were at an adequate level. [3 p267-71]

But, was it really so? Did reality correspond to these lofty ideals? Judging by the available evidence, it did not. The criteria for selection of soldiers were substantially lowered in order to satisfy the great demand for men in wartime, but sometimes also due to the lack of choice. For example, it was not rare to find boys aged thirteen or fourteen paired with middle-aged, or even old men, who were often disabled in some

way – whether they were lame, deaf or even blind. The average height of recruits in this era in the various European armies was barely 160 centimetres; quite a significant number of them suffered from rickets or had bad posture due to malnutrition. There is an opinion that colourful uniforms of this and subsequent century were an attempt to impose a semblance of martial order over short and deformed men. [4 p51]

If we look at some military treatises from the 1600s which deal with the issue of discipline, we can observe two very distinct approaches. For example, one such treatise is *An Abridgement of the English Military Discipline* from 1675, which had subsequent revised editions in following years. It is interesting to note that the *Abridgement* wasn't a strict disciplinarian's guide book, but rather an instruction manual on soldiers' bearing in the training-ground and battle, presented in a relaxed manner. [5 p78-9][1] It is interesting to note that the title was the only place the word "discipline" was mentioned in the book. Only at the very end of the manual, where organisation and procedures of courts-martial or counsels of war are discussed, there is a mention of enforcement of discipline and punishments. [6 p267-71] There the judges (higher-ranking officers) are instructed to deliberate culpability and punishment according to their conscience and the Ordinances or Articles of War. [6 p270] However, besides these general guidelines, there is no further elaboration. We shall return to this question later.

This stands in sharp contrast to Emperor Leopold's *Articelsbrief* (Articles of War) from 1668, which put a great deal of emphasis on strict discipline. Even a cursory look at the text reveals that almost every article demands corporal punishment or even death (*Leib- und Lebensstrafe*) in case of any wrongdoing. For example, Article 2. stipulates that the mutineers shall lose their lives without mercy. Article 3. specifies that the soldier who defies his officer's commands shall lose his life. Article 4. states that if a soldier speaks or acts blasphemously, he will be punished corporally or even by death, depending on the commander's judgement. Article 6. states that a soldier's duty is to take care of his rifle, and in case he gives it away or pawns it, he should be punished severely. Duels were also forbidden both for soldiers and officers, under threat of corporal punishment or death. Those who agreed to serve as seconds were also severely punished (Articles 7. and 8.). [3 p716]

Already mentioned work by Montecuccoli also stands in line with Leopold's *Articelsbrief*, asserting that nothing is more important for soldiers than discipline [2 p33] and that a soldier has to endure severe punishments if he does not do his duty, noting that it is certainly fair that he should hope for a great retribution. [2 p165]

It is interesting to note the difference between the two approaches. Also, one can question the possibility of issuing orders "leisurely" during the heat of battle. One explanation could be that this difference represents the reflection of specific conditions of the theatres of war in which the English and Imperial forces were mainly operating. There was a stark contrast between the relatively orderly warfare in the compact, rich and populous Spanish Netherlands (mostly present-day Belgium), and the vast and sparsely settled Hungary. The Spanish Netherlands encompasses an area of 273 by 160

[1] "The Words of Command are to be given leisurely, that the Soldiers may have time to perform the Exercise without confusion." [6 p8-9]

kilometres at its widest point on east-west and north-south axes respectively. It was predominantly a land of rolling plains that rarely rose more than 100 metres above sea level, interspersed with polders, canals and dykes. [5 p31] This territory was rich, fertile and populous, able to sustain foreign armies on its soil without much trouble, except for inconveniences due to increased taxation. Frequent campaigns during the 17th century created conditions for the appearance of professional victualling contractors, while local peasants and merchants used the situation to their advantage, selling their highly demanded products and services to visiting armies. [5 p34] About ten years before the events of the Nine Years' War, between 1676 and 1678, Spanish and French delegates met at the village of Daynze in order to arrange the control of levying contributions from the local populace, as well as to avoid incidents, excesses and damage to persons and property, which were quite common in this era, during the aforementioned process. Although there was no formal treaty, both parties agreed to follow the spirit of the talks: armed forces would levy contributions from a wider area, instead of individual villages or towns. Also, if an area was unable to pay the required sum or provide goods and fodder, an orderly exchange of hostages was envisioned instead of punitive burning or various other retributions. This, however, was not done just out of humanitarian concerns, although that element was also present, but primarily because commanders had realised that damage to property was counterproductive in the long run, and that looting and razing negatively impacted morale and discipline of their own men. There is a caveat, however, because warring parties have not always abided by Deynze tenets, and the Nine Years' War still abounded in reprisals and ravaging. [5 p34-7]

The French discovered that terrorising the countryside came at an unexpected cost. The devastation of Palatinate in late 1688 and during 1689 - the systematic destruction of towns, villages and fortresses on the eastern bank of the Rhine conducted with the intention to create a sanitary cordon[2] which would prevent the ability of the enemy to operate [7 p181-2] resulted in unforeseen consequences. Although the soldiers were instructed to carry out their orders in a disciplined manner, it soon became evident that this could not be executed in reality. It was impossible to order a soldier to, for example, burn down a house, but not to steal property or abuse inhabitants. Also, much of the destruction and burning was done by practically independent raiding parties, away from the overview of officers, which exacerbated the problem of control over men. Soldiers were also getting drunk on looted wine, which further goaded them towards excesses. [8 p198] Such behaviour caused resistance, as civilians took arms and tried to defend themselves as best as they could. Local German peasantry resisted and organised themselves as *Schnapphähne* (highwaymen), attacking the occupiers in guerrilla fashion. [8 p195] In turn, this infuriated the French, who committed further brutalities, thus feeding into the vicious cycle of violence. [8 p198] All this naturally had a negative impact on discipline, thus reducing the efficiency of the French army in the field.

[2] Here used in a sense of an area subjected to a scorched-earth policy.

On the other hand, conditions in the Hungarian theatre of war were quite the opposite of those in the Spanish Netherlands. Geographically, the Kingdom of Hungary encompassed a much larger surface area, with quite varied geography - ranging from great plains in the central and southern parts to mountainous north and east, criss-crossed with many rivers, including the second largest in Europe, Danube, which are characterised by numerous swamplands along their flow. Because of the intermittent wars between the Habsburgs and the Ottomans, Hungary was a desolate, sparsely populated and impoverished land. The road network was almost non-existent, which made the movement of units and supplies very difficult. Weather conditions were harsh and prone to seasonal change: springs were characterised by great humidity, summers by scorching heat, and winters by great cold. Snow could fall as early as October, which was also the month when strong and harsh winds started blowing. Also, daily temperature variations were common, so the temperature could plummet during the night, regardless of season. These conditions coupled with merciless, no-quarter combat led to the brutalisation of soldiers. [9 p24] The only way to impose discipline on men who fought and lived in such conditions, especially if we bear in mind that they were already of dubious personal quality, was by harsh treatment and cruel punishments.

It is also important to emphasise that, despite differences in the above-mentioned treatises, the reality of warfare was much closer to the points described in the works of the German military theorists than in *An Abridgement of the English Military Discipline*. Even more so if we bear in mind that a wide range of corporal punishments was utilised in the English army during the reign of Charles I (1600-1649), including riding the wooden horse,[3] whirligig[4] and running the gauntlet. [10 p97-9] Furthermore, the first Mutiny Act, enacted in the wake of the Ipswich mutiny of 1688, envisioned the creation of courts-martial, tasked with dealing with the offences of desertion and mutiny, with expected severity. Although it was meant only for those acts of misconduct, the Mutiny Act allowed the crown to create ordinances or Articles of War in order to punish other military violations. Further Mutiny Acts, enacted under subsequent rulers, expanded the list of punishable military offences. [10 p203ff] By the end of the 18th and the beginning of the 19th century, British Mutiny Acts and Articles of War evolved to contain a wide array of severe corporal punishments for soldiers, envisioned for various transgressions. [10 p224ff]

[3] A wooden beam(s) or a log set up horizontally, supported by four posts about 1,80 metres high. The whole thing was arranged to resemble a horse. A punished soldier was made to ride the "horse" for several hours, sometimes even days. His hands would be tied behind his back, and frequently weights were tied to his legs in order to increase the severity of the punishment. [10 p98]

[4] A type of wooden cage which could be made to rotate quite rapidly, so a punished soldier or camp follower would become very sick, "and commonly emptied his or her body through every aperture". [10 p98 n2]

The Nine Years' War (1688-1697) – A short overview

In this section, we shall provide a short overview of the conflict and the way of waging war in general, without examining the minutiae of particular campaigns, battles, manoeuvres, sieges etc., unless related to disciplinary issues. The Nine Years' War could be seen as an episode of a continuous struggle in Europe between the expansionist France of Louis XIV and various alliances of states opposed to these developments. It could be argued that a sort of undeclared war was fought primarily between France on the one side and the Habsburgs, England and the Netherlands on the other, already in the decade between 1678 and 1688. Of course, there were also French hostilities towards other European states, but they were not as broad in scope as those directed towards these primary adversaries. [11 p223] Methods of this aggression were various – for example, Louis XIV employed *Chambres des Réunions*, a number of courts (chambers) tasked with issuing quasi-legalistic judgements (*arrêts*), which were then used as a pretext for peaceful annexation of territories adjacent to French borders. Three such chambers were set up: one at Breisach for Alsace, second at Besançon for Franche-Comté and third in Metz for Lorraine and Bar. Under their auspices, significant territories around Strasbourg, Kehl, Verdun, Toul, Saar (subsequently renamed Sarrelouis) and Luxembourg were annexed by France between 1680 and 1683. In 1684 there was a limited military action against the Spanish Netherlands – the siege of the city of Luxembourg – but after the successful capture of the city, an agreement was reached on August 15, 1684, i.e., the truce of Regensburg, which essentially confirmed the previous French conquests. [12 p219-20,8 p163-4]

Besides that, the French opted for a purchase of Casale from the Duke of Mantua, with the intent to encroach on Spanish possessions in Italy, more precisely the Duchy of Milan. [11 p223] It should be borne in mind that these manoeuvres weren't just a ploy for Louis's aggrandisement – they had strategic reasoning behind them. These efforts were aimed to obtain more defensible and better delineated frontiers, in order to consolidate the territory of France. [8 p162] Also, during the 1680s, France entered a three-sided tariff war with England and the Netherlands, in order to gain a foothold in competitive markets for exporting of manufactured goods. [11 p224]

By 1688 all these tensions flared up again, and France invaded the Palatinate on September 24, 1688. The *casus belli* was the issue of election of the Archbishop of Cologne: there were two candidates for the position, French agent and Louis XIV's advisor in German affairs Wilhelm von Fürstenberg, and Prince Joseph Clemens, nephew of the late Archbishop-elector and brother of the Bavarian Prince-elector Maximilian II Emanuel. As neither candidate received the required number of votes, the matter was forwarded to Pope Innocent XI for arbitration. As the Holy See had very bad relations with France at the time, the Pope confirmed Joseph Clemens as the new Archbishop-elector. Louis refused to accept the decision, and moved his troops over the Rhine, besieging Philippsburg. [12 p51-2] The initial plan was to conduct a sort of military demonstration coupled with an ultimatum in order to compel the opponents to accept von Fürstenberg as the Archbishop of Cologne and to convert

the truce of Regensburg into a formal treaty. However, this actually elicited resistance, prompting rulers of the German principalities to organise a defence. In turn, the French responded by devastating the Palatinate in order to intimidate their enemies and force them into submission, as well as to secure French possessions by creating a sanitary cordon that would prevent the ability of the enemy armies to operate. This has produced a counter-effect, as now the German princes and the Habsburg Emperor were even more resolute in their resistance, while a local guerrilla movement arose in the Palatinate. [14 p51-2] To complicate things further, Louis XIV declared war on the Netherlands in November 1688; in April 1689 France declared war on Spain, while Dutch Stadtholder William III, as the king of England,[5] declared war on France in May 1689. In the same month, Bavaria joined the war against France via the Austro-Bavarian treaty, while in 1690 Savoy-Piedmont joined the anti-French alliance, i.e., so-called Grand Alliance, which was formed with the purpose to oppose the expansionist policies of Louis XIV. [14 p54]

Although the Nine Years' War saw a number of battles, such as Fleurus (1690), Leuze (1691), Steenkerk (1692), Neerwinden (1693), Marsaglia (1693), Namur (1695), [14 p55] to name but a few, the nature of fighting was fairly static, such limits being imposed by the nature of terrain, geography and limitations of supply and movement of the 17th-century armies. It has been noted that the military operations were not decisive, and that they were not even meant to be so. French armies never pursued defeated enemies in order to annihilate them. It was usual to pass the whole campaigning season without any significant combat. [8 p264] But such was the nature of fighting. There were numerous theatres of war where this conflict was fought: Flanders, Rhine, Northern Italy/Alps, Northern Spain/Catalonia, Ireland, the naval war in the Atlantic and the Mediterranean, but also in North America and India. Because the fighting spanned over a significant part of the globe, the Nine Years' War is sometimes considered in historiography as the first world war. However, the fighting in North America and India was strategically insignificant. Fighting in these two theatres was mainly done in order to protect the trade of tobacco, sugar, fish and precious metals. It was characterised by small-scale actions, usually raids, conducted by local militias occasionally supported by small detachments from Europe. [7 p203-5]

By 1697 indecisiveness of fighting and exhaustion of manpower, materiel and finances had set the stage for peace talks. The negotiations were conducted at the Rijswijk palace on the periphery of The Hague, beginning on May 6, 1697. Nonetheless, military action continued in the Netherlands and Spain, with the goal of improving the negotiating positions of the respective sides. On September 20, the peace treaty was signed at Rijswijk, while the Habsburg Emperor added his signature on October 30, when it became evident that his allies were unwilling to support his request for the return of Strasbourg. The Treaty of Rijswijk essentially enforced the *status quo ante bellum*, with France surrendering all conquests except for Alsace and Strasbourg.

[5] He became king of England in November 1688, by deposing his father-in-law and uncle James II, a Catholic monarch with "autocratic tendencies", in an event which was later called "the Glorious revolution". [14 p52]

Louis XIV also recognized William III as the king of England, renouncing the support for the son of James II. In historiography the conclusion of the Nine Years' War was seen either as a defeat of France or, rather, "a modest victory" for the Allies, [7 p205] or as a victory for Louis XIV, because he managed to keep most of what he had fought for. [8 p263] Whatever the case, the Nine Years' War could be seen as just one episode of the struggle for dominance between the European powers.

Nine Years' War on the Upper Rhine and disciplinary issues

The war on the Upper Rhine could be divided into two distinct periods. The first between 1688 and 1693 and the second between 1693 and 1697, the watershed being the appointment of Louis William of Baden-Baden (1677-1707) as the commander of the Imperial forces. From the point of view of the Imperial circles of Swabia and Franconia of the Holy Roman Empire of the German Nation, the two areas adjacent to the river Rhine, the Nine Years' War was one of bare survival. The circles had no means to defend themselves from the French onslaught alone, so they turned for help to Vienna and Emperor Leopold. This was a necessary move, but it also entailed a whole new set of problems - namely, from the perspective of the Viennese court, the frontline could be allowed to shift ten or twenty kilometres in the eastward direction, in order to accommodate for strategic considerations. However, such moving of the frontline could spell disaster for the circles of Swabia and Franconia. [15 p164]

It was also understood that a single victory in battle over the French would not lead to their defeat in the war. Bearing in mind that even a victorious army can suffer great casualties, and that the much more resourceful French could replace men and material much easier, the two Circles rightfully concluded that the war would be decided elsewhere and that their primary task was not to win, but to survive the war, so they could fight in the next one. [16 p44] In order to fully grasp the disparity between French and German forces, it should be noted that in 1693 the French had between 50.000 and 80.000 men, while the forces of the German Circles had just over 20.000 soldiers. [15 p201] And the ratio did not really change in the following years.

Besides the help from Emperor Leopold, the Rhenish Circles received assistance from other principalities of the Holy Roman Empire and their European allies. However, this created a situation for potential disunity, because the army on the Upper Rhine was now a patchwork of various contingents with very different aims and perceptions of the war. [16 p44]

This was evident in the Imperial campaigns of 1689, 1690 and 1691, which did not bring much success, except for the reconquest of Mainz (1689), while French attacks and advances on the right bank of the Rhine constantly exposed the vulnerability of German positions. However, in line with the type of fighting which was a general characteristic of the Nine Years' War, these actions were indecisive. [15 p136] To complicate things further, Imperial command on the Rhine during this period passed between Max II Emanuel of Bavaria (1679-1726), General Aeneas Caprara (1631-1701)

and Charles V of Lorraine (1675-1690), which caused confusion and disorder. [15 p133-5]

This was exploited by the French, who won the battle of Ötisheim in 1692, capturing the Imperial commander Frederick Charles of Württemberg-Winnental. [15 p137] This defeat further underlined the necessity for a more unified command. The possible solution was to appoint an experienced commander who had enough martial authority and who enjoyed the trust of the Emperor, as well as of the Circles, in order to impose unity on otherwise heterogeneous forces. [16 p44]

Naturally, such a person was not easy to find. However, by 1693 such a commander had entered the picture - it was Louis William, Margrave of Baden-Baden. He had earned a great reputation and experience fighting the Ottomans and he enjoyed a special trust of the Swabian Circle, because he belonged to it, as the Margrave of Baden-Baden. [16 p45-6] This appointment was well received among the Circles. One can even speak of an outburst of optimism, or even euphoria, when Louis William took over the command on the Upper Rhine. [15 p195]

Regardless, he faced the difficult task of organising and managing the poorly and unequally equipped troops, while short on money, supplies, equipment and transport means. The tedious tasks also entailed countless admonitions, counsels, orders, pleas, dealings with suppliers, financiers and officers, all the while solving numerous odds and ends. [16 p48] Things were further complicated by the disproportionately high number of generals - 37 of them - which negatively impacted hierarchy and commanding order. [15 p213] This was additionally compounded by Ludwig Wilhelm's lack of command authority over the auxiliary contingents from Saxony and Hessen-Kassel, which remained under separate command of their leaders, Prince-elector and Landgrave, respectively. [15 p212]

The most important task was the enforcement of discipline, which was, of course, conducted top down, but it did not encompass only rank-and-file: officers and even generals were subjected to disciplinary actions by Louis William. Some of the officers were very lax in their approach to duty, so the Margrave insisted on the presence of officers in the regiments, and tardiness or absence from important meetings was threatened with severe punishment. On top of that, many officers were accustomed to a pleasant lifestyle, and they developed a habit of taking soldiers as their personal servants. This was also forbidden by Louis William's order. Colonels were explicitly ordered to take charge and carry out orders themselves in a punctual manner, instead of delegating them to lieutenant-colonels, as it was customary until then, especially because lieutenant-colonels were prone to further delegate orders to their adjutants. It also became mandatory for regimental commanders to send daily reports to their immediate superiors, usually brigade commanders or marshals of the camp (*Generalwachtmeistern*). During the campaign of 1693, reporting to superiors became mandatory for all higher officers. The exemplary trial of *Feldmarschallleutnant* George Eberhard von Heddersdorf, who was accused of dishonourable and contrary-to-orders surrender of Heidelberg, was one of Louis William's tools for instilling discipline in his officer corps and preventing similar behaviour among other generals in the future. Von Heddersdorf was sentenced to death, but at the last minute, the

sentence was commuted to exile. However, despite all these efforts, it was an uneven success, mainly due to Louis William's limited command authority. [15 p191-2]

In order to furthrer bolster the strengths of his forces, Louis William ordered the transfer of troops from Hungary. However, this caused a concern among the Circles. When rumours spread at the beginning of 1693 that Ludwig Wilhelm plans to bring 8.000 Hungarian soldiers to the Upper Rhine, the Swabian Circle expressed its worries and asked the Margrave not to let them enter the territory of the Circle before the campaign began. Furthermore, German cavalrymen were deployed to oversee them. [15 p280]

The concern was not unfounded, however, because hussars and haiduks[6] from the Hungarian theatre of war had a particularly notorious reputation for indiscipline. Not undeservedly so - they were oftentimes closer to highwaymen in appearance and behaviour than to soldiers. This could be a good opportunity to quote impressions of Lady Mary Wortley Montagu, who was accompanied by such a unit of hussars during her journey from Petrovaradin (Peterwaradin) to Belgrade, during her husband's diplomatic mission to Constantinople in February 1717. "The Emperor has several regiments of these people [Rascians]; but, to say truth, they are rather plunderers than soldiers; having no pay, and being obliged to furnish their own arms and horses; they rather look like vagabond gipsies, or stout beggars, than regular troops." [17 p277]

However, it should be noted that these hussar regiments[7] sometimes had a good reason for such behaviour. For quite a long time they received their sustenance from the Circles, while their salaries have not been paid in years. Advances from colonels and officers did little to alleviate this situation. As General Styrum noted "They wander around like shadows". So, they began deserting to the enemy, as well as trying to escape to Hungary, all the while causing various excesses against the civilian populace. The subordination could be only maintained by the harshest punishments. [18 p93]

Because of the above-mentioned limitations and issues, Louis William had no opportunity to seize the initiative, and was forced to fight defensively, in reactive combat, to simply parry the French, in essence. He skilfully used light troops, especially hussars, to cause small, but frequent manpower losses to the enemy, which in total amounted to a significant number. They also raided supply convoys and attacked minor fortifications and garrisons of the French. This practice was called "little war" or *Kleinkrieg*, which was primarily employed by both the Habsburgs and Ottomans in the Hungarian theatre of war. This kind of combat was not customary for Western European battlefields, so it provided a much-needed leverage to offset weaknesses of the Imperial forces. Meanwhile, Louis William's main army was entrenched in a camp by Heilbronn; it was so well fortified that the French realised it was impossible to conduct a successful attack. Casualties suffered at the hands of light troops, along with supply losses and losses of minor fortifications and camps forced the French to

[6] Hussars and haiduks were irregular light cavalry and light infantry, respectively, who originated and were recruited in the Kingdom of Hungary.

[7] There were two hussar regiments which took part in Ludwig Wilhelm's campaign on the Upper Rhine - they were named after and commanded by Adam Kollonitsch and Johann Palffy. [18 p93]

withdraw over the Rhine in autumn of 1693. This strategy was a blueprint for further campaigns conducted by Louis William between 1694 and 1697. He had ordered the construction of a network of trenches, fortifications, redoubts and blockades in order to further hinder the enemy's advances. It was not a glamorous way of combat, there were no great or decisive battles, but the Circles managed to survive in such a way, and successfully defend their territory until the end of the war. [16 p 48-50]

Conclusion

In conclusion, it could be said that disciplinary issues faced by numerous commanders of the Imperial forces on the Upper Rhine during the Nine Years' War were, on the one hand typical for the 17th-century armies, while on the other, they were manifoldly increased due to the organisational chaos that plagued the armies stationed there. One of the main sources of that chaos was the composition of units, which represented a patchwork of contingents from various principalities of the Holy Roman Empire, each under the separate command of its generals. Also, many officers had a very lax approach to duty, while at the same time being very keen to adopt, or rather keep, luxurious lifestyle, taking soldiers as their personal servants, thus reducing discipline. These issues were alleviated by the appointment of Louis William, Margrave of Baden-Baden as the supreme commander of the Imperial forces on the Upper Rhine in 1693, who had managed to restore order and instil discipline by harsh and resolute actions. However, due to the lack of absolute authority over contingents from Saxony and Hessen-Kassel, the impact of his measures was limited. The introduction of hussars and haiduks from the Hungarian theatre of war brought greater tactical flexibility to the Imperial army, but on the other hand, increased problems with the maintenance of discipline and control, stemming from the type of combat that these light troops were engaged in, the so-called "little war" or *Kleinkrieg*.

The French forces in the same theatre of war also had disciplinary issues, primarily caused by their ravaging of the Palatinate in 1688/89. This concentrated destruction of settlements and fortifications on the right bank of the Rhine led to the loss of control over their own troops, who lost cohesion and discipline during the looting, turning more into brigands than organised fighting men.

Rezime

Pitanje discipline je bilo veoma važno za armije ranog modernog doba. S obzirom na uobičajeno socijalno poreklo vojnika, koji su poticali od viška seoskog stanovništva, društveno nepoželjnih, kriminalaca koji su se pridružili vojsci kako bi ublažili kaznu, ili prisilno regrutovanih (press gang), disciplina je bila veoma oštra, ponekad na granici nehumane. Povrh toga, teški uslovi ratovanja u 17. veku doveli su do dalje brutalizacije vojnika, što je zauzvrat zahtevalo čvršću kontrolu nad njima. U ovom radu su analizirani

disciplinski problemi sa kojima su se suočavale carske snage na gornjoj Rajni tokom Devetogodišnjeg rata (1688-1697), posebno u periodu komandovanja princa Ludviga Badenskog (1693-1697). Disciplinski izazovi stavljeni pred brojne komandante carskih snaga bili su, s jedne strane tipični za vojske 17. veka, dok su s druge strane, bili višestruko uvećani zbog organizacionog haosa u kojima su se nalazile vojske. Jedan od glavnih izvora tog haosa bio je sastav jedinica, koje su predstavljale splet kontingenata iz raznih kneževina Svetog rimskog carstva, svaki pod posebnom komandom svojih generala. Takođe, mnogi oficiri su imali veoma nonšalantan pristup dužnosti, dok su u isto vreme bili veoma voljni da usvoje, odnosno zadrže, luksuzan način života, uzimajući vojnike za svoje lične sluge, narušavajući na taj način disciplinu. Ova pitanja su ublažena imenovanjem Ludviga Badenskog za vrhovnog komandanta carskih snaga na gornjoj Rajni 1693. godine, koji je oštrim i odlučnim potezima uspeo da uspostavi red i uvede disciplinu. Međutim, zbog nedostatka apsolutnog autoriteta nad kontigentima iz Saksonije i Hesen-Kasela, uticaj njegovih mera bio je ograničen. Dovođenje husara i hajduka sa ugarskog ratišta donelo je veću taktičku fleksibilnost carskoj vojsci, ali je, s druge strane, povećalo probleme u održavanju discipline i kontrole, uzrokovanih načinom borbe koju su ove lake trupe upražnjavale, odnosno takozvanim „malim ratom".

Francuske snage na istom frontu takođe su imale i disciplinske probleme, prvenstveno uzrokovane njihovim pustošenjem Palatinata 1688/89. Ovo koncentrisano uništavanje naselja i utvrđenja na desnoj obali Rajne dovelo je do gubljenja kontrole nad sopstvenim jedinicama, koje su izgubile koheziju i disciplinu tokom pljačke, pretvarajući se više u razbojnike nego u organizovane vojnike.

Ključne reči: ratovanje, vojnici, Sveto rimsko carstvo, Ludvig Vilhelm, Markgrof od Baden-Badena, Rajna, disciplina, Devetogodišnji rat (1688-1697), kontrola

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AN EARLY EIGHTEENTH-CENTURY TREATMENT FOR EQUINE BOT FLY

Abstract: This paper presents brief comments on an early modern treatment for infestation of horses by bot fly (probaby *Gasterophilus intestinalis*). The Scottish author and physician, Martin Martin (c. 1660-1718) records the rural Gaelic practise of treating diseased animals using water in which Jurassic belemnites, probably belonging to the genus *Megateuthis* and collected from Bajocian rocks on the eastern shores of the Isle of Skye, had been steeped. This means of treatment is something of an outlier in the range of medicinal uses of belemnites, and the philosophy behind it is not clear.

Keywords: materia medica, veterinary medicine, myiasis

Non MeSH: Scotland, Oestridae, bot fly, belemnite, Megateuthis

Introduction

Myiasis is the invasion of living vertebrates by dipteran (fly) larvae. The larvae may be introduced as accidental, facultative or obligate parasites. The most derived group of obligate myiasis-causing parasites of mammals are the members of the family Oestridae, commonly known as Bot Flies, Warble Flies, Heel Flies and Gadflies, and which embraces four subfamilies. Bot flies which parasitise horses belong to the genus *Gasterophilus* (subfamily Gasterophilinae), although some species in the genus may infest cows, sheep or goats.

This paper will briefly consider a rather unusual rural Scottish folk medicine treatment for equine bot fly dating from the late seventeenth and early eighteenth century. The approach was recorded by Martin Martin (Màrtainn MacGilleMhàrtainn; c. 1660-1718).

***Gasterophilus intestinalis* de Geer, 1776**

Fig. 1. Adult female of Gasterophilus intestinalis De Geer, 1776. Wikipedia: Photograph by Janet Graham, CC BY 2.0.

The adult botfly measures around 10 mm to 15 mm in length and the hairy body gives it an overall appearance that somewhat resembles a bee (Fig. 1). The female is generally larger than the male, mostly by virtue of its long pseudoovipositor. A constriction between the first and second abdominal segments results in a 'wasp waist'. The adult fly does not feed directly on the host animal. Following mating, the female lays up to 1000 yellowish eggs on the skin of the forelimbs and shoulders of the host animal; eggs are laid by bending the abdomen in a tight C-shape (Fig. 1) so that each egg can be precisely placed on an individual hair shaft where it is secured by means of a cement. During normal grooming activity, the horse licks the infected area, thereby transferring the eggs onto its tongue. After a very brief period of incubation, the presence of salivary enzymes, the moist environment and the high temperature in the mouth (compared to the skin) stimulates hatching of the eggs. The first instar or maggot emerging from the egg then burrows into the tissues of the tongue surface (and sometimes also the gums and lining of the oral cavity). This can result in loss of appetite, inflammation of the oral tissues, loose teeth and pockets of pus developing in the host animal, although many animals show no ill effects at all.

After the first moulting, the second instars develop in the glossal tunnels for around 28 days. They emerge, only to be swallowed, thus gaining access to the stomach. They attach themselves to the upper, oesophageal and cardiac regions of the stomach, well away from the glandular fundic region where proteolytic enzymes and strong

digestive acids are produced [1]. These somewhat pill-shaped larval instars are adapted for clinging on to the stomach lining by possessing hooked mouthparts and rings of backwardly-projecting spines down the length of its body, with the exception of the last few body segments [1]. The third instars are relatively large (up to 19 mm long) and feed on the blood and tissues of the stomach lining by the abrasive use of their mandibles, causing ulceration. The host animal can often tolerate the myiasis quite well, although particularly heavy infestations may result in gastrointestinal blockage, colic, chronic gastritis, ulcerated stomach, oesophageal paralysis, peritonitis, stomach rupture, squamous cell tumours, and anaemia [2]. It takes up to 12 months for the third instar to mature. When ready, some time during the spring, it detaches itself from the stomach lining and passes out of the host animal in the faeces. Here, they burrow deeper into soil or faeces in order to pupate for a period of three to five weeks, depending on the ambient temperature [3], before emergence of the adult bot flies and the commencement of a new cycle.

Modern approaches to management and treatment include the use of insect repellents, scraping unhatched eggs off horse hairs using a bot knife, and the use of broad spectrum anti-parasitic agents such as Ivermectin and the antihelmintic Moxidectin.

Martin Martin and his publications

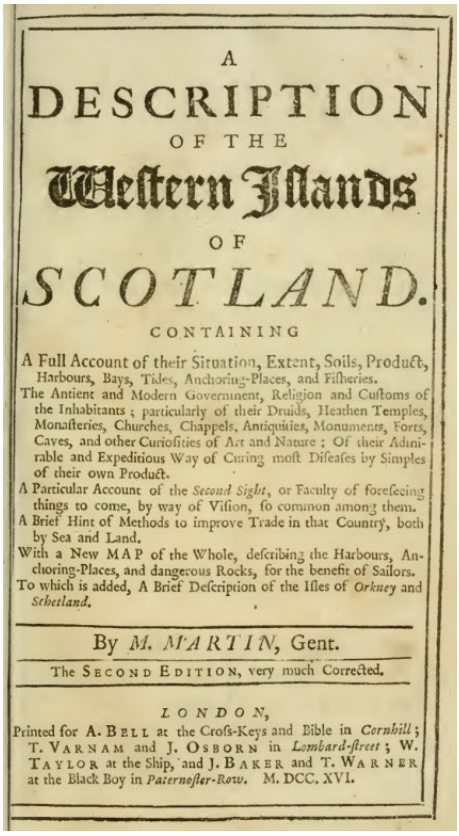
Martin Martin [4] was cousin to several Scottish clan (kinship group) chiefs. Born at Bealach on the Isle of Skye, he studied at Edinburgh University, graduating MA in 1681. Over the next fourteen years he acted as tutor to, successively, Dòmhnall a‘ Chogaidh (Donald MacDonald; 1650-1718), 4th Baronet of Sleat and Ruaraidh Òg MacLeod (dates unknown) of the Isle of Harris. During the first decade of the eighteenth century, Martin spent time both in the Highlands of Scotland and London; he made a permanent move to the latter in 1708, then becoming tutor to the third son of the Earl of Bradford. Furthermore, encouraged by his support group of fellow episcopalians, he established friendly working academic relations with a number of virtuosi whilst in the capital [5]. After studying for his MD in Leiden, Martin returned to London in 1710, where he continued to live and practise as a medical doctor, eventually dying from asthma in 1718.

In 1695, Martin travelled to Holland where he met Hans Sloane (1660-1753), then Secretary to the Royal Society. Under Sloane’s patronage, Martin undertook a tour of the Isle of Lewis in 1696, and St Kilda in May 1697. His voyages were made in the company of fellow geographer, John Afair (c. 1655 – c. 1722), a specialist in surveying and cartography, but with whom he did not enjoy good relations [6 p94].

A Gaelic speaker, with his university education and a seeming ease at moving in the circles of both the Gaelic èlite and the common man, Martin was well qualified to collect and record observations on the history, customs, geography, natural history, anthropology and folklore of Scotland. He was also a keen collector of ‘curiosities’ [5, 7]. It may have been Sir Robert Sibbald (1641-1722), first professor of medicine in Ed-

inburgh, who encouraged Martin to include an investigation into the medical conditions experienced by the inhabitants of Skye and the Western Isles of Scotland in his geographical studies [8 p84].

Martin's *Voyage to St Kilda* [9] was followed five years later (1703) by *A Description of the Western Islands of Scotland* [10]; a second edition was published in 1716 [11]. The latter volume is of particular interest here as it contains the treatment for equine bot fly which is the focus of this paper, together with many further observations on Scottish folk medicine, which have been the subject of recent scrutiny [8].



A
DESCRIPTION
OF THE
Western Islands
OF
SCOTLAND.

CONTAINING

A Full Account of their Situation, Extent, Soils, Product, Harbours, Bays, Tides, Anchoring-Places, and Fisheries.
The Antient and Modern Government, Religion and Customs of the Inhabitants; particularly of their Druids, Heathen Temples, Monasteries, Churches, Chappels, Antiquities, Monuments, Forts, Caves, and other Curiosities of Art and Nature: Of their Admirable and Expeditious Way of Curing most Diseases by Simples of their own Product.
A Particular Account of the *Second Sight*, or Faculty of foreseeing things to come, by way of Vision, so common among them.
A Brief Hint of Methods to improve Trade in that Country, both by Sea and Land.
With a New MAP of the Whole, describing the Harbours, Anchoring-Places, and dangerous Rocks, for the benefit of Sailors.
To which is added, A Brief Description of the Isles of *Orkney* and *Schetland*.

By *M. MARTIN*, Gent.

The SECOND EDITION, very much Corrected.

LONDON,
Printed for A. BELL at the Cross-Keys and Bible in *Cornhill*; T. VARNAM and J. OSBORN in *Lombard-street*; W. TAYLOR at the Ship, and J. BAKER and T. WARNER at the Black Boy in *Paternoster-Row*. M. DCC. XVI.

Fig. 2. Title page of A Description of the Western Islands of Scotland by Martin Martin (second edition, 1716). Archive.org.

Bot fly treatment

Amongst the geological observations made concerning the Isle of Skye, Martin [9; 10 p134] records:

> The Velumnites likewisegrow in these Banks of Clay; some of 'em are twelve Inches long, and tapering towards one end: the Natives call them Bot Stones, because they believe them

to cure the Horses of the Worms which occasion that Distemper, by giving them Water to drink, in which this stone has been steep'd for some hours,

'Velumnites', the item of materia medica identified here, is a spelling variant of 'belemnites'. Belemnites are fossil cephalopods characterised by the possession of an internal calcareous skeleton comprising a conical phragmocone (a chambered portion which housed the mantle) and a relatively long, dense calcite guard (Fig. 3) which acted as a counterbalance to the soft parts of the animal. Being heavily mineralised, the guard is most commonly found as a fossil. The belemnites ranged from Carnian (Late Triassic) to Maastrichtian (latest Cretaceous) times. High fidelity fossils preserving soft parts reveal that the living animal possessed 10 arms (plus an additional two, longer arms in males), all approximately the same length, bearing suckers and hooks. The long spear-, dart- or bullet-shaped morphology of the guard has led to the fossil having a diverse associated folklore [12, 13, 14, 15], including use as a medicinal material [16, 17, 18, 19; 20]; historical therapeutic applications include the treatment of wounds, a variety of urogenital, gynaecological, obstetrical and ocular problems, gout, jaundice, malaria and haemorrhage [18]. The only other recorded veterinary application of which I am aware is made by Robert Plot (1640-1696), first Keeper of the Ashmolean Museum in Oxford, who states that it was used to treat 'Ocular distempers in horses, in all parts of England' [21 p96]. Slightly earlier, the Flemish physician to Rudolph II, Anselm Boetius De Boodt (1550-1632), noted that 'There are those who, in order to extirpate the scars in the eyes of horses, infuse it into the eyes' [22 p237].

Fig. 3. Unidentified belemnite rostrum, Oxford Clay of Bedfordhire, UK. Length = 132 mm. Author's Collection.

Martin [11 p133] makes the comment that 'Banks of Clay on the East Coast' of the island yield *Lapis Ceraunius* or *Cerna Amomis* and the aforementioned belemnites. *Lapis ceraunius* or 'thunderstones', lightning bolts and associated objects hurled from the sky to the earth during thunderstorms, have variously been identified themselves as belemnites, fossil echinoids and prehistoric stone implements (e.g. 23), the latter commonly being the favoured view, actively questioned during the seventeenth and eighteenth centuries [24, 25, 26]. Thunderstones have a long literary history dating back at least to the first century AD and Pliny the Elder's *Naturalis Historia* [27] written around AD 73. According to the Aberdeen Bestiary [Folio 103r], they were believed to protect from lightning strikes, preserve the bearer during storms, provide assistance during battle and ensure restful sleep with sweet dreams. The latter resource

may have been produced in the scriptorium at the Augustinian priory of St Mary, Bridlington (East Riding of Yorkshire). Made around 1200, the Bestiary displays an illustrated style that is closely allied to that of late 12th century documents produced in the Yorkshire and Lincolnshire areas, and the Ashmole Bestiary in particular. Probably produced for a rich ecclesiastical patron, perhaps Abbot Robert de Longchamp (died 1239), the volume is believed to have been used as a teaching aid in a church or monastic setting during medieval times [28].

The *Cerna Amomis* cited by Martin almost certainly refers to fossil ammonites, usually cited at the time as *Cornua Ammonis*. This is borne out by his description of some such specimens – 'the breadth of a Crown-piece bearing an impression resembling the Sun' [11 p133] – which evokes the circular shape of the fossil and the radial ribs common to many species.

These observations are important in that they suggest a potential geological origin for the 'velumnites' cited by Martin; the presence of ammonites and belemnites in the same deposit suggests that an outcrop of Mesozoic (Triassic, Jurassic and Cretaceous) rocks acted as a source of specimens used by the inhabitants of Skye. Geologically, the bulk of the island is taken up by unfossiliferous Pre-Cambrian metamorphic rocks (Lewisian Gneiss, Torridonian Sandstone and Moine Schists), and a complex of Tertiary volcanics (granites, basalts and other igneous rocks). Mesozoic rocks crop out on the eastern side of the island, as recorded by Martin. The outcrop forms a band that stetches from just north of Uig, round the north-east peninsula and down the east coast to a point south of Portree. Further Mesozoic rocks are present between Broadford and Elgol, flanking the central igneous complex forming the Red Hills and Cuillin Hills on the island.

Martin records that the belemnites he had seen in use were at least 12 inches (30 cm) long. This is relatively enormous and suggests that the belemnites in question probably belonged to the genus *Megateuthis*, and possibly the species *Megateuthis gigantea* (formerly *Belemnites giganteus* von Schlotheim 1820) [29], now placed in *Megateuthis suevica* (Klein 1773) [30] by synonymy [31]. Relatively common and geographically widespread, members of the Megateuthidae range from Toarcian to Kimmeridgian rocks (Jurassic), and *M. suevica* is typically found in the Bajocian. A recent study of belemnite rostra belonging to this species suggests that the living animal may have attained lengths of up to 3.1 m [32], with larger rostra measuring up to 51 cm long.

Some of the earliest studies of the geology of the Isle of Skye record '*Belemnites giganteus*' in the Bajocian *humphresianum* zone outcropping near Portree [33 p325]. This suggests that Martin's record was accurate and that suitable belemnites could have been collected for veterinary purposes from the Jurassic rocks exposed along the eastern coast of the island.

Martin indicates that horses suffering from bot fly were given water to drink in which large belemnites had been steeped for several hours. The practise of soaking materials in water and other liquids in order to soften them and so to extract their therapeutic essences and virtues was common in early modern times, although it was usually applied to herbal materials as many instruction books for housewives show [e.g. 34,35]. The soaking of fossils is a rather unusual approach; contrary to soaking

resins, gums and other plant materials, steeping belemnites in water for a few hours would not have resulted in either their dissolution or softening.

Martin provides no indication as to the thinking behind this folk medicine practise. Some clues might be gained from considering the various accounts of the origins of belemnites in written sources and popular belief. Martin does express the idea that the belemnites grew *in situ* within the Jurassic clays, rather than being petrifactions of former life forms. This is an expression of the idea known as *lapides sui generis* ('stones unto themselves') which advocated that fossils were produced by a natural force whose qualities were unknown but which was instituted by God [21]. Perhaps it was this expression of God's provision that accounted for the presence of therapeutic virtues within fossils such as belemnites.

The Doctrine of Signatures was the concept that God had provided all the medicines needed for the health of mankind in the natural world. In addition, He had marked zoological, botanical and geological materials with clear signs as to the therapeutic potential which they contained – special shapes, colours, patterns, smells etc. - which acted as identifiers (to the appropriately educated Magus) for their intended medicinal application. This idea grew in popularity following the work of the German physician, Paracelsus (1493-1541). Oswald Croll (1560-1609), one of Paracelsus' followers stated the philosophy like this:

> 'But the foot-steps of the invisible God in the creatures, the shadow and image of the creator impressed in the creatures, or that internal force, and occult virtue of operation, (which as Natures gift is insited, and infused by the most high God, into the plant or anima, from the signature and mutual analogic sympathy and harmonious concordance of plants, with the members of the human body.' [36 p8].

He uses belemnites as an exemplar of this doctrine in action, referring to them as Lapis lincis or Lynx Stone (believed to have been voided in the urine of the European Lynx):

> 'All things which expel the Stone in the humane Body, are Magically signated from the similitude, and by their resemblances signifie the Disease. The Crystal, Flint, Citrine Stone, Judaick, and Stone of the Lynx: the Urine of the Lynx coagulates into a Stone, therefore its Urine is exceeding profitable to expel Gravel in the Bladder.' [36 p8]

It is difficult, however, to visualise how this might be translated into a treatment for bot fly. As mentioned above, belemnites were also seen as examples of thunderstones, other examples of which were credited with magical powers of protection and healing [24]. Perhaps the harnessing of the majestic power of lightning striking the earth was at play here.

The steeping of fossils to produce therapeutic waters is not a commonly recorded practise; fossils were normally pulverised to a fine powder which could then either be dissolved in vinegar or a similar solvent or blended with other comminuted materials and taken inwardly as a compound mixture in a suitable vehicle or applied topically. However, Martin himself indicates that the Jurassic ammonites collected from the same localities as the belemnites were treated in exactly the same manner as the bel-

emnites. These 'Cramp Stones', as he refers to them, provided a therapeutic water when steeped that could be used to wash any muscles in cows that were subject to cramp [11 p134].

Another, separate example of steeping ammonites, this time for protective rather than therapeutic benefit, occurs in German folklore. The *Milchdracken* or Milk Dragon was reputed to suckle cows, especially those in the barn, and so steal the milk, which it then took to its master. In order to prevent this theft of the farmer's milk, dragonstones or *Trackensteine* were placed in the milk pail. By the principle of sympathetic magic, the dragonstone would keep the dragon away. This particular dragonstone is undoubtedly an ammonite, as it is linked with the *Cornu Hammonis*. George Henning Behrens (1662-1712) described [37 p179] how farmers from Gandersheim in the Harz Mountains used [38 p7]:

> 'a fossile shaped like a Ram's Horn call'd Drake-stone [Dragonstone] …. For when the Cows lose their milk, or void Blood instead of it, they put these Stones into the Milk-pail, and by that means expect a due quantity of Milk from these Cows again.'

The Harz forms part of the enormous outcrop of the German Triassic, and the ammonites identified as Dragonstones likely belong to the Ceratitina, particularly *Ceratites* (*Paraceratites*) *nodosus*, a zonal fossil of the Upper Muschelkalk.

There are, however, some interesting parallels in terms of means of treatment, between the Bot Stones cited by Martin, flint arrowheads and snakestones. The latter, commonly beads of glass or vitreous paste, were said to develop curative powers when soaked in water or milk. Drinking the water in which such objects had been steeped was a means of treating snakebite and stings experienced by domestic animals in Cornwall [39 p186]. The water in which the stone had been soaked might also be used as a drench to wash a snakebite wound in cattle and other animals at various Scottish localities [39 p186]. Similarly, neolithic flint arrowheads, commonly identified as fairy darts or elf arrows and supposed to have been used to cause harm to cattle, are reported as having been added to water in cattle drinking troughs in order to effect a cure in County Kerry (Ireland) [40 p286]. Water in which neolithic flints had been dipped might also be used as a medicinal drench [40 p287].

Thus, it is not entirely clear as to the background philosophy behind using belemnites in this way. Furthermore, the record is something of an outlier in the list of medical uses to which belemnites were put.

List of Illustrations

1. Adult female of *Gasterophilus intestinalis* De Geer, 1776. Photograph by Janet Graham, CC BY 2.0.
2. Fig. 2. Title page of A Description of the Western Islands of Scotland by Martin Martin (second edition, 1716). Archive.org.

3. Fig. 3. Unidentified belemnite rostrum, Oxford Clay of Bedfordhire, UK. Length = 132 mm. Author's Collection.

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Rezime

Ovaj rad predstavlja kratak komentar o ranom modernom tretmanu zaraze konja obadom (verovatno *Gasterophilus intestinalis*). Škotski pisac i lekar Martin Martin (oko 1660-1718) beleži seosku gelsku praksu lečenja obolelih životinja upotrebom vode u kojoj su prethodno potopljeni belemniti iz perioda Jure, koji verovatno pripadaju rodu *Megateuthis* i koji su sakupljeni sa bajesijskih stena na istočnim obalama ostrva Skaj. Ovo sredstvo za lečenje je nešto izvanredno u rasponu medicinskih upotreba belemnita, a rezon iza toga nije jasan.

Ključne reči: materia medica, veterinarska medicina, mijazis, Škotska, Ostridae, obad, belemniti, Megateuthis

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THE HABSBURG BORDER CONTROL POLICY AGAINST THE SPREAD OF THE PLAGUE. AN EXAMPLE OF INSTRUCTION ON HEALTH MATTERS IN THE 18TH CENTURY[1]

Abstract: The paper analyzes the documents of the Court Sanitary Commission in Vienna on measures to suppress the threat of plague on the border with the Ottoman Empire. The documents refer to a wide border area in the 1730s and include instructions for the improvement of the Sanitary cordon, the organization of quarantines and the deployment of medical personnel. Peacetime period marked new methods the state applied to discard risks of population mass die–off due to epidemics of the disease whose causes science of the time still did not recognize. Gradual adapting of epidemics defense mechanism during the century should have led to better prediction of levels of risk, aiming to bring sanitary measures in Habsburg Monarchy through statistical estimations closer to mechanisms existing in other European countries. The aim of this paper is to show the steps in the establishment of a unified mechanism of defense against the plague in the various Habsburg border provinces.

Keywords: Plague, Infection Control, Epidemics.

Non MeSH: Sanitary cordon, Habsburg-Ottoman border, 18th Century.

After the Great Turkish War (1683–1699), the idea of greater influence in the Balkans started gaining traction in the Habsburg Monarchy, bearing in mind the territory it gained following the signing of a peace treaty with the Ottoman Empire in Sremski Karlovci (1699). By specifically arranging the border zone between the two states, the issue of border crossings was regulated without the sudden incursions of military units and insecurity for the first time. Achieving peace agreements with the participation of mixed commissions responsible for drawing maps of border zones,

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therefore, became common during the 18th century. [1 p23] The Treaty of Passarowitz (Požarevac) (1718) ended the Austro-Turkish war (1716-1718), the epilogue of which contributed to a significant change in the borders, as the Habsburgs now occupied the southeastern part of Srem, the Banat of Timisoara, Oltenia, the Kingdom of Serbia and the narrow strip of Bosnia along the Sava River with Bijeljina. [2 p65] Although the military character of the Austro-Turkish border had not changed since its gradual establishment (from the end of the 15th century), in peacetime the Habsburg court organised mechanisms to prevent the transmission and spread of infectious diseases, especially the plague. As a kind of sanitary cordon, this way of guarding the border in the 18th century represents an interesting system in the overall study of the history of health culture in Europe.

The improvement in and direction of trade across the state as one of the key aspects of mercantilism meant an increase in the movement of people and goods, which also meant the possible introduction of diseases into the Monarchy, of which the most dangerous at the time was the plague.[2] However, cameralism as an economic-administrative theory, created during the time of Emperor Leopold I, was the guiding principle of state development in the 18th century. Its basic postulates—established in the theories of Philip Wilhelm von Hörnigk, Wilhelm Schröder and Johann Joachim Becher—were that the state must manage its own economic policy for the sake of higher incomes, both for individuals and for the state itself. In this context, care for the population and of public health was of key importance, as confirmed in the cameralist theories of Johann Heinrich Justi and Joseph von Sonnenfels in the second half of the 18th century. The interests of the state were directed at the able-bodied population who could cultivate the land, work in factories and support the circulation of money, by paying taxes and participating in public works and military service. Scientific medicine and its broad social application were part of the intensive economic development based on the technological revolutions of the 18th and 19th centuries. [4 p17] Guided by this idea, the Monarchy gradually introduced a whole series of social measures aimed at improving living conditions in towns and villages, before promoting new settlements in desolate areas and introducing new techniques and the cultivation of new crops in agriculture. [5 p61-3]

The difficult financial situation in the Monarchy, caused by the wars fought since 1683, necessitated the need for the faster development of trade, especially trade directed towards the Levant, after the Peace of Požarevac. The need for a greater inflow of money into the state was also confirmed by the projected draft of annual income (when the outcome of the war was still uncertain) from tax contributions from

[2] The infection is caused by the bacillus Yersina pestis, which lives in the stomach of the Xenopsyllas flea, which often attacks rats and other rodents. The disease itself occurs in three forms – bubonic, pulmonary and blood. By biting a flea, the bacillus enters the bloodstream of a person, who suddenly develops a high fever, loses consciousness and rages. Swollen and purulent lymph glands appear in the patient and, in more severe cases, the disease also affects the lungs, which manifests itself through coughing with bloody sputum. The pneumonic plague can also be transmitted by droplets, and mortality usually occurs in an interval of two to four days, due to weakness of the heart [3 p1612].

the newly conquered lands following the war of 1717. The arbitrary projections were not realised in most cases, with only 1,565 of the predicted 100,000 forints collected in Oltenia, with a similar situation noted by the chief military commissars and chamber officials in Slavonia, Srem and Serbia. The organisation of institutions by creating administrations in the newly conquered territories, whose business scope was very broad but which was mostly based on finance and economy, was the first step towards stabilising the state coffers. [6 p68-9] Bearing in mind the very lively trade activity taking place across the new Austro-Turkish border, especially in the transport of goods and livestock from the Ottoman Empire to the Habsburg territories and from Wallachia and Moldavia to Venice, the state collected significant funds from customs duties. However, this state of affairs in peacetime would be threatened by the epidemic that was to break out in the immediate neighbourhood. The Treaty of Trade and Navigation of the 27th of July, 1718, provided for free trade between the Habsburg Monarchy and the Ottoman Empire with the payment of a customs duty of only 3%. [7 p94] This increased the volume of cross-border traffic and, thus, the risk of the spread of infection. Faced with the real danger of waves of the plague from the Ottoman Empire, more active work began in the Monarchy on health legislation and protection measures. By clearly defining the territorial borders with its southern neighbour and legally regulating the status and manner of the transition of Ottoman subjects to the soil of the monarchy, the basic prerequisites for the creation of a more permanent system of health control and protection were achieved.

The plague was present in the border regions from the beginning of the 18th century. In 1700 and 1707, the plague appeared in Belgrade, threatening the neighbouring town of Zemun. In 1708, it severely decimated the population of Bačka and, in 1709-1710 and 1712, Transylvania. When the plague appeared in Brasov in the summer of 1717, it slowly spread over the next two years to the entire territory of Wallachia and Transylvania. [8 p159-60] This was the reason the Venetian Commission of Health Supervisors established a quarantine for people, goods and animals coming from those territories, as well as from the Kingdom of Serbia, Bosnia, Dalmatia, Dubrovnik, Senj, Rijeka, Bakar and Bakarac, while other Italian cities soon followed with similar decisions. [9 p940]

After signing the Treaty of Passarowitz and with the alarming situation developing, the Habsburg authorities established the Council for Health, which was replaced by the Palace Sanitary Commission, before closing the borders of certain provinces. [10 p31] The various measures that were implemented at that time—both in the organisation of the work of *Contumazhausses* and the customs services of Oltenia, Timisoara Banat and the Kingdom of Serbia—were a model for actions in many other border areas of the Monarchy. The creation of a permanent sanitary cordon took place gradually, and it first included temporary quarantines, the locations of which were conditioned by the spread of the infection within the Monarchy. The sanitary cordon stretched from Transylvania, where five constituencies were established, through the Banat of Timisoara, the Kingdom of Serbia, along the Sava River in Slavonia, to Banska Krajina and the Karlovac Generalate. [11 p95-6] The cordon could only be crossed in certain places where there were *Contumazhausses*, while guards patrolling between

the relatively close guardhouses were in charge of preventing any illegal crossing of the border. In Vienna in 1732, a decree was published on the measures relating to temporary accommodation, which were determined in relation to the degree of danger for travellers who resided in such accommodation. A stay in a *Contumazhauss* ranging from 21 to 42 days (with an additional 14 days for goods) also depended on the health situation among the population from where they came. [11 p94] With a certificate of the time spent in the *Contumazhauss* and a customs certificate of cleared goods, a person could travel through the Monarchy. [6 p90]

We see that there was also an initial sanitary cordon on the border between Banska Hrvatska and Slavonia at the beginning of the 18th century from the conclusions of the Croatian Royal Council in 1709. This mentions the establishment of a hospital and quarantine isolation. In Slavonia at the beginning of the 18th century, lords were still in charge within their manors through their police corps. [8 p160-1] In the 1720s, temporary *Contumazhausses* were established in Slavonski Brod and Bijeljina, and in Kostajnica on the territory of Banska Hrvatska, which was under the administration of the Croatian Ban and its estates, not the Krajina Frontier. [12 p317, 8 p161, 11 p58] In the beginning, the function of the *Contumazhausses* depended on the occurrence of a plague epidemic on the other side of the border, so they only worked occasionally. However, in 1713, Emperor Charles VI laid the foundations for the permanent organisation of a sanitary cordon in the Krajina Frontier through a series of decrees. A patent, which was published on October 22, 1728, contained very rigorous measures aimed at tightly closing the border and caused many obstructions to the movement of people and trade. Three years later (on October 3, 1731), an order was passed on the organisation of the *Contumazhausses*, however, its opening was long awaited in the Krajina Frontier. In Lika, which was a busy trade hub along the Krbava River, the complete closure of the border created a difficult situation for the local population. The measures made it impossible for them to be supplied with grain, which they partly procured from the Ottoman side of the border, and, as the epidemic gained momentum, they were also prohibited from trading with the Habsburg hinterland. [13 p65-6]

In a letter dated the 24th of November, 1731, the Palace Sanitary Commission issued a series of orders on the military border, as well as other southern border regions of the Monarchy due to the increased risk of infection from the Ottoman side. The orders were primarily centred on a ban on the entry of people and goods from the Ottoman side, as well as from Venetian Dalmatia. Exact orders were given to the border guards that, in the event of illegal crossing of the border, they should first give smugglers a warning by shooting in the air, and then fire a fatal shot. The letter states that such orders were already issued by commanders in Petrovaradin and Banat along the eastern border to Vidin, and that they did not consider the procedure unnecessary. On the contrary, the responsibility was put solely on the perpetrators who committed the illegal border crossing. [14] This measure differed dramatically from the period when there was no plague epidemic, when traders who would not respect the rules of passing through the customs office and were caught smuggling goods (contraband), would only be fined by the customs service or *Überreiter*. [6 p91] The letter also suggests that the valley of the Una River along the border was the busiest region and that the Uskoks

had widespread trading activity on the Ottoman side of the border. Therefore, the order referred to the commanders of Novi and Kostajnica to bring the Uskoks into submission and to supervise their units in order to completely stop trade on the Croatian-Bosnian border, as well as from the territory of Venetian Dalmatia vis-a-vis Lika, Krbava, Karlovac Generalate, Rijeka and others Habsburg possessions. [14]

In the event that the plague was detected in a certain place, the commission demanded that the infected houses be surrounded and access to them prohibited, and that healthy people be transferred to another town or village. Then, after the whole place had been emptied, the houses of the infected were to be burned. Care for the population that would arrive in the territory of Lika, as well as the supply of the city of Senj, was entrusted to a special commission established in Graz. It is interesting that, in the same letter, the Royal Sanitary Commission recommended that only Albanian herders who came from "healthy areas" be allowed to drive their sheep to Serbia for grazing in the winter. The basic condition would be to wash the sheep three times and to agree on other conditions with the Belgrade administration and the military authorities. [14] Nevertheless, the commission ordered that under no circumstances should Albanian herdsmen be allowed to cross the border with their cattle, but that they must first be held in the *Contumazhauss*. In the acts of the Belgrade administration, we can find frequent complaints— from Albanians who drove their cattle to the Kingdom of Serbia to graze—about long detentions in the *Contumazhausses*, as well as regarding additional taxation demanded by Serbian National Militia. [6 p155] It was also recommended that both branches of government regularly monitor the health situation in Albania, which was logical considering the plague epidemic in the area of Thessaloniki, [15 pp170-1]Skopje, Metohija and Kosovo had come from Albania in the autumn of 1730. [14] In October 1730, the plague spread throughout Kosovo, as registered by the sanitary service of Venice, noting that the epidemic had also spread to the territory of Novi Pazar, Kruševac and Užice (i.e., the border region). [6 p155]

When it comes to the work of *Contumazhausses*, the commission noted several shortcomings regarding the separation of rooms for the people who stayed there. Indeed, they demanded that the newly arrived people be separated from those whose stay had been extended. It was especially emphasised that people would be strictly observed and monitored, and that interference in residents' recovery was not allowed in any way. [14] Comparing similar measures that were taken in the *Contumazhauss* in Paraćin in the Kingdom of Serbia in 1731, one can clearly see the desire of the Court Commission to introduce the same principles of work and number of experts in all *Contumazhausses* along the entire Austro-Turkish border. In the *Contumazhauss* in Paraćin, additional space was made through the building of an extension, which physically separated rooms for examining goods, people, papers and animals, although staff were also infected there. It was strictly forbidden to keep infected people in confinement, which was taken care of by at least one doctor or surgeon. Had it been noticed that someone from the Ottoman Empire had fallen ill, they would be sent back immediately, their goods confiscated while, if it was *Contumazhauss* staff in question, they were immediately taken to hospital and new people brought to the *Contumazhauss* in their place. Higher authorities were immediately informed about this to give their or-

ders relating to the situation, especially if there was a threat that the infection could spread quickly. Servants and goods cleaners, specially hired for those purposes, were not allowed to have any contact with anyone except the staff of the *Contumazhauss*. [10 p32-4]

As the central institution of anti-epidemic protection in the entire Monarchy, the Court Sanitary Commission (Sanitätshofkommission) delegated doctors and surgeons to work in the riskiest parts of the border. Following the example of the busiest *Contumazhauss* in the Kingdom of Serbia (Paraćin), as well as the one in the centre of Oltenia in Craiova, the commission wanted one doctor and two experienced surgeons to be sent to the Krajina Frontier as well. The opinion of the highly praised Field Marshal Lieutenant von Tillier was also taken into consideration, noting that, in future, it would be necessary to strive for a greater number of experts in this area. The importance of this kind of assistance was reflected in the fact that the proposed salary was the same as that of doctors and surgeons in Paraćin and Craiova, and as that of medical doctors who were sent from Dalmatia to Slavonia. The method of securing the salary fund in the Dalmatian and Bosnian border areas would be transferred to the Court Chamber Council (Hofkammerrat), bearing in mind that the Court War Council (Hofkriegsrat) had unpaid obligations for health needs that were represented in the submitted specification—an integral part of this letter. [16]

The largest number of infected people that reached Slavonia came as the result of human negligence and the lack of medical personnel—notably doctors. [17 p297] The appointment of doctors to work in *Contumazhausses* was the decision of the Court Sanitary Commission, which took into account the needs of a certain area and the experience the doctors had in working with infected persons. Thus, in a letter dated the 7th of December, 1731, a member of the aforementioned commission, Balthasar von Semiller, stated the reasons why the commission had decided to send the doctor of medicine, Joseff Waagner, to the Kingdom of Slavonia, as well as the tasks that were needed to perform as a contagious physician [16] in what were probably the only *Contumazhausses* in Slavonski Brod and Stara Gradiška at the time. [17 p296] Due to the outbreak of the plague in neighbouring Bosnia and the growing need to protect the imperial land, Dr. Waagner was sent to use his experience in theory and practice to help in the treatment of the sick who were in quarantine. His salary was 800 guilders per year, which was sent by mail from the Court Chamber, and which was awarded by one of the main generals in the Kingdom. [16] In comparison, other temporary employees outside Slavonia, depending on their qualifications, had annual salaries of 100 to 300 guilders. [6 p84] This data speaks of the common phenomenon that trained doctors had a hard time agreeing to go to border regions like Slavonia. In addition, the risk of getting sick was high during epidemic outbreaks, bearing in mind that surgeons and doctors were exposed to possible infection during the examination of passengers in the *Contumazhausses*.

In the more detailed description of Dr. Waagner's work, we see that it was necessary for him to diligently visit those who arrived daily in the hospital, as well as those who had been present for up to 42 days. He was also obliged to prepare a comprehensive report in the form of a table on the four-month turnover in the account. That re-

port consisted of a set of data collected on a weekly basis in a single form. In the divided sections of the weekly circulation in the *Contumazhauss*, data included the date of entry and exit of persons from the *Contumazhauss*, which country they came from, and the number of those who had been in the *Contumazhauss* for 42 days and what goods they had imported, as well as how many horses were in the *Contumazhauss*. In the columns with summary data, certain details were recorded for the military and civilian authorities. In addition to the Ottoman merchants from Bosnia (the majority), one Franciscan monk from Italy and one Uskok from Croatia were also recorded in the form. As well as recording data in the form, the doctor was also obliged to immediately inform the commission if he suspected that there was a new heightened risk from a certain area. Recognising mass disease in neighbouring areas from the very beginning could have played a key role in the timely prevention of the spread of the infection. Such reports were often made based on the personal experiences of delegated doctors, however, information from the Ottoman Empire also came through diplomatic representatives, agents, clerics and trusted people to the Monarchy. The doctor sent reports every two months or more often when necessary. The last item in the letter addressed to Dr. Waagner referred to the possibility of helping the sick in absentia, but only if it did not pose a risk to his health and that of his associates. [16]

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From the beginning of the 18th century, various legal acts in the Habsburg Empire regulated the crossing of the border with the Ottoman Empire and prescribed the way of organising the response to and defence against the spread of the plague on the Monarchy's territory. Although the state's economic policy promoted the achievement of trade goals, the danger of contagion required constant changes and new measures at the border. Aside from seeing Constantinople as a constant focus point of the epidemic, the authorities were aware of and responsive to the areas of northern Albania, as well as the wider areas of Sarajevo and Mostar, even though it is certain that the plague in the Balkans did not affect all these areas at the same time. In combination with the implementation of cameralist ideas, the Monarchy aimed to ensure a strong defence of the border zone by limiting the possibility of legal crossing of the border through quarantining arrivals. From the twenties of the 18th century, the sanitary cordon developed from being a simple one, with a small number of *Contumazhausses* and doctors, to a very complex system with the aim of acting preventively when an epidemic of infectious diseases would be observed. Investing in equipping the *Contumazhausses* and providing medical and other personnel was entrusted to the central institution in Vienna—the Court Sanitary Commission. Members of the commission tried to eliminate the danger of the detected outbreak of the plague on the other side of the 1900-km-long border with letters, decrees and orders until 1776, when management was gradually transferred to local commissions in the border provinces. In the Krajina Frontier, the final sanitary cordon with countermeasures was introduced, which, due to the ban on crossing the border, caused large shortages of food goods that the

population had previously procured from Bosnian merchants. A more liberal view of the Monarchy's economy (primarily trade) during the reign of Joseph II, as well as the influence of the physician Adam Chenot on the change in procedures for the protection against the plague, enabled a greater movement of people and goods across the border. With the publication of a new patent on the suppression and treatment of the plague on the 4th of May, 1785, rules were established that caused the plague to spread across the border only occasionally, quickly being stopped each time. This and other norms, such as those for medical practices, contributed to the building of legitimate and authorised medical services, along with a comprehensive health care system in the Habsburg Monarchy from the 1750s.

Rezime

Od početka 18. veka u Habzburškoj monarhiji je raznim pravnim aktima regulisan prelazak granice sa Osmanskim Carstvom i propisan način organizovanja odbrane od širenja kuge na teritoriji Monarhije. Iako je ekonomska politika države podsticala postizanje trgovinskih ciljeva, opasnost od zaraze zahtevala je stalne promene i nove mere na granici. Osim što su Carigrad videli kao stalno žarište epidemije, vlasti su budno pratile područja severne Albanije, kao i šire oblasti Sarajeva i Mostara, iako je izvesno da kuga na Balkanu nije zahvatala sve ove oblasti istovremeno. U kombinaciji sa implementacijom kameralističkih ideja, Monarhija je imala za cilj da obezbedi snažnu odbranu graničnog pojasa ograničavanjem mogućnosti legalnog prelaska granice putem karantina. Od dvadesetih godina 18. veka sanitarni kordon se razvio od jednostavnog sistema, sa malim brojem kontumaca i lekara, do veoma složene institucije sa ciljem preventivnog delovanja kada bi se uočila epidemija zaraznih bolesti. Ulaganje u opremanje *Contumazhauss*-a i obezbeđivanje medicinskog i drugog osoblja povereno je centralnoj instituciji u Beču – Dvorskoj sanitarnoj komisiji (Sanitätshofkommission). Članovi komisije su sve do 1776. godine pismima, uredbama i naredbama pokušavali da otklone opasnost od uočenog izbijanja kuge sa druge strane granice duge 1900 kilometara, kada je upravljanje postepeno prešlo na lokalne komisije u pograničnim pokrajinama. U Vojnoj krajini je uveden završni sanitarni kordon sa protivmerama, što je zbog zabrane prelaska granice izazvalo velike nestašice prehrambenih dobara koje je stanovništvo ranije nabavljalo od bosanskih trgovaca. Liberalniji pogled na privredu Monarhije (pre svega trgovinu) za vreme Josifa II, kao i uticaj lekara Adama Šenoa na promenu postupaka zaštite od kuge, omogućili su veće kretanje ljudi i robe preko granica. Objavljivanjem novog patenta o suzbijanju i lečenju kuge 4. maja 1785. godine, ustanovljena su pravila koja su uzrokovala da se kuga samo povremeno širi preko granice, pri čemu je svaki put bila brzo zaustavljena. Ova i druge norme, poput onih za lekarsku praksu, doprinele su izgradnji legitimnih i ovlašćenih medicinskih službi, zajedno sa sveobuhvatnim zdravstvenim sistemom u Habzburškoj monarhiji od pedesetih godina 18. veka.

Ključne reči: kuga, kontrola zaraze, epidemije, sanitarni kordon, habsburško-osmanska granica, 18. vek

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THE FIRST DIRECTORS OF VIENNA JOSEPHINUM - IOANNIS ALEXANDER VON BRAMBILLA AND FRANZ ANTON BRENDEL VON STERNBURG

Abstract: On November 7, 1785, Emperor Joseph II opened a medical-surgical academy in Vienna named after him Josephinum for the academic training of surgeons and doctors. The first director of the academy was Ioannis Alexander von Brambilla (1728-1800), responsible for the academization of surgeon training, who organized numerous instruments and the Josephinum library. His successor was Franz Anton Brendel von Sternburg (1723-1803) who, in addition to his professional and teaching work at the academy, founded a foundation that lasted until the First World War. In addition to the above information, we have presented recent insights from their private lives and completed their famous biographies. The first two directors of the Josephinum worked at the time of the "first Viennese medical school", which, with Enlightenment ideas, directly participated in the academization of surgery and the transformation of pre-modern medicine into modern medicine.

Keywords: history of medicine, surgeons, medical school

Non MeSH: Josephinum, Ioannis Alexander von Brambilla (1728-1800), Franz Anton Brendel von Sternburg (1723-1803), Vienna

Introduction

In Vienna, on November 7, 1785, Emperor Joseph II opened, alongside the existing centuries-old medical faculty, a medical-surgical academy *(Academia Caesareo-Regia Iosephina, Collegium Medico-Chirurgicum Josephinum)*, named after him *Josephinum (Joseph-akademie)*. The academy was built from 1783-1785, designed by the architect Isidor Caneval (1730-1786). It had six departments: anatomy, pathology, surgical operations, internal medicine, botany, and chemistry in addition to the mortuary with autopsy room, and the nearby main military hospital of Vienna (*Wiener Militär Garnisons Hauptspital)* was a clinic Josephinum where the students practiced. Joseph II. he donated 30,000 guldens for the creation of wax anatomical, pathological, surgical and obstetric preparations made by the anatomist Paolo Mascagni (1752-1815) from Florence with the anatomist Felice Fontana (1720-1805).

Josephinum was the most important and largest medical and surgical school of the Habsburg Monarchy, primarily for military doctors and surgeons, and by decree of Emperor Francis II/I since 1822, it has been given the status of a full university study. [1,2]

The first director of the Josephinum was the *protochyrurgus* and personal physician of Emperor Joseph II, Giovanni Alessandro von Brambilla, and after him Franz Anton Brendel von Sternburg, about whom we present more recent information in this announcement.

Giovanni Alessandro von Brambilla

Giovanni Alessandro Brambilla (Ioannis Alexander von Brambilla) was born in San Zenone on April 15, 1728, studied medicine in Pavia, then served as a junior military surgeon (germ. *unterchyrurgus*) and surgeon (germ. *chyrurgus*) of the personal German guard from 1755. years. In 1764, during the Seven Years' War, where he was a military surgeon, he came to serve in Vienna as the personal physician and protomedicus (*protochyrurgus*) of the then Archduke Joseph II, later the emperor, and then became the chief surgeon of the Austrian army (*generalstabsarzt*). With Archduke and Emperor Joseph II he organized and reformed the medical service of the Austrian army based on the numerous experiences he gained as a war surgeon, especially in military surgical education based on the scientific foundations of the time. Thus, following the circumstances of the war and the need for a larger number of surgeons, he organized a half-year course for wartime military surgeons (whose education normally lasted two years at the time) at the Gumpendorfer anatomical-medical-surgical school on April 11, 1781. [1-3] In 1784, he published a manual for professors imperial and royal surgical military academy (*Instruktion fur die professoren der k. K. Chirurgischen Militarakademie*). [4]

With the opening of the Josephinum, Brambilla, by decree of Emperor Joseph II became the first director of the academy (*k. k. Leibwundarzt und Direstor de Jose-*

phinischen medizinisch-chirurgischen Akademie) (Fig. 1.). Not long after the opening of the academy, in 1786, von Brambilla issued the Decree and Statute of the Josephinum for education and the acquisition of the degree of Master and Doctor of Surgery, but according to the decrees at the time, doctors of surgery (*Doktor der Chirurgie*) were not also doctors of medicine (*Doktor der Medizin*). [5] Brambilla was declared a knight (germ. *Reichsritter*) of the Holy Roman Empire. He prepared a catalog with 600 sets of instruments for various operations, and with his contemporary and friend van Swieten, he believed that diseases should be treated in three ways: proper and healthy food and drink, medicines and surgical instruments, i.e. surgical procedures. Historians of medicine described him as a well-known and very skillful surgeon who gained numerous experiences as a war surgeon. From his time running the Josephinum, in addition to numerous anatomical wax preparations, cassettes with instruments for separate operations (trepanations, amputations, obstetrics) and autopsies, numerous pathological preparations, didactic preparations from biology (mineralogy, zoology and botany) which were then studied compulsorily at studies of surgery and medicine. [1,3,6]

Figure 1. Giovanni Alessandro von Brambilla

He was especially emotionally deteriorated by the death of Emperor Joseph II February 20, 1790 from tuberculosis, in whose treatment Brambilla actively participated together with the court protomedicus Anton v. Störck (1731-1803). The deathbed of Emperor Joseph II with both doctors and a friar confessor was immortalized by the painter Löschenkohl in 1790. Brambilla died in Padua on July 30, 1800. [3] His tomb-

stone is located in the monastery of St. Anthony of Padua (Fig. 2.), whose image and translation from the Latin language we bring in its entirety [7]:

Ivan Alexander of Brambilla
By the Pope of the crowned (emperor) Joseph II Augustus Protosurgeon
Knight of the Holy Roman Empire
According to court advice Founder of the Royal and Imperial Academy in Vienna which took care of the health of soldiers
To the President, Law Writer, Manager who published (wrote) many books and generously provided instruments and equipment to the archigymnasium, hospital and library in Ticin with the aim of acquiring knowledge of treatment
Exceptionally venerable, who a few days after he came to Padua in 1800, was taken alive in the same city
Wife and regretful sons
In the ancestral bosom of the most excellent husband and father
prevented by fate from placing, this stone we place in a foreign land

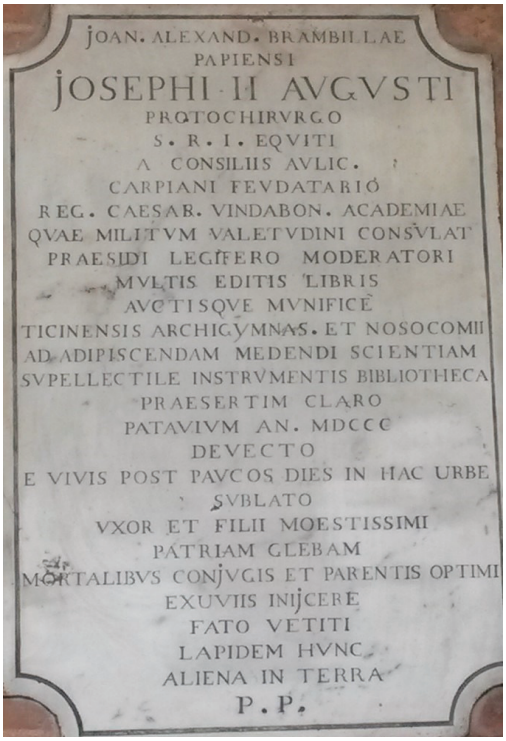

Fig.2. Tombstone of Giovanni Alessandro von Brambilla in Padua (author's photography)

Franz Anton Brendel von Sternburg

Franz Anton Brendel von Sternburg (fig. 3), born in 1723, was a descendant of a distinguished German doctors family. After finishing his studies, he was a war surgeon. He was wounded on the battlefield in Silesia in 1745, participated in the Seven Years' War as a *Feldarzt*, and was then promoted to staff and senior staff surgeon (*Oberstabschyrurgus*). From 1785 he was *Stabschyrurgus Protochyrurgus* (Chief Surgeon) in Vienna and employed at the Josephinum, and after the death of Brambilla, he was the director of the Josephinum. Before his retirement, he worked in super-arbitrary commissions in the Vienna General Command and the Vienna Invalidenhaus. He worked as a surgeon for over 50 years, passing through all social levels and ranks, awarded numerous orders, as well as the highest military order of Maria Theresa.

Emperor Leopold granted him the nobility „von Sternburg" by charter dated October 16, 1790. He also acted as a humanist and a representative of contemporary surgical thought, so in 1785 he founded a foundation to reward military surgeons for solving a given thesis that will be published every year by the Josephinum Military Medical Academy of Vienna. Foundation *k. k. Feld Stabsarzt Franz Brendl* was used until World War I. Brendel died three years after Brambilla, in 1803. [1,2,8,9]

Members of his family also lived in Bjelovar, a city that was the headquarters of the Varaždin Generalate during the existence of the Habsburg Monarchy. Maria Brendel von Sternburg, born in 1845 and died on July 8, 1917 at the age of 72, and then Stefania Čubelić, born in 1884 and died in 1972, were buried in the family tomb at the Bjelovar city cemetery. [10]

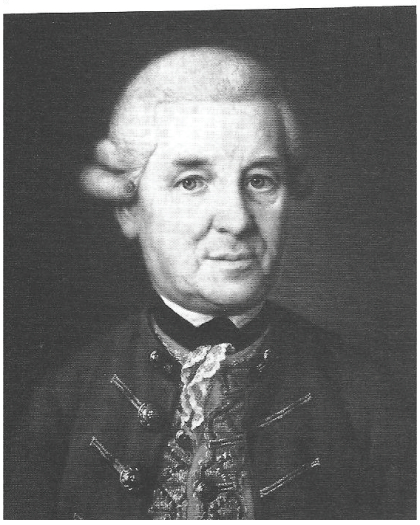

Fig. 3. Franz Anton Brendel von Sternburg

Discussion

War surgery was the basis of the development of modern surgery, and numerous doctrines for the treatment of various injuries arose from war medicine. Thus, in the time of pre-modern medicine in the 18th century, scientific medicine was studied at the studios, which provided surgeons with knowledge of anatomy and clinical medicine, as a necessary and fundamental occupation on the battlefields, and at the same time became the basis for the academization of surgery into the system of modern medicine as a whole. Surgical procedures of the 18th and first half of the 19th century were: trepanations, amputations, incisions, repositioning of fractures and dislocations, laparocentesis, lithotripsy and herniotomy, and the witnesses of that time and of such numerous procedures are precisely the preserved instruments of Josephinum, which were originally created by von Brambilla. In the former Josephinum, today is the original medico-historical museum and a realistic representation of the time of the academization of medicine and surgery in the era of the first Viennese medical school. [10-12]

Surgery practitioners were students of the Josephinum, and after passing practical work, they received a confirmation and recommendation (approval, attestation) that they became lower surgeons (*unterchyrurgus*) and were able to perform their work. Thus, numerous such certificates were issued by the then proto-surgeons of the Josephinum in Vienna, von Brambilla (...von Brambilla approbiert...), von Brendel or protomedicus Graffenhueber through the so-called *Assent list* to the competent unit or military hospital of the Imperial Army where they come to serve (Fig. 4).

The staff regimental surgeon (*Staabs chyrurgus*) or the professor of surgery gave a written report and evaluation about the completed interns-junior surgeons, which then conditioned further military health promotion from junior surgeon-junior doctor (*Unterfeldscher, Unterchyrurgus, Unterarzt*) to senior surgeon-senior doctor (*Superior chirurgus, Oberchyrurgus, Oberarzt*), which is also evident from the personal data of individual surgeons in their profiles [1,12].

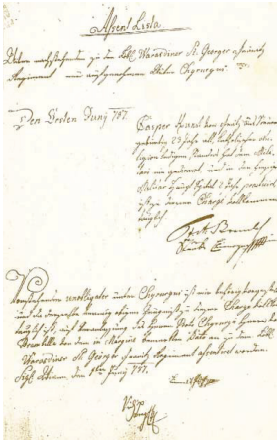

Figure 4. Original Assent-Liste for the surgeon Casper Kunst form June 1, 1797 with the signature and recommendation of Brambilla [13].

Numerous well-known surgery teachers worked and taught at Josephinum and made their treatment methods famous to this day, such as prof. Kern and his methods of open wound treatment. Thousands of students of surgery and medicine at this academy acquired their knowledge and skills based on the curriculum that was set and upgraded by its first directors, about which we have presented new knowledge from their private lives in this paper and completed their famous biographies. [12] The organization of the Josephinum as a teaching and scientific base for military medicine of the Habsburg Empire, the academization of surgery and the integration of medicine just began with the work of von Brambilla and his successor Brendel. It will last almost a whole century until the transformation of pre-modern medicine into modern medicine, which the two, the first directors of the Josephinum, did not experience and could not anticipate.

Rezime

U Beču je 7. novembra 1785. godine car Josif II otvorio, pored postojećeg viševekovnog medicinskog fakulteta, medicinsko-hiruršku akademiju (Academia Caesareo-Regia Iosephina, Collegium Medico-Chirurgicum Josephinum), nazvanu po njemu Josephinum (Joseph-akademie). Akademija je građena od 1783-1785, po projektu arhitekte Isidora Kanevala (1730-1786). Imala je šest odeljenja: anatomiju, patologiju, hirurgiju, internu medicinu, botaniku i hemiju pored mrtvačnice sa salom za obdukciju, a obližnja glavna vojna bolnica u Beču (Wiener Militär Garnisons Hauptspital) bila je klinika Josephinum-a gde su studenti vežbali. Josif II poklonio je 30.000 guldena za izradu voštanih anatomskih, patoloških, hirurških i akušerskih preparata koje je izradio anatom Paolo Maskanji (1752-1815) iz Firence sa anatomom Felisom Fontanom (1720-1805). Josephinum je bila najznačajnija i najveća medicinska i hirurška škola Habzburške monarhije, prvenstveno za vojne lekare i hirurge, a ukazom cara Franje II/I od 1822. dobija status pune univerzitetske studije. Prvi direktor Jozefinum-a bio je protohirurg i lični lekar cara Josifa II Đovani Alesandro fon Brambila, a posle njega Franc Anton Brendel fon Šternburg, o kome u ovom saopštenju donosimo novije podatke.

Ključne reči: istorija medicine, hirurzi, medicinska škola Jozefinum, Đovani Alesandro fon Brambila (1728-1800), Franc Anton Brendel fon Šternburg (1723-1803), Beč

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BUILDING AN ORIGINAL AND INTERNATIONALLY STANDARDIZED PUBLIC HEALTH SYSTEM IN THE KINGDOM OF YUGOSLAVIA

Abstract: This paper analyzes the key processes involved in establishing the public health system in the Kingdom of Serbs, Croats, and Slovenes (later the Kingdom of Yugoslavia), drawing upon existing scholarly studies and relevant archival sources. In the aftermath of World War I, the nascent state was confronted with numerous public health challenges. The establishment of the Ministry of Public Health marked the beginning of efforts to address these issues, as the Ministry assumed responsibilities over healthcare, medicine, veterinary medicine, pharmacy, and military health. This initiative included the enactment of necessary legal regulations, the creation of social medical institutions, and the regulation of medical personnel training, thereby laying the groundwork for a new approach to public health. The Ministry spearheaded reforms in the organization of health services, encompassing the establishment of new healthcare institutions, the creation of an innovative educational system, and the implementation of health programs and competencies designed to address both crisis situations and ongoing healthcare needs. Concurrently, the Ministry launched various preventive and social programs, as well as comprehensive health education initiatives, aimed at enhancing public awareness of hygiene and healthy behaviors. Additionally, significant efforts were made to establish enduring conditions for the integration of new scientific knowledge into daily life. All these programs were unified by a common ideological principle that posited that medicine, healthcare, and scientific advancements must serve the broader society, ensuring equal access for all community members. These initiatives were undertaken under the auspices of the Hygiene Department of the Ministry of Public Health, led by Dr. Andrija Štampar, an internationally recognized public health expert. The development of this public health system was further supported by professional and financial assistance from international organizations, including the Health Organization of the League of Nations and the Rockefeller Foundation. This collaborative effort resulted in the creation of a public health system that was both original and internationally standardized.

Keywords: History of Medicine, 20th Century History, Public Health Administration, Public Health

Non MeSH: History of Public Health, Health Organization of the League of Nations, Rockefeller Foundation, School of Public Health, Institute of Hygiene, Andrija Štampar

Introduction

The new public health initiatives introduced in Europe and the United States following World War I inevitably influenced the newly established Kingdom of Serbs, Croats, and Slovenes (later the Kingdom of Yugoslavia). The country, emerging from years of war, faced significant public health challenges, including epidemics and economic collapse. The newly formed state, composed of diverse regions with disparate health organizations and epidemiological profiles, required a unified health system capable of addressing contemporary health issues and providing a stable institutional and professional foundation for future operations, even after acute crises were resolved. This system was expected to offer conditions conducive to the prevention of epidemics and the management of other health concerns, including various social diseases.

The organization of the new health system began with the establishment of the Ministry of Public Health in 1918. [1] As the one of the first ministries of its kind in Europe, this initiative was internationally significant, marking a shift in which healthcare and social welfare were separated from the Ministry of the Interior, a structure previously in place. The healthcare sector gained professional autonomy and independent administrative support, facilitating the establishment of a novel approach to public health challenges. These changes, and the processes they initiated, laid the foundation for what would become the standard in public health during the interwar period and beyond, including post-World War II. The methodologies developed during this period would serve as the basis for modern concepts of preventive and public healthcare, both in times of crisis and in ongoing health management. These early public health decisions had profound social impacts and significantly influenced the development and shaping of public health services, as well as the field of medicine as a scientific and practical discipline. [2]

Dr. Andrija Štampar (1888-1958), a central figure in these reforms and later an internationally recognized public health expert, played a crucial role in shaping the country's health system and implementing comprehensive health reforms. It is important to note that all these reforms were implemented during the 1920s, as the political controversies of the 1930s led to the removal of Andrija Štampar, who was the central figure in the country's public health reforms during that period. Following his dismissal, Štampar left the Kingdom and began working as an expert for the Health Organization of the League of Nations, contributing to numerous public health projects around the world. [3] For this reason, this paper will initially focus on the events that occurred in the Kingdom during the 1920s, a period marked by heightened activity in public health initiatives.

This ambitious public health initiative aligned with similar efforts across Europe and the world, influenced by the active role of the League of Nations' Health Organization. This international body played a crucial role in shaping globally agreed-upon strategies for addressing public health issues and fostering international cooperation in medical and scientific matters. The Rockefeller Foundation's financial support was

instrumental in this process, enabling the construction and establishment of key institutions, providing scholarships for staff training, and supporting research into infectious diseases and vital statistics. [2]

This paper examines the key public health processes undertaken by the Kingdom, drawing on existing studies and archival materials from the Croatian state Archive in Zagreb and Rockefeller archive centar in New York.

From the inception to broader influence

The Ministry of Public Health of the Kingdom of Serbs, Croats, and Slovenes was established on December 20, 1918. The Department for Racial, Public, and Social Hygiene (abbreviated as the Hygiene Department) was the principal division within this institution, with Dr. Andrija Štampar serving as its director from its inception. As the institutions of the new state were being formed, Štampar, a young doctor, entered the system under the mentorship of Milan Jovanović Batut, a prominent Serbian hygienist and a significant figure in Balkan public health. Batut recognized in Štampar the vigor and determination necessary for advancing public health, and this position allowed Štampar to realize his social medicine ideals and significantly influence the health system of the new state and the implementation of extensive health reforms. [3]

Although relatively young, Štampar was well-acquainted with the hygiene and health conditions in rural areas and had already gained experience in combating infectious disease epidemics during World War I. In 1915, Štampar worked to control a smallpox outbreak in the district of Nova Gradiška in Croatia and played a role in suppressing cholera, which had spread from Bosnia to Nova Gradiška during the war years. In correspondence with local health authorities, Štampar detailed the ways in which infection spread, noting that the health conditions in affected villages were particularly poor, especially regarding water supply. Villages often lacked wells and relied on contaminated tributaries of the Sava River, or had unfenced and polluted wells in unsanitary environments. The absence of proper sanitation facilities compounded the problem, leading to widespread contamination. Housing conditions were equally dire, with multiple people sharing single rooms, and food scarcity and poor hygiene were prevalent. [4]

These observations by a field doctor reflected the general situation in the country at the time and provided Štampar with valuable experience for his future work. Upon accepting his position in the Ministry of Public Health, which afforded him the opportunity to shape the new healthcare system, Štampar approached his responsibilities with utmost seriousness, professional knowledge, and a deep understanding of the conditions on the ground, coupled with exceptional enthusiasm. His dedication in the ensuing years led to the establishment of a new public health system, which, due to its organization, effectiveness, and originality, became a model for numerous health administrations in Europe and beyond. [5] This system laid the essential infrastructure

for preventive measures, response during health crises, and the continuous provision of public health services.

New public health for a new country - ideas and controversies

Andrija Štampar's efforts to establish a new public health system in the Kingdom of Yugoslavia were met with significant challenges, given the dire public health conditions that plagued the country in the aftermath of World War I. The Kingdom was characterized by widespread poverty, a lack of public awareness about hygiene, and poor nutrition. Infectious diseases like tuberculosis, sexually transmitted infections, and intestinal diseases were rampant, often reaching epidemic levels. The Spanish flu, which followed the war, exacerbated the already heavy public health burden.

Between 1921 and 1925, the general mortality rate in the Kingdom was alarmingly high at 20.2 per thousand. While this gradually decreased to 15.9 per thousand by 1937, the rate of improvement was slow. The birth rate also declined during this period. The leading causes of death in 1924 were tuberculosis, whooping cough, typhoid fever, scarlet fever, diphtheria, smallpox, and strep throat, with tuberculosis remaining the most frequent cause of death throughout the interwar period. Although the frequency of typhoid fever decreased towards the late 1920s, other public health issues, such as infant mortality, remained severe, with the Kingdom recording one of the highest in Europe. [6,7]

Urban migration compounded public health problems, particularly in cities where migrants, often destitute and lacking basic amenities, lived in unsanitary conditions. This led to severe social issues, including unemployment and the exploitation of women, many of whom were forced into prostitution. [8]

The priority for the health policy at the time was controlling infectious diseases and suppressing epidemics, a challenging task given the Kingdom's vast, poorly connected territory and the varying levels of economic and social development across different regions. The northern regions, including Croatia and Slovenia, benefited from the legacy of the Habsburg Monarchy's health organization, which was, however, inadequate under the new conditions. The opportunities in the field necessitated the establishment of a permanent and proactive epidemiological service, aimed at systematically eradicating infectious diseases at their source by eliminating risk factors and vectors responsible for their transmission. Achieving this objective required a comprehensive range of interventions, extending from disease prevention efforts to the implementation of rigorous sanitation measures in the field, alongside the promotion of hygienic practices and health-conscious behaviors. Furthermore, these initiatives were complemented by extensive vaccination campaigns and the administration of medications targeting diseases that fell within the scope of these protective measures.

Štampar, influenced by the ideas of social medicine placed a strong emphasis on the social determinants of health. He believed that public health should not be the sole responsibility of doctors but should involve the broader society. His approach was un-

dertaking a society as an organism and aimed to address the social causes of diseases through social pathology and therapy. He advocated for a healthcare system that prioritized prevention and community-based care, rather than the traditional model focused on individual treatment in clinical settings. [9]

Štampar‘s position in the Ministry of Public Health allowed him to implement his ideas, significantly influencing the establishment of the new public health system. The Ministry‘s organizational structure initially included several departments, with Štampar overseeing the Department of Racial, Public, and Social Hygiene. This department was tasked with a wide range of public health responsibilities, from improving nutrition and hygiene to protecting vulnerable groups like pregnant women, children, and workers. [10]

However, the implementation of these ideas was met with resistance, both from within the medical profession and due to the political tensions of the time. The attempt to pass a new Law on the Protection of Public Health, which Štampar worked on, faced significant opposition and was never fully realized. Nonetheless, some of its principles were incorporated into later regulations, such as the 1927 Regulation on the Organization of the Hygiene Service and the 1928 Regulation on Health Education. [11]

The political landscape of the Kingdom further complicated the implementation of Štampar’s health policies. The reorganization of health authorities in the late 1920s led to tensions, particularly in Croatia and Slovenia, where the existing health system was disrupted. The situation worsened with the introduction of King Alexander‘s dictatorship in 1929, which merged the Ministry of Public Health with the Ministry of Social Policy and led to the marginalization of Štampar‘s ideas.[1]

Štampar’s vision for a socially-oriented public health system was ahead of its time, emphasizing prevention, community involvement, and the broader social determinants of health. While his ideas faced significant challenges, they laid the groundwork for a public health system that sought to address not just the symptoms of disease, but the underlying social conditions that contributed to poor health. [9]

Expansion of social medical institutions

Under the Štampr‘s vision in 1920-tis the Kingdom of Yugoslavia embarked on a significant expansion of its public health infrastructure. The aim was to establish a comprehensive network of social and medical institutions to address the diverse public health needs across the country. Between 1920 and 1925 the Kingdom saw the establishment of approximately 250 new institutions. These included: Public health centers, Health Stations, Dispensaries for pregnant women, children, and mothers, School polyclinics and Research and diagnostic institutes.

[1] By 1931, Štampar had lost his influential position, and the health policy began to shift away from his social medicine principles. However, in certain regions, especially after the administrative reorganization into Banovinas at the end of the 1930s, social medicine and preventive health ideas saw a resurgence.

By January 1, 1931, when Štampar retired, the number of public health institutions had grown significantly. The network included:

- 1 School of Public Health
- 10 Hygiene Institutes
- 44 Public Health Centers
- 44 Bacteriological Stations
- 52 Anti-Rabies Stations
- 81 School Polyclinics
- 28 Dispensaries for Infants
- 35 Anti-Tuberculosis Dispensaries
- 66 Skin-Venereal Clinics
- 17 Trachoma Control Clinics
- 10 Social-Medical Departments
- 12 Sanitary-Technical Departments
- 19 Chemical Departments
- 2 Biological-Immunological Departments
- 5 Parasitological Departments
- 16 Anti-Malarial Wards
- 1 Veterinary Ward
- 1 General Ward
- 2 Hospital Wards
- 111 Health Stations
- 10 Public Baths
- 19 Auxiliary Stations
- 20 Sanatoriums and Convalescent Centers [12]

The special task among mentioned institutions was on Central Hygiene Institute in Belgrade. It should be a key institution aimed at coordinating epidemiological efforts and supporting public health initiatives across the country. Another imoprtan institution was Institute for Tropical Diseases in Skoplje, focused on combating malaria and other tropical diseases. It also played a central role among small health centers accros Macedonian villages. [13]

This expansion created a robust and comprehensive network of institutions that covered even the most remote areas of the country. In larger cities, more complex and hierarchical institutions were established, while simpler institutions were distributed in smaller towns and villages. This distribution ensured broad access to public health services and created a system where information and materials from distant institutions could be processed and utilized effectively.

School of public health in Zagreb

The School of Public Health in Zagreb, established in 1926, was a cornerstone of the network of social and medical institutions developed under the Štampr's program. It not only served as a center for training medical professionals but also played a crucial role in coordinating the activities of the various public health institutions throughout the country. The School of Public Health in Zagreb, founded in 1926, was part of a broader initiative by the Rockefeller Foundation to enhance public health infrastructure and education across Europe. Modeled after the Johns Hopkins School of Public Health in Baltimore, which was established with Rockefeller funding in 1918, the Zagreb School aimed to emulate the advanced public health approaches of its American counterpart. The ceremonial opening of the Zagreb School's new building took place on October 3, 1927, following the opening of a similar institution in Budapest. This was part of a larger movement that saw the establishment of public health schools in various European cities, including Athens and London, with plans for Paris that were ultimately stalled by the political climate of the late 1930s.

The foundation of the School was largely influenced by a plan developed in 1925 by Andrija Štampar and Selskar Gunn, the director of the Rockefeller Foundation's International Health Division. The School was initially known as the Institute of Hygiene with the School of Public Health and included several specialized departments, such as bacteriology, social medicine, and vaccine production. The School was tasked with combating infectious diseases, promoting hygiene, and advancing social medicine. It played a significant role in public health education, offering courses to health professionals and the general population. [13]

At its inception, the School of Public Health in Zagreb, officially integrated into the Institute of Hygiene, comprised several specialized departments, including:

- Administrative Department
- Bacteriological-Epidemiological Department
- Biological Products Department
- Chemical Department (with a section for food control)
- Anti-Rabies Vaccine Department
- Measles Vaccine Department
- Hospital Department (focused on infectious diseases)
- Parasitological Department
- Technical Department (including sections for village sanitation and sanitary technology)
- Department of Social Medicine (with sections for Hygiene propaganda, Folk pathology and statistics, and Popular teaching) [14]

The School was tasked with a comprehensive range of public health activities such as infectious disease control: testing, suppressing, preventing, and treating infectious diseases. The hygiene and social medicine suport addressing problems related to

hygiene and social medicine, with a strong emphasis on public health education. In this way educational and public outreach activities played a significant role in educating medical professionals as well wide public. In order to fulyfy this part of the obligations School started with various educational programs for doctors, nurses, and other health workers. It also provided popular health education for the general public, including specialized courses for peasants. Students from the Zagreb medical school and foreign scholarship recipients participated in practical workshops held in the model village of Mraclin in Turopolje County, which demonstrated optimal hygiene and health infrastructure. The School also produced a wide range of propaganda materials, including posters, leaflets, manuals, books, and journals. It also engaged in film production to support health education efforts. [13,15]

The School of Public Health was notable for its significant contributions to the field of medical science in production of vaccines and serums as well as anti-syphilis drug production: The School's Biological Products Department manufactured a variety of vaccines and serums, including those for typhoid, paratyphoid, cholera, pertussis, and more. It produced around a million doses of smallpox vaccine annually. It also played a pivotal role in the domestic production of the anti-syphilis drug Neosalvarsan. This drug, an improved version of Salvarsan, was a major advancement in the treatment of syphilis. With support from the Rockefeller Foundation, staff were trained in foreign laboratories, leading to the production of Neofenarsan at the Zagreb School. By 1936, the medical community was informed about the drug's production history, effects, and clinical experiences through the Association of Physicians in Zagreb. [13]

Professionalization of medical personnel

The rapid expansion of public health institutions necessitated the training and professionalization of medical personnel. Recognizing this need, the Kingdom focused on enhancing medical education and providing specialized training for various roles within the public health system.

In 1921, the Faculty of Medicine at the University of Zagreb introduced courses in hygiene and bacteriology. That same year, a seminar on Social Hygiene and Health Policy, led by Štampar, became part of the medical curriculum. Štampar's influence extended beyond Zagreb, as he also lectured at the Faculty of Medicine in Belgrade. According to a te sources Štampar was granted permission to give lectures on social hygiene at the University of Belgrade during the 1922/23 academic year. Other medical faculties in countyalso folowed this trend. [16,3]

The School of Public Health in Zagreb, as was mentioned, played a role in organizing specialized courses for doctors and other medical personnel. A 1930 rulebook mandated a six-month course for doctors employed in general administration, hygiene institutes, and the broader hygiene service. These courses covered public health, social medicine, health enlightenment, and medical history. [17]

Nurses were recognized as vital to the success of public health initiatives. Their role was highlighted at international gatherings, such as the 1930 meeting of European hygiene school directors in Paris. The training of nursing assistants was a priority, reflecting the essential role of nursing in public health. [8]

Sanitary technicians and construction engineers were crucial to the implementation of public health measures. They were responsible for planning and carrying out sanitation projects and constructing hygienic infrastructure. Their role extended to health education, where they organized lectures and presentations to educate the local population on hygiene practices. [17]

The success of public health initiatives relied on the collaboration of various professions. For instance, film makers, such as Aleksandar Gerasimov and Milan Marijanović, contributed to the creation of educational films on health and hygiene. [18] This interdisciplinary approach, involving artists, writers, and educators, ensured the development of effective health promotion materials. School teachers also played a critical role in public health. They were responsible for teaching hygiene in schools and monitoring the health of students. Teachers were trained to recognize and address health issues among students, thus contributing to the prevention of disease spread.

Popular health education

During the interwar period, a particularly significant public health strategy was the widespread education of the population about health and the integration of scientific knowledge into everyday life. In the 1920s there was a marked shift in the global social attitude towards science. The prevailing belief was that science would resolve numerous unresolved issues, particularly those related to public health and social problems. Industry also began to take a keen interest in scientific advancements, recognizing the potential contributions of science to economic growth, mass education, and more effective health and social protection. [19]

It was widely anticipated that science would play a crucial role in revitalizing a Europe shaken by war and disease. Štampar himself was deeply committed to the progress of science and the need, as he frequently emphasized, to ensure that its benefits reached all segments of society, not just the affluent. He believed strongly in the importance of popularizing science to enhance public health, employing various publicity mechanisms to achieve this goal. [17]

Štampar also had a keen understanding of the power of publicity, which had already proven to be an effective medium during World War I for disseminating ideas across economic, political, and health domains. During this period, advertising began to be more intensively used to influence everyday habits, such as promoting hygienic lifestyles, new ways of utilizing leisure time, and encouraging physical culture. Štampar harnessed advertising as a tool in the service of social medicine, with the aim of ensuring that health education messages about the benefits of science and medicine would be consistently present in people's daily lives. [20]

Various methods of health education were employed, ranging from hygiene exhibitions and lectures to screenings of educational films, as well as parades and ceremonies dedicated to specific health topics. Public spaces were adorned with health posters and hygiene messages, while courses and presentations on topics critical to public health were also organized. [17]

Initiatives from international organizations in the Kingdom of Yugoslavia

The Health Organization of the League of Nations, established in Geneva following the First World War, emerged as a prominent international body focused on public health. Its primary objectives were to advance global health standards, unify medical parameters, and develop standardized action protocols. The League's Health Organization played a crucial role in promoting international cooperation in public health and addressing global health challenges. [21]

The another important international orgsnisation was the Rockefeller foundation, founded in 1913. Rockefeller Foundation significantly expanded its global outreach after the First World War, particularly in the realm of public health. Its efforts in the Kingdom of Yugoslavia were instrumental in shaping the country's public health infrastructure and medical education. The most represntative project in the Kingdom was conecetd with the suport of buliding and working od the School of Public Health in Zagreb, Cental Hygien Institute in Belgrad, Intitute for Tropic Desease in Skoplje as well as numerous other social and medical institution in the country.

In the early 1920s, the Rockefeller Foundation focused on enhancing medical education in the Kingdom of SCS. Its initiatives included equipping Medical Faculties. The Foundation provided financial assistance for the acquisition of modern medical equipment and resources. Another program was conected with a scholarships for young scientists. Scholarships were offered to young scientists and medical educators to further their studies and gain teaching positions at medical faculties. [13] Between 1920 and 1928, the Foundation also helped supply medical books and journals to key institutions, including: University of Belgrade, University of Zagreb, Military Hospital in Belgrade, Bacteriological Institute in Dubrovnik and Bacteriological Station in Ljubljana. [22]

The Rockefeller Foundation's scholarship programs were vital in training personnel for newly established public health institutions. These programs were developed in several phases. In early 1920s Foundation began offering scholarships for medical teaching staff at newly founded faculties. An agreement with the Faculty of Medicine in Belgrade in 1921 allowed young faculty members to study in the United States and the United Kingdom. [21]

In 1924 Foundation introduced scholarships targeting specific fields of public health, including: public health administration, vital statistics, sanitary engineering, food control, industrial hygiene, epidemiology, as well as malaria and tuberculosis studies. The special atention was dedicated to malaria and Foundation supported

specialized training for malaria research. This included sending individuals to courses organized by the League of Nations in London and Hamburg, with additional visits to Italy and France.The Foundation also funded international training programs for foreign scholars in the Kingdom. This allowed international experts to study the innovative public health practices and institutions in Yugoslavia. [23]

All this programs strengthening medical faculties in the country and enhancing the quality of medical education and research. It also advancing public health practices and implementing effective public health measures and sanitary practices. Colaboration with League of Nation Health Organisation and Rockefeller Foundation fostering international cooperation and encouraging the exchange of knowledge and expertise between Yugoslavia and other countries. The collaboration between international organizations and local experts like Štampar exemplifies the effective integration of global and local efforts in advancing public health, setting a model for future international health initiatives.

Conclusion

After World War I, the newly established Kingdom of SCS - Yugoslavia embarked on a comprehensive health reform program, creating an institutional framework to address public health needs. Central to this effort was the establishment of the Ministry of Public Health, which took on the responsibility of organizing and managing a network of social medical institutions. These institutions were designed to cover a broad spectrum of health services, from treating the sick to preventive care and responding to health crises. Alongside this institutional development, the Kingdom invested heavily in the education and training of medical professionals, from doctors and nurses to auxiliary medical personnel like sanitary technicians and laboratory staff.

League of Nations‘ Health Organization as an international body played a crucial role in shaping globally agreed-upon strategies for addressing public health issues and fostering international cooperation in medical and scientific matters. Together with the the Rockefeller Foundation‘s financial support was instrumental in this process, enabling the construction and establishment of key institutions, providing scholarships for staff training, and supporting research into infectious diseases and vital statistic on the internatinal level.

These national and international efforts ensured the standardization of public health responses and the creation of robust health systems capable of addressing contemporary health challenges. An international scientific community emerged, focusing on the role of medicine in society, establishing new epidemiological and preventive practices, and adopting standardized measures for monitoring and combating diseases. This era marked the beginning of a new global health order, where national health administrations increasingly relied on international funding and expertise to develop public health systems capable of meeting the demands of the time.

Sažetak

Ovaj rad analizira ključne procese koji su bili uključeni u uspostavljanje javnog zdravstvenog sustava u Kraljevini Srba, Hrvata i Slovenaca (kasnije Kraljevini Jugoslaviji), oslanjajući se na postojeće znanstvene studije i relevantne arhivske izvore. Nakon Prvog svjetskog rata novonastala se država suočila s brojnim javnozdravstvenim izazovima. Osnivanje Ministarstva narodnog zdravlja označilo je početak napora za rješavanje ovih pitanja, budući da je Ministarstvo preuzelo nadležnost nad zdravstvom, medicinom, veterinom, ljekarništvom i vojnim sanitetom. Ta je inicijativa uključivala donošenje potrebnih zakonskih propisa, stvaranje socijalno medicinskih ustanova i reguliranje školovanja medicinskog osoblja, čime su postavljeni temelji za novi pristup javnom zdravstvu. Ministarstvo je predvodilo reforme u organizaciji zdravstvenih usluga koje su uključivale osnivanje novih zdravstvenih ustanova, stvaranje inovativnog obrazovnog sustava te implementaciju zdravstvenih programa i kompetencija namijenjenih kako kriznim situacijama tako i tekućim zdravstvenim potrebama. Istodobno, Ministarstvo je pokrenulo razne preventivne i socijalne programe, kao i sveobuhvatne zdravstveno prosvjetne akcije, s ciljem podizanja svijesti javnosti o higijeni i zdravom ponašanju. Dodatno, uloženi su značajni napori da se uspostave trajni uvjeti za integraciju novih znanstvenih spoznaja u svakodnevni život. Svi ovi programi bili su objedinjeni zajedničkim ideološkim načelom prema kojemu medicina, zdravstvo i znanstveni napredak moraju služiti širem društvu, osiguravajući jednak pristup svim članovima zajednice. Ova nastojanja bila su pokrenuta su pod utjecajem Higijenskog odjela Ministarstva narodnog zdravstva, kojeg je vodio dr. Andrija Štampar, međunarodno priznati javnozdravstveni stručnjak. Razvoj novog javnog zdravstvenog sustava dodatno je podržan stručnom i financijskom pomoći međunarodnih organizacija, uključujući Zdravstvenu organizaciju Lige naroda i Rockefellerovu fondaciju. Njihov zajednički napor rezultirao je stvaranjem sustava javnog zdravstva koji je bio u isto vrijeme i originalan i međunarodno standardiziran.

Ključne reči: istorija medicine, istorija 20. veka, javno zdravlje, javno zdravstvo, istorija javnog zdravlja, Zdravstvena organizacija Lige naroda, Rokfeler fondacija, Škola javnog zdravlja, Institut za higijenu, Andrija Štampar

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ARTIFICIAL INTELLIGENCE, TRANSHUMANISM AND BIOPOLITICS: THEORETICAL FRAMEWORKS IN THE PAST TWO DECADES[1]

Abstract: The aim of the article is to present the theoretical frameworks of the anthropology of artificial intelligence (AI) and transhumanism, with reference to the concept of biopolitics, since the beginning of the 21st century. The introductory part briefly looks at the phenomenon of AI and the anthropological study of it, which is pursued within the broader context of anthropological studies of technology. The basic question analysed in artificial intelligence studies is man's relationship to technology and its place and role in the development of humanity. The authors also find it important to consider how the development of technology, and of AI within it, can affect the distribution of power and control systems of economic processes, primarily economic growth, migration and health. Finally, the results of anthropological research on AI and transhumanism are presented. In the conclusion, the authors briefly review the importance of AI and transhumanism research results and their role in the future development of anthropology and other social sciences.

Keywords: artificial intelligence (AI), anthropology, technology, social sciences

Non MeSH: transhumanism, biopolitics, anthropology of artificial intelligence, anthropological studies of technology

[1] This paper is an expanded version of the text presented at the conference on Eugenics, Public Health Policy, Nationalism and Populism in Southeast Europe (18th 21st century), held on March 13, 2024, at the Faculty of Philosophy, Belgrade, and organized by the Scientific Society for the History of Health Culture of Serbia and the Faculty of Philosophy.

Introduction: the nature of anthropological research on AI and biopolitics

Arguably, a key research topic related to human identity and self-knowledge is one that aims to focus on what it means to be "truly" human. The main purpose of AI is to show whether and how it is possible to study and simulate human intelligence so that computers can be programmed to do what the human mind does, e.g., to think independently, learn and advance intellectually through the acquisition of their own experience and based on the collected information. According to some authors, the first and foremost is to create a model of the human mind that will be used as a basis for building and programming an intelligent entity that resembles a human being. Alan Turing, a British mathematician and founder of AI, believed that an intelligent computing machine should resemble a human being by virtue of being able to think like a person. This perspective is accepted and integrated into the basic theories of modern artificial intelligence, which consider our mental capacities to be crucial for everyday life and self-knowledge. [1 p3] Basically, at first a computer was an information processing device, which operated by using symbols according to certain rules. When using computers, we must follow these rules and be "sensitive" to computer symbols, i.e., we are conditioned to think according to the way computers process our thoughts into information and knowledge. People who live and work with computers have come to rely on digital information on a daily basis. According to Ting Guo, "self-reconceptualization becomes more essential in contemporary culture since it is heavily influenced by AI technologies." [1 p6]

Researchers, among them historians, investigate a key question of civilization: to what extent and by what means does technology determine political, social, economic and cultural forms in a society? In anthropology, the opposite question may also be posed: how does the cultural context shape, i.e., create or modify technology? Historians, in principle, support the view that technologies are social products, sensitive to the system of government and, therefore, to democratic or totalitarian control. Karl Marx started the modern discussion of determinism, and Robert Heilbroner renewed it in the context of the history of technology. Marx's views are somewhat embedded in contemporary Western culture, in the form of phenomena that are constant reminders of how rapidly changing technologies can change human lives. The idea of "technological determinism" can take different forms, ranging from "hard" to "soft". According to "hard determinism", the progress of technology has the ability to influence the course of events, in the present and in the future. For example, the side in a war that has a more advanced military technology may gain the upper hand at a critical moment. Innovations in the field of genetic engineering can lead to changes in human DNA that can be inherited by future generations of people, thus directly influencing the future. The future seen through the eyes of "hard determinism" may have several versions. According to optimists, it will be the result of many free choices and the realization of the dream of progress. For pessimists, it will be the product of needs dictated by political and economic power structures, leading to totalitarianism. Proponents of "soft determinism" remind us that the history of technology is the history

of human action. In order to understand the origin of a particular type of technological power, researchers must first investigate its actors, i.e., who they were and in what circumstances they operated. In this sense, important questions arise: why were innovations created by certain people and not by others, why the innovations occurred at a certain time and place, and not in another time-space framework, and then, who benefited from them, and who suffered? [2 pIX-XV]

Back in 1998, Dennis Weiss pointed out that "the various subcultures that have grown up around the digital computer (the so-called 'digital culture') have been actively defining and shaping popular conceptions of what it means to be human and the place of humanity in the digital era." Weiss emphasizes the mind as information independent of the physical body, the obsolescence of the human body, the elimination of the individuality of each person, the flexibility of human nature and logic, and the arrangement of the computer as a metaphor for the cosmos. According to him, "a renewal of the philosophical anthropology movement — devoted to the issues of human nature and humanity's place in the cosmos — permits us to see the inadequacy of the conception of human nature implicit in the digital culture." [3 p142] The basic focus of anthropology of AI is man's relationship to technology, and its research is concerned with the future of humanity together with technology and with the questions of the "essence" of technology. Seventy years ago, Martin Heidegger posited technology as a way of "discovering" the world. The essence of technology, he argued, is not only technological or mechanical, but represents the way in which the world is revealed to us, and thus the "enframing" of the problem of technology determines our understanding of what exists in the world. [4 p3-4; 5 p23-24] Leslie White emphasized the primacy of technological factors in determining the form that society will assume: "[A] social system might well be defined as the way in which a society makes use of its particular technology in the various life-sustaining processes […]." [6 pXIII] White also believed that the technological system of society included the means and ways of applying energy, and that the use of energy was a decisive factor in cultural evolution. The technological aspect of culture, according to White, initiates change, sets in motion a series of transformations following one another, which ultimately affects every part of the system. [6 pXIV].

The most important feature of the anthropological studies of technology is their focus on various knowledge practices that technologies bring about and on which they are based. Research in anthropology actively contributes to discussions of various value issues relating to technologies. Finally, they point to the way technologies fit into broader political-economic and socio-historical processes that shape and often foster inequality and discrimination, while at the same time creating diversity. [7 p2-3] At the end of the 20th century, in the 1980s and 1990s, industrial mass production increased, together with a faster development of transportation and global communications, and increased migrations. The same period also saw the efforts intensifying to define new directions for the anthropology of technology in the era of globalization. During the first two decades of the 21st century, anthropologists have continued to study the ways in which technologies develop and shape everyday life. [7 p12-18]

The term biopolitics was first used by Michel Foucault to denote the organized power of institutions over life in general, through the scientific and technological regulation of knowledge as a new form of state surveillance, i.e. repression over the lives of citizens. According to Alpar Lošonc, Foucault believed that the backbone of biopolitics is represented by political economy, changes in the management of family and society. Lošonc quotes from Lazzarato: "biopolitics is the strategic coordination of these power relations in order to extract a surplus of power from living beings. Biopolitics is a strategic relation; it is not the pure and simple capacity to legislate or legitimize sovereignty. […] According to Foucault […] biopower coordinates and targets a power that does not properly belong to it, that comes from the 'outside'. Biopower is always born of something other than itself." [8 p163-164; 9 p103, 10] According to Bogdana Koljević Griffith, "[…] it is also about total control of economic processes, i.e., the ultimate goal of modern political economy is population regulation in practically all aspects – especially economic growth, migration and health. Or, more precisely, given that the power exercised over populations relevantly includes the control and regulation of biological processes – birth, death, disease, food and living conditions in general […]." [11 p1233] Artificial intelligence and transhumanism can also be considered in this context. The creation of artificial intelligence is often influenced by political and economic factors, and behind the ideas at the core of some AI systems are often people from the world of politics and political and economic power centres. Transhumanism, with its ideas about "improving man" and encouraging the development of intelligent life through science and technology, can influence the control of various issues in the field of health and provide solutions for controlling the population problems that the world is facing today.

Basic results of anthropological research on AI and transhumanism (2000–2023)

Only some of the results and interpretations of modern anthropological research on artificial intelligence in the digital age will be presented here to serve as an illustration of some of the contemporary trends in the anthropological analysis of the AI phenomenon and associated problems in the past two decades or so.

For researchers concerned with the nature of knowledge, the idea of artificial intelligence is one that fascinates and stimulates re-thinking. AI research opens up a wide range of key questions relating to culture, cognition, knowledge and power, raising numerous philosophical and methodological problems. Some AI experts believe that computers will be able to replace human expertise. Researchers who approach AI with a grain of salt respond to these claims by arguing that, given the nature of knowledge itself, machines can support human expertise, but cannot replace it completely. [12 p35] According to Diana Forsythe, when building an expert (AI) system based on scientific knowledge, the principles of selection and interpretation of existing knowledge must be applied. She believes that it would be useful for AI engineers to include the theory and methodology of qualitative social sciences in their education. In this

way, engineers would develop new ways of thinking about how to acquire knowledge and that would help them achieve their own system-building goals. AI engineers are aware that they have to make choices about what to include in their systems, which is essentially based on their own values and assumptions. AI engineers' ways of thinking, values and assumptions have a manifold influence on the selection of knowledge on which AI systems are based. The knowledge and solutions that AI systems possess and bring, which are taken for granted as being reliable, illustrate the cultural nature of scientific practice. Design decisions made by individual AI engineers are encoded in computer languages that many people cannot read, and when an expert system is built, it is very easy for the user to assume that what such a system "says" must be correct. In a way, a knowledge-based AI system is a replica of its creator's perspective. AI engineers are often unaware of everything they have incorporated into or excluded from the system. The power exercised by AI engineers has a political dimension, raising questions about the relationship between technology and society. The big questions that arise are whose knowledge should form the basis of the "knowledge base" and whose practices should be considered as "expert"? Who should select the cases or "knowledge" that should represent "reality"? All of this is influenced by big political issues concerning differences in culture, race, class and gender. [12 p55-58]

"Deep learning" techniques, which are gaining popularity in the field of artificial intelligence, identify patterns in a large number of data systems, make classifications and predictions. AI experts and scientists who trust "deep learning" techniques present these classifications and predictions as more accurate than those made by humans. Claims of "superhuman" accuracy of these results, along with the inability to explain fully how these results are obtained, create a discourse about AI that some authors call enchanted determinism. To analyse this discourse, researchers draw on Max Weber's "theory of disenchantment".[2] "Deep learning" is a complex form of technological calculations and predictions that Weber associated with disenchantment. In order to explain the mechanisms of these systems, which cannot be interpreted, and their counter-intuitive behaviour, so-called magical discourses are being used. Discourses of magical "deep learning" create techno-optimism, leading to a large number of phenomena, and the deterministic, calculated power of these systems intensifies the social processes of classification and control, and protects their creators from responsibility. [16 p1-19]

[2] Weber borrowed the idea of the process of disenchantment of the world from Schiller. Putting this idea at the core of his sociology, Weber, elaborating on it, expects the suppression of superstition, myth and magic which will be replaced by a more realistic approach to the world. Once magic is eliminated from life, the mind returns to itself and tries to reconstruct the world according to rational criteria. In this way, intellectualism suppresses magical beliefs and the world s processes become disillusioned, losing their magical significance; they still exist, but no longer signify anything. The new religions of modernity, which replace the myths of traditional society, cause a short circuit in the human mind with empty promises, cause resentment, which leads to collective aggression and despair. [13 p496-498; 14 pXX-LXII] As stated by Weber: It means that in principle, then, we are not ruled by mysterious, unpredictable forces, but that, on the contrary, we can in principle control everything by means of calculation. [15 p12-13] Our age is characterized by rationalization and intellectualization, and above all, by the disenchantment of the world. [15 p30]

According to Marchenko and Kretov, the question of correlation between the philosophy of information and transhumanism projects should be divided into several spheres. The first of these is the nature of formal modalities of interaction between humans and the digital information environment. Next, the status of human consciousness and personality in the context of such interaction is important and, finally, we are considering the transformation of cognitive and human activity through this interaction. The status of human consciousness and personality moves on levels between imperative (that is, the one who programs) to affiliate (social-communicative platforms) and dependent (strategies of use, problems of digital personality and manipulative strategies in the sphere of information). The transformation in the form of speech and language discourse is explained by the fact that "live" speech is not formalized within digital communication models. [17 p110-11]

Some authors look are concerned with the economic, political and historical dynamics of technological innovations and their consequences on employment and economic restructuring, which are carried out through sovereign and discursive power. [18 p331] The conclusions are reached that technological change has a transformative potential, but also its uncertainties and limits. Also, Boyd and Holton believe that the analytical perspective "has normative implications in that it raises the possibility of alternative futures [...]. The possibility of futures other than the dystopian or utopian strands of the radical change thesis, allows an array of competing hypotheses about future trends to be articulated and evaluated against a plurality of normative viewpoints. Such an exercise is crucial if a deliberative democratic discourse is to emerge around new technology." [18 p343]

From the standpoint of political anthropology, algorithms, digital data processing and decision-making mechanisms are no longer purely technical-rational constructs. They are always created under the influence of those who create them politically and technically. In other words, the creation of AI is very frequently influenced by political factors, interests and ideas behind people from political life, and AI engineers turn those ideas into reality through programming. So AI can be seen as a kind of amalgamation of people and codes, which is in accordance with the basic principles of the so-called "new materialism" school of thought. According to these views, it is inadequate to distinguish between humans and machines, animate and inanimate matter, participants in events and structures. According to some authors, the people who develop the systems do not dictate the functioning of the algorithms, but the acquisition of power and the necessity of management will result from the interaction between the algorithms and those who developed the system. "'Governance by Things' requires good, human and humane 'Governance of (these) Things'." [19 p7-8]

According to Michael Harkin, the long-awaited biological connection of man and technology contributes to the transformation of human beings. The development of technology has led to the proclamation of "technological singularity", in which an intertwining of humanity with technology will be possible, whereby a kind of immortality will be achieved, either through the replacement of impaired body parts or through the replication of individual human consciousness in a virtual form. If the development of technology enables humans to overcome their own mortality, the issues

of maintaining populations with unlimited life spans and the morality of living outside "natural" limits will open up. Harkin also points out the importance of how the benefits of technology will be distributed. He aslo states: "Finally, as humans become more technological beings, technological beings are becoming more human. The category of 'humanoid robots' is new to us in reality, although long imagined in science fiction, and considered at a fairly deep level by writers such as Isaac Asimov and Philip K. Dick. However, the reality of humanoid robots will open up fundamental philosophical, ethical, and legal questions of humanity and its relation to robots". In the same way, the author discusses the Internet revolution, highlighting the intertwining of the virtual and real worlds of Internet users, because for many online identity is a central component of their overall identity. According to Harkin: "If we are living (or soon will be) in a post-human world, it is worth questioning whether we can be said to be entering a post-cultural era. [...] Or, going further, should we finally recognize, as many have urged, that 'culture' was always an ideological construct — a scientific reification used to manufacture and legitimize boundaries that reflected a set of distinctly European fantasies — fantasies that proved to be historically unsustainable?" [20 p99-102]

According to Kathleen Richardson, the Terminator film series exemplifies how super-advanced intelligent machines tend to destroy humanity to ensure their own supremacy. She explores the origins of the robot as a cultural product in the cultural milieu of the 1920s. According to her, the robot was a critical response to the views of right-wing and left-wing philosophies which, as Karol Čapek believed, were obsessed with work and production. Richardson explores how the revolution and the fear that humans are gradually losing their individuality influenced the notions and understanding of robots. Then she introduces the concept of robot into the field of artificial intelligence, which focuses on the simulation of human intelligence in machines, and points out that much of the efforts put into creating AI has been devoted to the development of war machines. In doing so, Richardson focuses on Alan Turing's biography, related to his theory of thinking machines. The author explores the philosophy associated with social robots and social machines, and leads us to the new way of thinking about what it means to be social and how companionship between humans and machines can be developed. Richardson is also engaged in the study of gender issues of the people involved in the creation of robots and AI systems and the types of those people, who are often characterized as "weird". The creative work of scientists on constructing the robot is a form of unconscious dialogue with their own existential anxieties and difficulties. Finally, the author interprets the roles of fantasy and reality in the creation of robots. [21 p1-20]

Michael Mateas analyzes HAL 9000, a form of AI from the books of Arthur Clarke and the film productions created from them (most notably 2001: A Space Odyssey and 2010: The Second Odyssey). Instead of presenting Hal as an expression of human fear of an evolutionary confrontation with increasingly autonomous technologies, Mateas offers an interpretation of Hal as an expression of goals, methodologies and dreams in the field of artificial intelligence. Hal contained pre-existing intellectual currents already operating within the field of AI and served as an important cornerstone that had a remarkable impact on individual actors in the field of artificial intelli-

gence and aspirations in the field. Writing in the context of the combined efforts of the humanities and computer science, Mateas reads Hal as a representation and expression of technological practices within AI. Hal was and remains a powerful inspiration for AI researchers. The author shows how Hal influenced the work of AI engineers and the current state of AI research. There have been many depictions of robots and smart computers in science fiction films, but few have achieved the status of Hal among AI experts. It has integrated many specific abilities, such as computer vision, natural language processing, chess playing, etc., representing the desirable model of intelligence that AI researchers have been looking for.[3] Also, Mateas points out that the field of AI has produced a series of technological practices and interpretive conventions in the creation of machines whose behaviour can be considered intelligent. Artists have begun to incorporate AI into practices of cultural production, which is reflected in the production of artefacts and experiences that function in the field of culture. [22 p147]

According to Wolfgang Hofkirchner and Hans-Jörg Kreowski, "transhumanism is a worldwide philosophical and futuristic movement aiming to enhance the intellectual and physical capabilities of human beings beyond their current limits. Having its roots in the 1920s and 1930s, it has gotten quite some drive and attention in the last three decades. [...] Transhumanists intend to employ already existing and future technologies such as artificial intelligence, robotics, cognitive science, information technology, nanotechnology, biotechnology and others as human enhancement technologies." The authors state two positions. The first was given by Max More, one of the main proponents of transhumanism, who defines it as "both a reason-based philosophy and a cultural movement that affirms the possibility and desirability of fundamentally improving the human condition by means of science and technology." There is another point of view, that of Francis Fukuyama, who saw transhumanism as one of the most dangerous ideas in the world.[23 pV]

For the military-industrial complexes, transhumanism is a kind of temptation. Namely, future technologies promise to break the limits of military power, especially in terms of connecting people and machines, overall computers. [24 p97-110] Also, new gene editing inventions allow direct modification of the DNA of organisms. Genetic engineering can be used to improve human beings and, even, ensure that these changes be inherited by future generations. [25 p111-120] In the same way, transhumanism forces social innovation that can be a double-edged sword, as we face an era of military rearmament due to advances in AI, robotics, and the enhancement of human beings. [26 p121-130] Some authors believe that computers will never be more intelligent than humans, because human intelligence is not based only on logical and computational operations, but possesses a number of characteristics unique only to humans (such as curiosity, imagination, intuition, emotions, passions, desires, pleasures, enjoyment, purposes, goals, values, morals, experience, wisdom, judgment and humour). [27 p133-140] Others believe that a verification criterion is necessary for robotic devices, computing machines, autonomous cars, drones, etc., so they will not harm

[3] Michael Mateas. Reading Hal: representations and artificial intelligence , https://users.soe.ucsc.edu/~michaelm/publications/mateas-a-space-odyssey-2006.pdf (accessed 14.01.2024)

humans under any circumstances. [28 p141-154] Transhumanism is under the scrutiny of scientific critical viewpoints related to racial and decolonial theories. The views of transhumanism tend to establish an "algorithmic" relationship to the historical processes of race formation within the Euro-American historical experience, and form a techno-scientific response to the "white crisis" phenomenon. [29 p169-183]

Questions in the domain of transhumanism and biopolitics have also been discussed by anthropologists and sociologists in Serbia and the region. The second volume of the journal Anthropology for 2012 (published by the Department of Ethnology and Anthropology, Faculty of Philosophy, University of Belgrade) is devoted to relations between the body, (bio)technologies and power. Polona Tratnik points out the importance of biotechnology, which she considers as "a political technology investing in the body, improving its qualities, prolonging youth, taking care of health and reproduction". […] It intensifies techniques of biopolitics and anatomo-politics (detected by Foucault) and implicates specially derived politics, engineering-politics and regenerative-politics, which demonstrate that there is power over life and body in contemporaneity that is far exceeding the extensions and the technological possibilities of power from the biological modernity." [30 p17] Ivana Greguric touches upon many questions raised by cyborgisation, the process "in which organic and inorganic 'nature', humans, computers and machines integrate, making a single matrix entity – the Cyborg", and emphasizes: "In order to protect man from the omnipotence of technology and its unethical application is necessary to establish cyborgoethics that would determine the implementation of an artificial boundary in the natural body." [31 p41]

Veselin Mitrović, focusing on liberal eugenics, writes: "Does the precision of the reproductive technologies enable freedom of choice regarding the desirable personal traits, or it is a potential tyranny of parents over children and the path to a uniform sexuality?" [32 p79] He is of the opinion "that the concept of the liberal eugenics would not lead to the reproduction of chosen traits but to the self-reproduction of women which might eventually create an asexual society". [32 p79]

Offering introductory remarks on the post-secular paradigm and the influence of religion in new medical biotechnologies, Zorica Ivanović considers, among other issues, governing biotechnologies: "Today, already extensive literature on various aspects of contemporary biopolitics points to the importance of new medical biotechnologies, which should be understood as 'political technology invested in the body'. It is a 'politics of life itself', which differs from biopolitics from previous periods in that it enables us to control, manage, reshape and adjust 'the very life capacities of human beings as living creatures'." [33 p 855-856] "In any case, one of the important elements in the repertoire that states have developed to deal with the challenges of managing biosciences are bioethical bodies. These bodies represent advisory institutions of expertise appointed by state or international authorities, which have the task of considering morally and technically complex issues on behalf of the public with the aim of encouraging wider discussion and giving opinions and recommendations to awardees." [33 p 856] "In this way, the development of biosciences called into question not only the boundaries between living and non-living, between human and non-human, but also posed a challenge to the moral and political understanding of the very foun-

dations of democratic institutions in societies where religious freedoms are treated as the basis of individual freedom and human dignity." [33 p856-7] "[…] the influence of religion on the processes of formulating public policies and passing laws in the field of bioethics can be diverse depending on specific situations and different religious traditions. This remark applies both to the elements and influences that constitute the landscape of actors and to the methodologies and influence of social authorities that create norms." [33 p862]

According to Steven Lyon and Michael Fisher, the displacement of populations caused by natural disasters opens up a series of problems in urban planning, the solution of which requires a shorter or longer period of time. The authors believe that the most important contribution that anthropologists can make is the creation of a formal model of indigenous knowledge systems, derived from specific cultural systems, and the identification of ways to communicate with such systems. The creation of indigenous knowledge systems would imply a multidisciplinary approach that borrows knowledge from the development of AI and MAM (multi-agent modelling – design of multi-agent systems)[4]. Lyon and Fisher point out that these disciplines can play an important role in the long-term planning of the coexistence of relocated communities, if these knowledge systems are adequately informed by anthropological interpretations relating to communities that are relocated. [34 p40-53]

According to Steven Puff: " Anthropologists should explore machine learning anew in order to revitalize their understanding of the interconnected sociotechnical phenomena of machine learning, data science, and big data […]. This would help foster new connections between anthropology and data science and within the qualitative/quantitative battlefield; this could help generate new connections with a newly rising perspective more potentially amicable to ethnography and other anthropological methods and modes of thinking."[5] Some authors believe that the association of anthropology, information science and artificial intelligence opens up the possibilities of a transdisciplinary activity that is able to shape and interpret human culture. An Ethnographic Semantic Data Modeling (EKSDM) approach is proposed because it combines ethnography with semantic data processing techniques to create systems of analysis that encompass broader contexts and explanatory possibilities.[6]

[4] Agents and multi-agent systems represent software that has the ability to solve problems independently, without user intervention, and today they are mainly used to solve typical problems in the field of transportation and logistics, and serve to support decision-making

[5] Paff, Stephen, The anthropology of machine learning , 39, 2018. https://ethno-data.com/the-anthropology-of-machine-learning/ (accessed 12.03.2024)

[6] Artz, Matt. From machine learning to machine knowing: a digital anthropology approach for the machine interpretation of cultures : 1-7, 2023. https://www.researchgate.net/publication/372336052_From_Machine_Learning_to_Machine_Knowing_A_Digital_Anthropology_Approach_for_the_Machine_Interpretation_of_Cultures (accessed 12.03.2024)

Conclusion

Social sciences, among them anthropology, are invited to consider the cultural aspects of society that are influenced by the increasingly rapid development of artificial intelligence and new technologies. Also, social sciences can indicate the directions in which the future of society can develop in accordance with the development of technologies, and, perhaps, influence the formation and standardization of future cultural aspects and models related to AI and new technologies.

Scientists, among them anthropologists, should try to interpret this phenomenon with their active involvement. Their goal is to provide a multitude of possible visions of humanity's future, to point out the advantages, disadvantages and dangers brought by access to modern technology, which is increasingly based on artificial intelligence. Scientists should seek to provide answers as to how to live with AI and how it affects the formation of new value systems and transforms humans themselves. In a way, AI can be considered, especially from the perspective of the wider population and some scientists, among them anthropologists, as an opportunity to achieve the utopian dream of objectivity of results and methods in a broader sense, free from the influence of politics, ideology and power structures. AI may serve as a tool to break free from the control of political and economic power centres. Also, according to some scientists, AI can ensure privacy and gradually lead to the transformation of existing models of political and economic order.

On the other hand, transhumanism and the ideas it advocates are being scrutinized by some scientists precisely because it gives the possibility of using AI as a tool of biopolitics. A part of the wider population, a part of the scientific community and pseudoscientific circles, in some media-dominated societies, which are prone to conspiracy theories and technophobia, voice their concerns that artificial intelligence may become a tool of global control or, even, the realization of the fear that autonomous technology might clash with humanity at its ultimate evolutionary stage. Such fears are observable as a motif in literature and film art. Also, religious people and those with a somewhat more traditional value system believe that the development of technology and the growing attachment of man to it, and the inadequate attitude towards it, leads to alienation, changes in relations between people and the collapse of value systems which were considered "desirable" in a long historical period. Therefore, fear of the unknown dominates among these people and the anxiety that if too much freedom is allowed in the process of constantly overcoming previously set civilizational and technological boundaries, the existence and role of man in the modern world may become meaningless.

The development of AI certainly leads to transformations of human society and the individual in it. They can be fast, undesirable, and sometimes society cannot keep pace with such transformations. On the other hand, they can contribute to progress in the sphere of science, health, education, economic and infrastructural development, help in solving population crises, enable the extension and facilitation of human life, etc. Given the multitude of possible scenarios when it comes to the question of direc-

tions in which the development of AI can lead humanity, only time will tell to which destination this development will take us.

It seems that a moderate path is always the best solution when decisions need to be made regarding dilemmas related to the relationship between artificial intelligence and human beings. According to our opinion, it implies the use of AI for the benefit of humanity, and preserving a relationship with technology in which human would not lose personal identity, unique physical, psychological and intellectual properties, the ability to develop and progress in all possible aspects, through personal work and achievements, and the interaction with the world in which lives. AI technologies and humans can and must co-exist in a modern society, and for this co-existence, sometimes, it is necessary to set limits determining the extent to which artificial intelligence can replace or permeate the human entity.

Rezime

Istraživači iz sfere društvenih nauka mogu svojim aktivnim angažmanom pokušati da interpretiraju ovaj fenomen u nastojanju da daju mnoštvo mogućih vizija budućnosti čovečanstva, da ukažu na prednosti, mane i opasnosti vezane za pristup modernoj tehnologiji, u čijoj je osnovi sve više veštačka inteligencija, kako se sa njom živi i kako ona utiče na formiranje novih sistema vrednosti i transformiše samog čoveka. Na neki način, AI se može smatrati, pogotovo iz vizure šire populacije i pojedinih naučnika, među njima i antropologa, mogućnošću da se ostvari utopijski san o objektivnosti rezultata i metoda u širem smislu, lišenih uticaja politike, ideologije i struktura moći. AI može poslužiti kao sredstvo za oslobađanje od kontrole političkih i ekonomskih centara moći. Takođe, prema pojedinim naučnicima, AI može obezbediti privatnost i postepeno dovesti do transformacije postojećih modela političkog i ekonomskog poretka. Razvoj AI svakako dovodi do transformacija ljudskog društva i pojedinca u njemu. One mogu biti brze, nepoželjne, a društvo ih nekad ne može ispratiti na adekvatan način. S druge strane, one mogu doprineti napretku u sferi nauke, zdravstva, školstva, ekonomskog i infrastrukturnog razvoja, pomoći u rešavanju populacionih kriza, omogućiti produženje i olakšanje ljudskog života i sl. S obzirom na mnoštvo mogućih scenarija kad je reč o pitanju kojim putem razvoj AI može povesti čovečanstvo, samo ostaje da vreme pokaže do kojeg odredišta će nas taj razvoj odvesti.

Ključne reči: veštačka inteligencija, antropologija, tehnologija, društvene nauke, transhumanizam, biopolitika, antropologija veštačke inteligencije, antropološke studije tehnologije

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Review

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BOOK REVIEW: *UMIJEĆE MEDICINSKIH MJERENJA SANTORIJA SANTORIJA/VEŠČINA SANTORIJA SANTORIJA O STATIČNI MEDICINI/ L'ARTE DELLE MISURAZIONI MEDICHE DI SANTORIO SANTORIO. HRVATSKI, SLOVENSKI I TALIJANSKI PRIJEVOD* [THE ART OF MEDICAL MEASUREMENTS OF SANTORIO SANTORIO], BY ZRINKA BLAŽEVIĆ (EDITOR), ZAGREB: FF PRESS, 2023, P. 291. 24 X 15 CM. ISBN: 978-953-379-001-5

This book, co-published by the Centre for Historical Research from Rovinj (Croatia), the IRRIS Institute for Research, Development and Strategies of Society, Culture and Environment from Koper (Slovenia), the Centre for Research on the History of the Population of the Northern Adriatic of the Faculty of Philosophy of the University of Juraj Dobrila in Pula (Croatia) and the Faculty of Philosophy of the University of Zagreb (Croatia), includes an introductory study and a trilingual translation of Santorio Santorio's work *The Art of Medical Measurements / De medicina statica*, first printed in Venice in 1614. It is extremely relevant as a historical source, and it is hallmarked by a high scientific and professional level of production. Marta Jurković's introductory study „*The Art of Medical Measurements* by Santorio Santorio" consists of the following chapters: Note about the author; Structure of early modern medical knowledge; Bibliographic note on the work; The body as a system: metabolism and the idea of balance; Beginnings of quantification in medicine; Leiden edition of *The Art of Medical Measurement*. A list of sources and literature follows, followed by a translation of the work from Latin into Croatian (Zrinka Blažević), Italian (Matija Drandić) and Slovenian (Darja Mihelić). The comments were prepared by Zrinka Blažević.

Santorio's *The Art of Medical Measurements* is organized into seven sections, and in addition to the main text of the treatise, the revised edition contains an introductory note, a dedication to Nicoló Contarini (1553 – 1631) and a preface („To the Reader"), as well as subsequently added aphorisms and a copperplate depicting a measuring stool. Santorio's *Art* consists of five hundred and two consecutively arranged aphorisms, which are marked with Roman numerals and arranged in seven sections: *On the weighing of insensible evaporation* (140 aphorisms), *On air and water* (61 aphorisms),

On food and drink (105 aphorisms), *On sleep and wakefulness* (70 aphorisms), *On exercise and rest* (36 aphorisms), *On sexual intercourse* (42 aphorisms) and *On mental feelings* (48 aphorisms). It is clear from the above mentioned that Santorio followed the normative early modern hygiene-dietetic tradition when conceiving the *Art*. However, unlike his contemporaries, he gave unquestionable priority over unnatural things to insensible evaporation.

It is worth highlighting the most important elements that make this edition scientifically and professionally relevant. First of all, it brings the first complete, even trilingual, translation of one of the most important and influential works of early modern medicine. It is a book that had an exceptional influence on the development of medicine and natural sciences, as evidenced by the fact that its author Santorio Santorio (1561-1636) is considered the founder of iatrophysics, the predecessor of corpuscular theory and the promoter of quantitative methods in medicine. In accordance with the Hippocratic-Galenian teaching on the so-called six unnatural things (*sex res non-naturales*), which rests on the idea that the health of the body and mind can be preserved by proper regulation of the way of life, Santorio Santorio elaborated the iatrophysical conception of health and strengthened it with the experimental results of weighing sensible and insensible evaporation. This work by Santorio has not been adequately interpreted in the field of domestic history of science, so this edition makes a great first step in this regard.

The introductory study analyses and presents the innovative aspects of Santorio's works and work, but also clearly indicates in which aspects Santorio remains within the traditional Hippocratic-Galenian paradigm. The author of the introductory study, Marta Jurković, evaluates and comments on Santorio's inventions and techniques, especially the quantitative procedures and measurements that Santorio introduces into medical theory and practice. Santorio, in fact, invented numerous surgical and measuring instruments, which he described in detail in another work from 1612 in which he commented on Galen's work. Among the instruments, there are now generally accepted instruments such as pulsilogium or devices for measuring pulse, thermometers for measuring body temperature and weighing chairs, i.e., scales for measuring body weight. In addition, it should be noted that the translator from Latin to Croatian, Zrinka Blažević, has provided expertly relevant comments, i.e., auxiliary tools, thanks to which this edition, in addition to scientists from the humanities and natural sciences, will also be able to be used by the interested public.

The book is intended for philologists, historians and scientists of natural sciences, especially those who deal with the history of science and the history of medicine, but also those who research cultural history, intellectual history and the history of everyday life. Thanks to translations from Latin into Croatian, Italian and Slovenian, as well as an extensive introductory study and comments, it is also accessible to a wider regional public. The potential benefit for high school and university history (and natural science) teachers should be highlighted, but also for citizens in whom the long-term coronavirus pandemic has increased sensitivity to the history of medicine and interest in anti-epidemic measures, healthy living, healthy nutrition, dealing with stress and other phenomena, which Santorio cultivated centuries before our time.

The fact that this project initiated the processing and translation of a very important work from the history of European and world medicine is particularly important. Translations into Slovenian and Italian make the Croatian edition internationally relevant and provide important international references for domestic and regional historiography, which it otherwise chronically lacks. The edition offers a methodological pattern of how to approach similar medical works from the pre-modern period and develops the relevant terminology.

The scientific community in the domain of historiography (history of science, history of medicine, intellectual history, cultural history), as well as Italian studies, Slavic studies, Croatian studies, and classical philology will certainly benefit greatly from this edition, both in terms of content and in terms of the development of specific terminology. Due to the great effort and numerous specific knowledge invested in the multilingual edition, the book will certainly have a considerable international reception. Due to the treatment of an extremely topical issues in times of a pandemic, this work is also important from the perspective of public interest, and it can also serve to enrich history classes at the high school and university level. Therefore, it can rightly be concluded that the trilingual edition of the work *The Art of Medical Measurements* by Santorio Santorio truly represents a great scientific contribution in the historiographical and philological sense.

Review

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BOOK REVIEW: PRAVILA O MEDICINI ČVRSTIH DIJELOVA U SVRHU ISPRAVNE UPOTREBE MJERENJA / CANONES DE MEDICINA SOLIDORUM AD RECTUM STATICES USUM [PRINCIPLES OF THE MEDICINE OF SOLIDS FOR THE PROPER USE OF MEDICAL MEASUREMENT], BY ĐURO BAGLIVI. TRANSLATED AND EDITED BY ZRINKA BLAŽEVIĆ. ZAGREB: MEDICINSKA NAKLADA, 2022, P. 165. 24 X 17 CM. ISBN: 978-953-368-015-6[1]

Medicinska naklada has long provided general audiences with university textbooks and specialist literature. However, the prominent Zagreb-based medical publisher has recently branched out into historical treatises, beginning with *Pravila o medicini čvrstih dijelova u svrhu ispravne upotrebe mjerenja* [Canones de medicina solidorum ad rectum statices usum; Principles of the Medicine of Solids for the Proper Use of Medical Measurement] by the Ragusan-born physician and polymath Đuro [Giorgio] Baglivi (1668–1707). This edition marks the first translation of Baglivi's final work into Croatian, an achievement made possible by Professor Zrinka Blažević of the Faculty of Humanities and Social Sciences in Zagreb, who also edited and annotated this beautifully produced bilingual edition. Numbering at 165 pages, the volume includes an introduction, a transcript of the Latin original, and the Croatian translation.

The introduction (pp. 1–17) gives a comprehensive overview of Baglivi's life and work, situating him within the wider framework of early modern medical thought. This is followed by an in-depth analysis of the Leiden edition of the *Canones*, published in 1707. The volume editor underscores the polemical nature of Baglivi's treatise, noting that it builds on *Ars de statica medicina* [On Medical Measurement] (1614) by the Istrian-born Venetian physician Santorio Santorio (1561–1636). Both works are early modern adaptations of Galen's concept of the six non-naturals, offering dietetic and hygienic advice on how to maintain health and extend life. The introduction also examines Baglivi's letters on a range of subjects, concluding with an overview of his theory of solid pathology and its impact on contemporary understandings of the body, medical and popular alike.

[1] This review was originally published in Croatian in Radovi Zavoda za hrvatsku povijest Filozofskoga fakulteta Sveučilišta u Zagrebu [Journal of the Institute of Croatian History] in 2022.

The main body of the text includes the publisher's note (pp. 20 and 90), preface (pp. 21–24; 91–96), the treatise itself (pp. 25–41; 97–116), and the epilogue (pp. 42–43; 117–118). Baglivi begins the two-part preface by listing prominent Italian physicians and their contributions to European science and medicine, followed by a commendation of Giovan Francesco Morosini (1658–1739), the Venetian envoy at the Papal court. The *Canones* consist of 51 aphorisms in which Baglivi elaborates on Santorio's treatise, further developing the foundational concept of balance, or *eukrasia*. In early modern medicine, *eukrasia* referred to the balance of the four bodily humors (blood, phlegm, black bile, yellow bile), which depended on good digestion and the excretion of harmful matter. However, Baglivi redefined health as an equilibrium not only between body and spirit, but also between the body's solid and fluid components (i.e. fibers and humors). The treatise concludes with an epilogue comprising nine aphorisms, a sort of manifesto in which Baglivi explicitly identifies his influences: Santorio Santorio and William Harvey (1578–1657) in theoretical, and Hippocrates (c. 460—c. 375 BCE) and Louis Duret (1527–1586) in practical matters.

As noted, the Leiden edition of the *Canones* also includes Baglivi's reflections on several topics (pp. 45–87; 119–165), presented in three letters to the Dutch physician Peter Hotton (1648–1709), professor of medicine at the University of Leiden. In the first letter, Baglivi describes a series of earthquakes that struck Central Italy between 1703 and 1705, focusing on the interdependence between human health and environmental factors. He also discusses the discovery of the column of the Roman Emperor Antonius Pius (138–161) and the headstone of the Passiena family in Rome, along with recounting the debates held in the *circolo di Tambura*. The final sections of the letter feature an account of the autopsies of Enrico Noris (1631–1704) and Celestino Sfondrati (1644–1696). These reports serve as an introduction to the second and most important letter (pp. 66–80; 142–157). In it, Baglivi lays out his solidist teaching, drawing on both ancient and contemporary sources to support his ideas. In the third and final letter (pp. 81–87; 158–165), he explores the growth of rocks, comparing the circulation of the sea within the Earth's core to the circulation of blood in the human body. Baglivi concludes the letter by announcing his plans for a new treatise, *Morborum successionibus* [*On the Succession of Diseases*], though he was ultimately unable to complete it.

The treatise is interesting on both the formal and conceptual level. Following the tradition of Hippocrates and Santorio, Baglivi presents his findings in the form of aphorisms. However, unlike the restrained Santorio, who briefly denounces his critics in the preface, Baglivi is markedly caustic. Throughout the *Canones*, he polemicizes with his "adversaries", whom he identifies as the "ignorant masses" (IV), "gullible physicians" (XXX), and "alchemists" (XLIV). To assert the validity of his interpretations, Baglivi draws on his natural-historical experiments, practical observations, and "the oracles of Nature" (XXXII). These self-fashioning strategies reflect not only the emerging culture of authorial originality, but also the coexistence of competing theories within the broader landscape of medical knowledge.

Traditional history of science has often promoted a teleological, linear view of scientific progress. However, Baglivi's theory is best described as eclectic: it is a multilayered reworking of Hippocratic and Galenic humoralism, in which he incorpo-

rates elements of iatrophysics as advocated by William Harvey and Santorio Santorio, as well as the methodical solidism of Caelius Aurelianus (5th century AD). These creative adaptations of existing medical knowledge directly challenge the Kuhnian model of scientific revolutions. The value of critical editions like this one is therefore twofold. On the one hand, they invite us to question established interpretations, in this case the narrative of a unified scientific revolution. On the other hand, they remind us that science itself is a social practice, and that scientific facts are a matter of expert consensus. And finally, this book is a treasure trove of fascinating and original insights: the author addresses a wide range of topics, from the importance of oral hygiene for proper digestion to female (reproductive) health.

Many experts consider Baglivi an innovative and important thinker. However, the Japanese historian of science Hisao Ishizuka merits particular mentioning: in his opinion, Baglivi's soldist teaching marks an epistemic shift in the history of medicine. Baglivi's conceptualization of the human body as a mechanism woven from sensible fibers had a profound impact on eighteenth-century culture at large, especially on the Enlightenment discourse on sensibility and empathy. It is no small thing that Medicinska naklada has recognized the value of both the work itself, and the expertly crafted translation. Baglivi's dedicated and meticulous translator has already given us a translation of Santorio Santorio's *Ars de statica medicina* and is currently working on a Croatian translation of the Hippocratic Corpus, which can only be described as a highly anticipated and valuable undertaking!

UPUTSTVO ZA AUTORE O PISANJU RADOVA ZA ACTA HISTORIAE MEDICINAE STOMATOLOGIAE PHARMACIAE MEDICINAE VETERINARIAE

Acta historiae medicinae, stomatologiae, pharmaciae, medicinae veterinariae je časopis koji se bavi temama istorije zdravstvene kulture (medicine, farmacije, stomatologije i veterine), mentaliteta, privatnog života, urbane i ruralne svakodnevice i životnih uslova, strukture gradskih i seoskih naselja, istorijom demografije, granica (strukture, institucije, promet ljudi i robe, kretanje zaraza, regulacije i kršenje regulacija), zdravstvene deontologije kao i istorijom arhitekture i urbanizma u kontekstu istorije zdravstvene kulture i institucija. Časopis izdaje dve sveske godišnje, uz objavljivanje: izvornih naučnih članaka, preglednih naučnih članaka, kratkih naučnih članaka, prikaza i bibliografija.

Acta historiae medicinae, stomatologiae, pharmaciae, medicinae veterinariae objavljuje radove koji nisu ranije objavljivani. Mogu se prihvatiti i radovi in extenso koji su prethodno delimično izloženi na naučnom ili stručnom skupu. Prihvaćeni radovi objavljuju se po redosledu koji određuje uređivački odbor na predlog glavnog i odgovornog urednika.

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