Peculiarities of shaping of architectural moulds and profiles in St. Petersburg architecture of the XVIII century

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Abstract. The article discusses the formation of moulds and string cornices in the St. Petersburg architecture of the XVIII century. Significant distinctions of Russian architectural moulds in comparison with their analogues existent in classical orders of Western European architecture are revealed. The causes lying underneath of the regional transformation of architectural elements are analyzed. The examples of designing profiles in each individual style period of the XVIII century are provided. It has been found out that the whole first half of the XVIII century is characterized by seamless profiles without complex intercalated moulds, such as dentils, modillions, and consoles. The inherent features of the Elizabethan Baroque are unique moulds with an upper notch. The period of Early Classicism is characterized with the usage of both Baroque and classical moulds in the style of J. Vignola. Strict classicism was the period when architects used moulds in the style of A. Palladio and the usual practice was application of Greek moulds. On the basis of the analysis carried out in the research, characteristic features and dating elements of each stylistic period are determined, and the elements inherent for the unique style of architects who created their works during the specified period are described.

1. Introduction

In research of historical architecture based on applying the styles of classical architecture, or architectural orders, the shapes of moulds and profiles of decorative elements appear to be of great importance. What were the regularities and rules for constructing moulds and profiles of the buildings created in St. Petersburg in the XVIII century? A glance will suffice to show that these moulds differ significantly from the canonical order samples of Western Europe. It is also evident that the profile outlines were considerably changing throughout the XVIII century. Scientific works that would provide a due analysis of this phenomenon are not available. It is necessary to determine the features of drawing architectural moulds in St. Petersburg and reveal all the factors affecting the possible changes. Investigation of these issues may be vitally important in the study and restoration of buildings. For example, this could allow determining the time period that a building facade fragment belongs to, or specifying which existing moulds have preserved authentic author’s solution.

2. Materials and methods

Teaching the classical orders in architecture has always started with drawing architectural moulds. Moulds are the simplest elements making up the architectural profiles of the historical building facade. According to the theory of architectural orders, there exist two main traditions of drawing the outlines
of moulds, namely, the Roman and the Greek ones. Roman moulds were built using the mathematical compass and the ruler, their forms were described by the ancient Roman author Marcus Vitruvius and recorded in the writings of the Renaissance theorists J. Vignola, A. Palladio and others [1]. The hand-drawn character of Greek moulds differs significantly from that of the Roman moulds. The orders and details of the facades of most of the historical buildings in Europe in the XVII century – early XX century were built on the basis of Roman moulds. However, if ancient Greek orders were included in the design of the buildings, Greek profiles could also be used.

The analysis of the profiles and moulds of the buildings in St. Petersburg and its suburbs shows that in reality, these moulds are more complex and varied, and do not correspond to either Roman or Greek forms. The study of the moulds of the XVIII century is complicated due to their poor preservation. Profiles made of lime mortar were repeatedly retightened, and the original stucco moulds have not survived to the present moment. Stone moulds that have survived are quite rare and, as a rule, they are in poor condition. Author's drawings referring to the XVIII century, on which small elements are depicted, are so negligible in number that they can be considered as unique ones. Despite many of the negative factors mentioned above, the study of moulds in Russian architecture of the XVIII century is of great importance for the restoration of buildings and broadening the knowledge on the history of architecture. The analysis carried out by the author, based on considering a large amount of material and rejecting the obviously inaccurate data, has allowed determining and generalizing the most characteristic features of the stylistic architectural periods and coming up to certain conclusions.

3. The study of the structure of the modified lead-tin-base bronze

The moulds referring to the Petrine Baroque (1703–1730-s) bear the features of a transitional period when Russian architects were only beginning the study of Western European architecture. As for the profiles, you could come across some rough simplifications, when complex classic moulds were reduced to primitive fasciae. The most perfect moulds referring to that era, which have survived to our days, can be seen at the Hermitage Pavilion (in Peterhof) created to the design of I. Braunstein, an architect of German origin. The rest of the profiles (for example, the ones of the Monplaisir Palace (in Peterhof) or the Summer Palace of Peter I on the grounds of the Summer Garden, are much simpler. However, it can be argued that relatively complex profiles and simpler ones have common features (Figure 1). The moulds referring to that period are large-sized, concise and distinct. In their structure, most of them are regular Roman ones. In general, relatively few cymae reversae or cymae rectae are used, architects prefer using fascia boards and quarter-round fillets. The stylistics of profiles can rather be regarded as being closer to the works of the German theorist of the XVII century L. Sturm [2] than to the Italian Renaissance epoch samples by G. Vignola or A. Palladio. The treatise of L. Sturm was popular in Russia in the first half of the XVIII century and it was recommended for study and imitation [3].

![Moulds of the Petrine Baroque: a, b —capital and base of the Monplaisir Palace (1714–1723, architects A. Schlüter, J. Braunstein, J.-B. Le Blond, N. Michetti); c — the cornice of the Hermitage pavilion in Peterhof (1721–1725, architect J. Braunstein); d - window trim of the Summer Palace (1710-1713, architect D. Trezzini).](image-url)
The moulds of the Petrine Baroque can be regarded as classical and regular. However, the profiles composed of them were often made with great violations and deviations from the canons. For example, the simplest component – astragal – on the facade of the Monplaisir Palace is made in three versions and no one of them complies with the canonical rules. During this period, complex elements, such as dentils, modillions, consoles are not applied. As a result, it can be stated that in the Petrine Baroque period in St. Petersburg there is not a single order profile that would exactly match the rules of classical order of architecture.

Architraves in this period are characterized with a simple outline in the form of a wide band, sometimes framed along the edge with a cima reversa, as the architraves of the Summer Palace windows. The windows of this building are framed with a cima reversa that recedes from the window opening and, as it were, creates a window trim with the "ears" characteristic of the Peterine Baroque. The repeating elements were very noticeable. Under the strongly protruding fascia there could be fixed a roll moulding (Figure 1, c), over which a sharp shadow was formed. Such a thin sharp shadow can be seen both in the cornices and in the architraves. This small detail may be regarded as a harbinger of significant changes with moulds that would occur later.

During the Ann’s Baroque period (1730-s – early 1740-s), profiles were made of stucco or soft limestone (mainly on plinths). These moulds were tightened and repaired many times, and it is evident that the nature of the profiles has certainly changed (Figure 2). During this period, the profiles were smaller and fractional in nature. Their forms became softer. Cymas were used more often than listels and quarter-width fillets. In moulds, there could be two or three fasciae in succession. This repetition violates the classical rule of profiling, which requires the continuous alternation of elements in shape and size.

![Figure 2](image.png)

Figure 2. Profiles of the Ann’s Baroque: a ─ entablature of the Church of St. Simeon and Anna (1731–1734, architect M. G. Zemtsov); b ─ archivolt of the St. John’s Gate of the Peter and Paul Fortress (1738–1740, architect B. K. von Minich); c ─ the base of the Church of St. Panteleimon the Healer, current condition (1735–1739, architect I. K. Korobov); d ─ entablature of the Church of the Three Saints (1740-1760, architect C. G. Trezzini).

By this time, St. Petersburg builders had managed the skill of constructing complex elements, such as Attic bases (see Fig. 2, b), Ionic capitals ornamented with garlands, and even Corinthian capitals. But the absence of consoles and modillions on the ledges is still noticeable. On the building of the Church of St. Simeon and Anna, there are simplified dentils, the shape of which is very much deviated from the classical pattern (Figure 2, a). The entablatures contain pilaster sides emphasizing the Baroque nature of the profiles.

A characteristic element of the Ann’s Baroque is a special composite mould, namely, a roll moulding between two fasciae. It was placed under a big-sized protruding mould (Figure 2, d), herewith a deep narrow shadow was formed.

In the era of the Elizabethan Baroque, a further estrangement from the classical canons is observed.
There emerge elements that are significantly different from Roman and Greek moulds. The architects of St. Petersburg working in this period (F. Rastrelli, S. I. Chevakinsky and others) were striving to achieve the maximum decorative effect at the maximum simplicity of manufacture. Therefore, all the profiles referring to this period are seamless, without intercalated elements (there are no consoles, dentils, or modillions). Ledges and string cornices are complex in their nature, with a large number of moulds. So as to visually fractionalize the profiles, they used special moulds which cast deep shadows on the building facade.

Quarter-round fillets and listels during this period were most often replaced with an oval or round-shaped mould with considerable overlapping above the upper profile (Figure 3). The Baroque cyma reverse had received a zigzag shape with a shadow groove on the top. Such relief design elements were easily discerned on the white profiles of the facades. The outlines of the Russian Baroque listel rather resemble the Greek echinus than the Roman moulds. Baroque listel and cyma reverse are widely common in cornices and horizontal moulds. They can be located in the most unexpected places, such as at the end of the dripstone above the window aperture (Figure 4). In the classic version, a fascia and a cyma would be placed here.

![Figure 3. Comparison of curvilinear column moulds: a — Greek echinus; b — Roman quarter-round fillet; c — Russian Baroque listel; d — Greek cyma reverse; e — Roman cyma reverse; f — Russian Baroque cyma reverse.](image1)

![Figure 4. Profiles of the Elizabethan Baroque: a — a fragment of the author’s drawing by F. Rastrelli “Window of the Monplaisir Palace”; b, c — Ionic Baroque cornice and dripstone above the window aperture of the Catherine Palace in TsarskoyeSelo (1752–1757, architect F. Rastrelli); d — the Stroganov Palace (1752–1754, architect F. Rastrelli).](image2)

Curvilinear moulds with an upper notch can be considered the most important dating element of the Elizabethan Baroque. European drawing of Baroque moulds is significantly different from Russian samples. Russian moulds are different from the moulds created by Italian architects Andrea del Pozzo and G. Guarini, the theorists of Baroque architecture of the XVII century. Comparison of Russian moulds with the profiles created by L. Sturm shows that the German architect drew moulds which were much closer to Roman models. Some approximate analogues of Russian Baroque moulds can be...
found in French architecture. Thus, curved bastons can be seen in the "Course of Architecture" by Augustin-Charles d’Aviler (one of the versions of the publication was edited by J. B. Le Blond in 1710) [4]. Special hand-drawn moulds with cutting curves are characteristic of some profiles of the Palace of Versailles. However, the moulds of European Baroque have a more flexible hand-drawn character and differ from the Baroque moulds of the Elizabethan style, which are geometrically simpler, but even further deviated from the classical shapes.

The Elizabethan Baroque is characterized with the decoration of buildings with plentiful stucco moulds and exquisite capitals. Herewith, the moulds have never been profiled with relief: they are smooth, and only sharp strips of horizontal shadows and deep vertical pilaster sides fractionalize the Baroque moulds.

Another distinctive feature of that era is a special drawing of complex cornices (Figure 4, a, b). In their supporting part, such mandatory elements of the order as dentils, modillions and consoles were not envisaged. Instead of dentils, a large fascia was designed. By such signs as the absence of dentils in the supporting part of the cornice, one can immediately distinguish the profile referring to the XVIII century Elizabethan Baroque from eclectic Baroque profiles of the XIX century, where, according to the classical tradition, dentils are included into the design of cornices.

Architectural profiles referring to the Early Classicism period (1760–1770) are transitional in nature: among them both Baroque and classical forms are present. The same architect could at the beginning of the period adhere to the forms of the Elizabethan Baroque and later start using the correct Roman profiles. It is remarkable how different are the profiles created by architect J. B. Vallen Delamotte on the facade of the Gostiny Dvor building and on the facade of the Small Hermitage. On the facade of the Gostiny Dvor building (Figure 5, a), there are Russian Baroque profiles. J. B. Vallen Delamotte, who had been specially invited to St. Petersburg to teach Russian architects classical European canons, was forced to put up with the style of profiles made by local craftsmen. However, during the construction of the Small Hermitage (Figure 5, b), the French architect insisted on the classic drawing of moulds.

Classic relief appeared on some moulds: architect I. E. Starov was the first to make profiling with ionics on the Doric capitals of the entrance portal of Prince Vladimir Cathedral. He is known to have created the order on the facade of the Saint Trinity Cathedral of the Alexander Nevsky Lavra taking the order of architect J. Vignola as a sample.

For all the elements created during the period of early classicism (plat-bands, reliefs, separate moulds), typical features are a low profile and a smaller ledge (in comparison with elements created during the Elizabethan baroque period). The reliefs become less protruding, and the curved bastons are reduced in size.
Strict Classicism is the period characterized with using the correct Roman classical moulds and rejecting baroque profiles. However, sometimes they appeared in small details. For example, on the facade of the Academy of Sciences building, upon careful examination, you can see the baroque cyma reverse on the door trim (Figure 6, a). In this early project of Giacomo Quarenghi, construction masters worked according to the old tradition, but subsequently the architect no longer allowed such a deviation. Architects Giacomo Quarenghi and N. A. Lvov made the correct Roman moldings, as if coming out from the pages of classical treatises (Figure 3, b). It was in the works of A. Palladio that they saw the ideal order based on Roman heritage [5]. Conciseness and restraint of A. Palladio’s profiles were closer to the stylistics of the strict classicism period than the elegant and decorative moulds created by J. Vignola.

Greek orders and moulds were brought to Russia by architect Ch. Cameron. Both the Cameron Gallery and Cold Baths and Agate Rooms in Tsarskoye Selo have Greek profiles (Figure 6, c). However, the Greek orders of Russian buildings referring to the late XVIII century were always drawn with addition of Roman moulds (for example, the "Temple of Friendship" by Ch. Cameron in Pavlovsk Park).

Creative work of architect V. Brenna, whose main work was the Mikhailovsky Castle in St. Petersburg, refers to the end of the XVIII century. During this brief period (1796–1801), sometimes called Pavlovsk Classicism [6], pilaster sides and some Baroque elements were used, but Baroque profiles were no longer applied.

The imperial military style required clearly defined forms, so V. Brenna’s moulds were classical Roman ones, distinct and concise, with a characteristic lack of small details. Sometimes, however, a little deeper notch of a bending cima could be seen in his designs. Such a notch was made rather for the reason of the forms’ clarity than due to the wish to return to the Baroque traditions. Profiles were without reliefs, on belts; an ornament sometimes could be seen on friezes (for example, meander-shaped ornaments). Especially distinguished are the plat-bands on Mikhailovsky castle building: the depth and clarity of the moulds make them look almost neoclassical, characteristic rather for the beginning of the XX century than for the end of the XVIII century.

4. Discussion
There are some issues that remain under discussion and need to be investigated. Firstly, it is still to be found out, if there were exact analogues of Russian moulds of the Elizabethan Baroque in Western Europe. Where did the technique of using moulds with the upper notch come from? What analogues
did architect F. Rastrelli rely on creating his original forms and in what extent do these forms differ from the originals?

5. Conclusion

Thus, during the XVIII century the architecture of St. Petersburg has come a long way in the development and change of the tradition of drawing architectural moulds and profiles. The analysis carried out in the research and generalizations made on its basis allow making the following conclusions:

• each style period of the St. Petersburg architecture development in the XVIII century has its own features of drawing moulds; the historical situation and the individual development path of St. Petersburg brought significant changes to the classical traditions of building architectural forms;
• the entire first half of the XVIII century is characterized with the absence of complex intercalated moulds, such as dentils, modillions, and consoles;
• the Petrine Baroque period is characterized with profiles with a predominance of quarter-round moulds in the style of architect L. Sturm;
• The Elizabethan Baroque is characterized with unique moulds with an upper notch changing the character of the profile as a whole;
• Early Classicism is characterized with both Baroque and classical moulds in the style of architect J. Vignola;
• Strict Classicism used moldings in the style of A. Palladio and introduced Greek moulds into the architectural practice of St. Petersburg.

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