Architecture of Defensive Gates of Western Ukraine Castles in the 16th – 17th Centuries

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Abstract. On the territory of Ukraine there have been preserved a number of castles which as relics of cultural heritage are attractive tourist landmarks. In modern information sphere, alongside great number of historical-descriptive sources on the castles of Ukraine, there is a market lack for the results of comparative and typological analysis of their defensive structures. In particular, investigation of the architecture of the castle entrance junctions as predominant structures of the castle complexes reflecting its representative and defensive functions is topical. The objectives of the investigation are: to determine the state of preservation of entrance gates in the castles of the 16th – 17th centuries in Western Ukraine; to define forming preconditions and factors in the period of their military functioning and after it; to identify and describe types of volumetric-spatial characteristics of the castle gates on the basis of the patterns of the systems of defensive structures organization formed in the history of military art; to characterize elements of entrance junctions (structures in front of the gates, external fortifications, lifting bridges) and external decoration of gate structures. As a result of the investigation, the degree of entrance gates preservation has been found. We have discovered that out of the whole range of castles functioning as defensive structures in the mid – 16th – 17th centuries in the western region of Ukraine only in the 9 of them there are gates with the integral volumetric-spatial structure operating as part of museum complexes and other public buildings; 8 gates are in ruins, still they have preserved volumetric-spatial structure; other 7 castle gates have preserved only separate fragments as part of the later structures or as ruins. Five variants of volumetric-spatial structure of the gates have been defined and analyzed. Relying on the structural analysis of the preserved gates and historical sources, we have found out that within the period of the 16th – 17th centuries when application of the firearms on the investigated territory was widespread, in the castles along with the prevailing number of structures characteristic of the bastion DS (defence system) there continued to function separate earlier structures peculiar to the tower and bastei DS. This is explained by the fact that some castles were laid down before the investigated period, which offers possibility of further investigation with the aim of going into the constructional history of the examined castles.

1. Introduction

Preserved to the present days, Western Ukraine castles have received a new life as the objects of cultural heritage, thus becoming attractive tourists’ landmarks. Alongside prevailing number of historical and descriptive sources on the castles, in the contemporary information field there is a pressing need for the results of the comparative and typological analysis of the architecture of the defensive works. Tourist attraction to the relics of the past must be grounded on scientific research
since the castles have a great potential for revealing in-depth knowledge of defensive structures as the most constituent part of the cultural heritage.

A castle entrance gate is a representative object and a very informative source for comprehending the architecture of the whole defensive complex. Firstly, it is dominant in the composition of the castle and represents the status of the castle owners. Secondly, it was functioning as an integral element in the contour of the fortification and thus containing information about the system of the castle defensive structure organization. Thirdly, revealing and examining layers from different stages of military functioning in the preserved castle junctures gives possibility to penetrate into the depth of the castle history. Throughout the period of their functioning, preserved defensive structures underwent modernization and adaptation to utilitarian non-military functions in the 18th – 20th centuries. Hence, the question how the entrance gates looked in the past period of their military functioning in the 16th – 17th centuries requires thorough investigation.

The objectives of the investigation: to determine the state of preservation of entrance gates in the castles of the 16th – 17th centuries in Western Ukraine; to define forming preconditions and factors in the period of their military functioning and after it; to describe types of volumetric-spatial characteristics of the castle gates and to define their belonging to the corresponding system of defensive structure organization; to characterize elements of entrance junctions (structures in front of the gates, external fortification, lifting bridges) and external decoration of gate structures.

In territory, the investigation comprises a number of Western Ukraine regions (Lviv, Volyn, Rivne, Ternopil, Ivano-Frankivsk regions) and its time limits represent the last period of the castle military functioning, taking into account layer upon layer of all the preceding periods.

2. Materials and methods
Numerous publications of Ukrainian and Polish researches (most famous of which are the works by A. Cholowski [1], H. Logvyn [2], O. Matsuk [3], R. Aftanazi [4], Z. Plarchyk [5], Ya. Adamchyk [6], V. Pshyk [7]) teach upon construction history of the castles and present data on the lost elements, reconstructions and demolitions, which makes it possible to picture various changes that were taking place in the defensive structures of some castles as well as their outer appearances at different stages of existence. In addition, some researches (B. Gverken [8; 9], Yu. Nel’hosvy [10], O. Hodovaniuk [10; 13], Ya. Bohdanovsky [11], O. Plamenytska [12], L. Prybieha [14]) raise a question concerning formative influence of defensive functions on the fortification of the castles. They offer variants of the castle classification depending on the type of defensive structure or defence system used. In their papers on separate castles, a number of researchers brought up questions concerning architecture of the gate structures and the elements of entrance junctions [15 - 22]. However, a complex investigation of entrance gates of Western Ukrainian castles has not been carried out.

Methodological basis of the investigation is an interdisciplinary approach which enables one to reveal reasons for fortification architecture forming on the basis of the patterns of the systems of defensive structures organization formed in the history of military art. Generalized information on the building history of the castles and their spatial-planning characteristics is obtained from the historical sources and scientific literature and is presented in detail in our previous publications [23]. Analysis of the current state of the structures is conducted on the basis of our personal field survey.

3. Results and discussions
3.1. Preconditions of castle defensive gates shaping
In the middle of the 16th – at the end of the 17th century forms of fortifications that arose as a result of the increase of the firing capacity of artillery started to spread on the territory under study which was a part of the Polish State (the Commonwealth). At that period, centralization of state power institutions took place and absolute monarchy was established in many European countries, which did not promote setting up of private fortresses. In the Commonwealth, on the other hand, mediaeval
principles of social life were preserved, gradual weakening of centralized power and decentralization of state structures were observed.

Such structures as castles continued to be erected and function for the reason that their residential and defensive functions develop further and acquire new qualities that single them out from the vast majority of fortified settlements and fortresses. The castle fortifications are kept up in good condition and modernized even during the 18th century, which, as explained by M. Tkachov, is connected with the need to further defend themselves against social revolts and uprisings [24].

In order to study architectural form and understand the place and the role of the gates in the system of castle fortifications, as the basis of our study we adopt the models of systems of organization of defensive structures formed in the history of military art. In particular, we rely on the ideal models of defence systems worked out by the Polish researcher of the defence architecture Ya. Bohdanovsky [25].

3.2. Condition of preservation of the castle defensive gates
Before considering architecture of the gates, it is important to point out, relying on our previous studies, that in the middle of the 16th – the end of 17th centuries more than one hundred castles functioned on the territory of Western Ukraine (within Lviv, Volyn, Rivne, Ternopil, Ivano-Frankivsk regions) [26]. With the aim of comprehensive analysis of the architecture of defensive gates, we have singled out as the objects of our investigation only those castle the defensive gates of which have been preserved to the present day or about which the information is available in historical sources. Such are the gates in 36 castles. We have defined the following degrees of preservation of the structure of castle gates. 1) The integral part of volumetric-spatial structure is preserved, the gate is exploited as a part of the museum complex or other public buildings. These are the gates in Olytsa (two gates) (Volyn region); Dubno (Rivne region), Zhovkva, Zolochiv, Pidhirtsi; Svirzh (Lviv region); Zbarazh, Yazlovets (second line) (Ternopil region). 2) The identity of the volumetric-spatial structure is partially violated (is not left intact) through the loss of some elements, the gate lies in ruins or after non-defensive alterations becomes the part of other structures. Here belong the gates in Klevan (Rivne region); Dobromil (Lviv region), Ptiv, Chernelytsia (Ivano-Frankivsk region), Berezhany, Zolotyi Potik, Pidzamochok, Yazlovets (first line) (Ternopil region). 3) Only some elements of the volumetric-spatial structure are preserved and lie in ruins or are part of other structures after reconstruction. Such are castle gates in Knyahynyn (Rivne region), Stare Selo (Lviv region), Mariampil (Ivano-Frankivsk region), Budaniv, Zaloztsi, Kudrynets, Mykulynts (Ternopil region). 4) Any remnants of the gates above the surface of the day light are missing. These are the castle gates in Brody, Murovane (Liashky Murovani), Pomoriyan (Lviv region), Halych, Rakovets (Ivano-Frankivsk region), Buchach, Vyshniivtsi Kryvche, Oleksynets Staryi, Skalat, Terebovlia, Tocky, Chortkiv, Yahilnytsa (Ternopil region). Although afore mentioned gates are not preserved, still in scientific publications, such as historical descriptions and iconography information is available on their appearance in the past.

3.3. Typology of the castle entrance structures
We distinguish five variants of entrance gates in the investigated castles.

Variant 1. The structure of the gate (rectangular in design) partially juts out (sticks out) beyond the external perimeter of the outline and in the past, apparently, it performed flanking function i.e. the space along the walls was exposed to fire. Such a planning solution is found in the castles fortified in the tower DS in Lyashky Murovani and Kudrynets in which entrance gate was arranged in a corner tower. The tower with an entrance gate, partially projecting over the outer boundary of the wall, was placed roughly in the middle of the curtain walls in the castle of Staryi Oleksynets (figure 1.1, 1.2). After reconstruction in the second half of the 17th century, an entrance to the castle in Halych was arranged through the rectangular in design cornerstone brickwork structure. Out of the above mentioned gates, there have been preserved to this day only the ruins of the gates of the castle in Kudrynets.
Figure 1. Castle gates built according to the medieval principles of fortifying: 1 – Castle in Oleksynets Staryi (graphic representation of the castle plan, current state. Lost structures are marked by a dash line, drawings by O. konchenko, fortification contour after B. Gwerken [15]); 2 – Castle in Oleksynets. Outer facade of the entrance gate (drawings by O. Okonchenko, graphic representation from a photo of the beginning of the twentieth century [27]); 3 – Castle in Budaniv (graphic representation of the castle plan, measurements of the beginning of the twentieth century by B. Gwerken [8]).

Figure 2. Castle in Pidzamochok: 1 – view of the castle from the entrance; 2 – graphic representation of the castle plan, current state. Photo and drawing by O. Okonchenko.

Variant 2. The structure of the gate juts out beyond the boundary of the external line of the defensive walls and is adjacent to them; the path of entry to the territory of the castle goes along the fortification line and in the gate itself turns to the entrance arch inside the fortification perimeter. Such a solution resembles the medieval-type entrance – zahab – a long defensive corridor leading to the gate along the defensive wall. Entering such a corridor, the enemy got under the fire from the galleries in the walls.

In the castle in Budaniv, the zahab-type entrance is adjusted to the side of the northern curtain walls. Though it was laid at that time but it is well traced on the plan dating from the early 20th century (Figure 1.3). There are valid grounds to believe that such a design not characteristic of the bastei defensive system is the result of the fact that earlier fortifications were included in the castle modernized at the turn of the 16th – 17th centuries. The planning structure resembling a zahab-type entrance is traced in the north-eastern curtain walls of the bastei castle in Berezhany, although historical plans of the 18th – 19th centuries testify to the fact that the gate was in the south-east wall dating from the 16th –17th centuries.

Variant 3. The structure of the gate does not jut out beyond the outer boundary of the defensive wall and is adjacent to one or is between the two of the gate structures – flanking towers, basteis or early bastion forms. Such a solution of an entrance gate is found in the modernized according to the principles of the bastei system of defence in the castles in Klevan and Berezhany (Figure 6.6) and Pidzamok with the south bastion corner defensive works in the form of puntone (Figure 2). In the castle in Pidzamok, the location of the entrance juncture is similar to the placement of the gates in the
tower system defence organization, since the passage is between two by-gate towers, which was characteristic of defence structures in Western Europe as far back as the 14th – 15th centuries.

![Figure 3. Castle in Pniv: 1 – View of the castle from the entrance; 2 – Graphic representation of the castle and gate plans, current state. Photo and drawings by O. Okonchenko.](image1)

The first, second and third variants of entrance solutions are connected with the medieval principles of fortifying when the castle defence was primarily meant to protect defensive walls and the foot but not to protect the forefield like it was in the period of massive spreading of artillery. The presence of outdated solutions in the fortifications functioning in the 16th – 18th centuries testifies to the fact that early (older) defensive structures were included in modernized fortification perimeters. In particular, in the castles laid by the middle of the 16th century (Rakovets, Klevan, Buchach, Terebovlya, Pomoryany, Lyashky Murovani)

Variant 4. The passage is arranged through the bastei or early bastion forms. Such an entrance gate performs both flanking and passage functions simultaneously. This solution is caused by the desire to find forms that can protect the entrance and have the positions for defence against firearms or at least against manual firearms. A typical example of such a solution is the entry gate in Pniv located in the

![Figure 4. Castle in Yazlovets: 1 – Second line of fortifications (view of the western part of the castle with the entrance gate); 2 – Entrance gate of the first line of fortifications; 3 – Graphic representation of the castle plan, current state (a – the gate of the first line, b – the gate of the second line); 4 – Plan of the entrance gate of the first line of fortifications [8]. Photos and drawings by O. Okonchenko.](image2)
flank of the pentagonal in design structure (Figure 3). The gate itself is very small in size but its pentagonal form and the shape of the neighboring corner defensive work indicates that the designers calculated the firearm firing angle. Entrance to the territory of the castle through the flanking defensive structure can be observed in the preserved to the present day ruins of the castle in Dodromil where the passage way is located in the large polyhedral bastei, and in the nucleus of the castle in Yazlovets (Figure 4) in which the entrance is arranged through a quadrangular corner bastei.

![Figure 5. Volumetric-spatial solution and exterior decoration of entrance gates and graphic representation of the castle plan, current state: 1 – Castle in Zolotyi Potik; 2 – Castle in Zhovkva; 3 – Castle in Zbarazh. Drawings by O. Okonchenko](image)

Variant 5. Design solutions characteristic of the period of artillery distribution. Unlike the previously considered solutions, an entrance gate is located in the middle of a curtain wall (a wall, or an embankment) – in a structure that did not jut out beyond its outer boundary and was protected by flanking fire from the corner defensive structures. Such an entrance is typical of the majority of the investigated castles fortified according to the principles of the bastion system of defence. Still one may come across this solution in some tower system castles after their modernization, namely in the castles of Kryvche and Svirzh, as well as in the bastei castle in Mykulyntsi. According to the principles of the bastion DS the entrance junctions were constructed in the early bastion castles which had corner defence works in the shape of a puntone and beluards (castles in Zhovkva, Zolotyi Potik, Zbarazh and Yazlovets in the western part of the second fortification line) (Figure 5) and in the castles fortified in the classical bastion systems (castles in Brody, Pidhirtsi, Chernelytsia, Olyka, Zolochev, Vyshivtsi, Dubno, Mariampil, Berezhany) (Figure 6). Dimensions of the gates depended on the solution of the entire bastion front.

3.4. Location and external fortifications of entrance gates
In the period of its military operation the core of the castle could have several gates. For example, in the castle in Olyka after its reconstruction at the end of the 17th – in the middle of the 18th centuries there functioned not one (as it had been before the reconstruction) but two entrance gates – on the side
of the town and on the opposite side. It is not always possible to define unambiguously what gates belong to the period of military functioning as it is in the castle of Vyshnivtsi (Figure 6.4) where information about the three gates, not preserved till the present day, is found only on the plans dating from the middle of the 18th century. For the reasons of convenience, many new passages in the fortification perimeter of the castle appeared only after the loss of its military significance. The presence of the gates in different directions of fortification perimeter is justified if through them during the period of their military functioning there was connection with external defensive structures located in front of the bastions (bastion front).

![Figure 6. Graphic representation of the castle plans (current state is denoted by a solid line, the lost fortifications – by a black dash line, the flooded areas – by hatching, the location of the gates – by a red line). Castles in: 1 – Pidhirtsi; 2 – Chernelytsia; 3 – Mariampol; 4 – Vyshnivets; 5 – Olyka; 6 – Berezhany; 7 – Brody; 8 – Dubno; 9 – Zolochiv. Drawings by O. Okonchenko.[23]](image)

As the most vulnerable place, the castle gates were often defended by additional pre-gate structures. There is only descriptive information on pre-gate structures in tower and basti castles on the investigated territory, e.g. there are assumptions that the entrance to the castle in Terebovlya was extra fortified with a barbican [28; 29]. In Toky, the passage to the core of the castle ran through a two-tier tower with machicolations, located on the opposite to the castle side of the peninsula and connected to it by defensive walls in the north and embankments or moats in the south [30]. In the castle of Pomoriany, the pre-gate structure near the castle on the territory of the town retained its defensive functions even in the second half of the 17th century – in the period when the castle and the town already had bastion fortifications [31].

For example, in the castle in Zolochiv (Figure 6.9), besides the main entrance to the castle located in the middle of the north-western curtain, there is a small passage in the opposite curtain information about which we find in the plan dating back to the 17th century [30]. Through this passage, a connection was established between the core of the castle and the kronverk typical of the Old Dutch School of Architecture. Remnants of these fortifications are barely traced in the planning structure of the plots on the southern side of the castle. The main castle entrance was fortified by a ravelin [31]. At the beginning of the 21st century, during the restoration of the castle the ravelin in front of the gate was reconstructed.
3.5. Drawbridge and an additional entrance close to the gate

From historical sources, we learn that in many of the investigated castles bridges with lifting part were functioning, which was an obligatory element of the castle bastion fortification. However, in the majority of the castles the structure of the gates was rebuilt, moats were filled up while drawbridges and their mechanisms were dismantled during the 18th–19th centuries. Historical descriptions testify to the fact that in the past there were drawbridges in front of the gates in the castles in Pomoryany [31], Dubno [33], and Zolochiv [34].

![Figure 7. Elements of castle entrance junctions: 1 – Castle in Brody. (Watercolor 1850 [10]); 2 – Castle in Brody (Graphic representation by O.Okonchenko of the plan of the entrance gate from the drawing of the end of the 18th c. [37]); 3 – Castle in Zhovkva. Chamber of the drawbridge, measurements of 2009 [38; 39], Drawing by O.Okonchenko.](image)

We can find evidence of the existence of lifting mechanisms while examining facades of the gates. For example, in the castle gates in Chernelytsia (in the second tier) (Figure 8.1), in Oleksynets Staryi (Figure 1.2), and Zolotyi Potik (in the third tier) (Figure 5.1) there are openings on the external front that, as we assume, are the remnants of the earlier portals of the lifting mechanism of the drawbridge. Although, no visible traces of the lifting mechanism are preserved in the structure of the castle gates in Zhovkva (Figure 5.2; 7.3), during archeological examination a chamber meant for the operation of the drawbridge was discovered under the passageway and on its bottom there was a well preserved fragment of the wooden bridge [38]. Thanks to these discoveries, it was possible to reconstruct the dimensions of the inner part of the drawbridge and the level of its working surface and to prove that the bridge was rebuilt after the drawbridge had stopped its functioning [39].

The entrance junction might have had two entries next to it – the main one and a wicket gate. In particular, each of the entrances was provided with a separate lifting section of the bridge. Information on the necessity of a wicket-gate next to the gate is found in the Treatise “Budownictwo Wojenne” by J. Naronowicz-Naronski published in 1659. [40] There is information preserved on the existence of such solutions in the past in the investigated castles. In particular, according to the inventory of 1689 (cited in the work by S. Kravtsov [41]) in the 17th century in the castle in Brody through the moat to the gate there ran a bridge with two lifting parts, one of which opened the gate itself and the other led to the wicket-gate (Figure 7.2). In the castles in Berezhany and Chernelytsia (Figure 8.1) there is a wicket-gate opening next to the entrance gate laid after the latter had lost its military significance.

3.6. Volumetric-spatial solution and exterior decoration of entrance gates

Architecture of fortifications of the investigated castles was primarily determined by their defensive functions. Therefore, all the elements and details of the castle defence structures were first of all dictated by their practical application and constructive design. Introduction of the ravelin in the bastion system of defence made the gate hidden as much as possible on the side of the forefield, which enabled application of rich decoration of external wall of the gate, which in its turn, made the entrance to the territory surrounded by fortifications more representative. Typically, the gates were decorated with pilasters on both sides of the passage and rusticated portals, as it is in the castles in Zolochiv,
Chernelytsia, and Pidhirtsi (Figure 8). A characteristic element of the external surface of the gate is a stone relief shield with coats of arms fixed to the wall.

Figure 8. Exterior decoration of entrance gates: 1 – Castle in Chernelytsia; 2 – Castle in Pidhirtsi. (Drawing by Yu. Nelhovsky 1949. [10]); 3 – Castle in Zolochiv. Photos by O.Okonchenko.

Location of the gate on the central axis satisfied conditions of achieving compositional integrity but the need to hide defensive structures at the level of the forefield was a restrictive factor in creating a residential image of the castle and the gate as its dominant in particular. The presence of the lifting part of the bridge in front of the gate, undoubtedly, indicates existence of at least two tiers in the structure: in the first tier there was a passage, while the mechanism of the drawbridge was in the second one. In the period of military functioning, the presence of high turrets above the gate in the bastion line of fortifications was undesirable.

After military function was lost, new tiers were freely erected above the gates thus acquiring more representative character. In addition, turrets on the gates played the role of observation posts over the territory at the approaches to the most remote fortifications of the town and the castle. For example, in the castle in Zhovkva (Figure 5.2) in which at present there are four floors only the first tier with a passage in it and a chamber under it can be attributed to the period of its primeval laying. While in the castle in Zolotyi Potik (Figure 5.1) the gate might have been of three tiers – the same as it has come to our time, which is proved by the preserved three-tier corners of the castle and a rather high level of the forefield, in comparison with the day surface, in front of the curtain walls with the gate. Residential features of the 18th century architecture are reflected in the rebuilt structures above the gates in the castles in Zbarazh (Figure 5.3), Zhovkva (Figure 5.2), Brody (Figure 7.1), and Olyka (Figure 6.5). Entrance portals received gorgeous decoration. For instance, during the restoration in the castle in Zbarazh a two-tier entrance gate was rebuilt in correspondence with its appearance in the 19th century. The gate of the 2nd line of bastion fortifications of the castle in Yazlovets had 1-2 tiers at the first stages of its military functioning but as a result of the fortification lines reconstruction into a monastery one more tier was built up on the bastions, curtains, and gates (Figure 4.1).

Changes connected with the reconstruction of castles after their loss of military significance did not presuppose military function and the owners of the castle did not aim to preserve primeval appearance of fortifications. Therefore, fortifications acquired features not peculiar to defensive structures of any period. Defensive character was lost owing to breaching door and window openings, additional passages in the defensive walls, building additional tiers on them, trimming facades of defensive structures with pseudo defensive or decorative elements characteristic of civil structures, rebuilding roofs and changing their form. Besides, such components of defensive structure as breastworks (working zone), embrasures, external fortifications in the bastion DS, moats and bridges were lost not being used in a new function. It is only the name “castle” itself and peculiar to defensive structures planning design that testifies to the military past of the structure.
4. Conclusions
As a result of the analysis of the state of the preservation of the gates, we have discovered that out of the more than one hundred castles function as defensive structures in the mid – 16th – 17th centuries in the western region of Ukraine only in the 9 of them there are gates with the integral volumetric-spatial structure operating as part of museum complexes and other public buildings. 8 gates are in ruins, still they have preserved volumetric-spatial structure; other 7 castle gates have preserved only separate fragments as part of the later structures or as ruins. The rest of the castle gates are lost. The above mentioned structures require special attention of the public since most of them are in the non-preserved state of ruins and therefore suffer unceasing losses as a result of environmental and anthropogenic factors.

Relying on the structural analysis of the preserved gates and historical sources, we have found out that within the period of the 16th – 17th centuries when application of the firearms on the investigated territory was widespread in the castles, along with the prevailing number of structures characteristic of the bastion DS there continued to function separate earlier structures peculiar to the tower and bastei DS. This is explained by the fact that some castles were laid down before the investigated period. It also allows us to refer the time of laying preserved castles fortifications in Budaniv, Kudrynsti, Berezhany, Pidzamochok, and Oleksynets Staryi before the middle of the 16th century.

Analysis of the elements and their comparison has shown that since the period of military functioning and to the present time entrance junctions of the castles have undergone significant changes. Complicated by turnings and obstacles in the form of drawbridges, an entrance juncture which prevented quick penetration into the castle was transformed into the simplest one often by adding a passage in a more convenient place. As a rule, buildings received new floors, tiers, roofs, decorative trimming, and stylistic solutions; moats were filled in, bridges and their lifting components were dismantled, machicolations and portholes of the lifting mechanism were remade into windows or walled up. Despite the variety of solutions in the structures under consideration, they always have indications characteristic of a certain type of the system of organization of defence structures. The findings of our investigation may find application in drawing up projects for restoration, reconstruction and exhibiting of the castle defensive structures and can serve as a supplement to theoretical works in the history of architecture. Of paramount importance is conducting of typological and comparative analysis of the gates, which will make it possible to use preserved elements as analogues to restore the lost ones.

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