

Historical and Genetic Regularities in the Formation of the Urban Plan Structure as the Basis for the Spatial-temporal Model of Settlement*

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Abstract—The article provides methodological recommendations for carrying out historical - genetic analysis of urban settlement structures, based on the study of their evolution, in order to obtain fundamental knowledge of the regularities in the origin and development of various types of settlements. This knowledge is essential in considering project proposals and perspective forms of future planning and development. The proposed analytical procedures allow constructing a historical - genetic model of a settlement as an aggregate of successively formed parts of the city with its historical and natural boundaries. The recommended scientific provisions aim at studying the initial stages of settlement development at the “proto-city” phase, imprinted in the historical topography and plan. The acquired knowledge allows constructing a historical-genetic (or spatial-temporal) model of the settlement, which would aid in value-based territory zoning, identification of the objects for protection and regulations for new construction.

Keywords—*historical development code; settlement system; spatial-temporal model; urban planning; historical-genetic model*

I. INTRODUCTION

Territorial and urban-planning settlement structure is an integral part of national heritage, since people have taken root in the settlements, occupying the area, settled down, established spiritual and ethno-cultural traditions, developed and maintained cultural heritage and national identity. Territory-integrated urban-planning structure preserves cultural background of settlement development, and is to be investigated in the aspect of accumulating material assets over the course of history. Not only does this structure have the tangible component (traces of civilization and the stages of human development), but it also represents the

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multivariate urban-planning and spiritual heritage. Therefore, even if historical and cultural heritage cannot be traced by material evidence, there are developmental characteristics and the territory-related spiritual component.

Throughout history, because of the neglect of the heritage, the settlements were gradually losing their historical appearance, authenticity, memorial symbols and buildings, and the urban areas were becoming less diverse. Free remodelling and the loss of a complex morphology were the guiding principles of construction. All what were required were professional culture, responsibility, and compliance with the construction regulations, documented in the Land-use, building and planning recommendations, as it had previously been in the urban planning of the past. The absence of rules and discipline and the abuse of administrative power resulted in tragic consequences for the cities of Vologda, Tomsk, Yaroslavl, Tambov, Kursk, Moscow, and many others.

II. THE PURPOSE AND OBJECTIVES OF RESEARCH

The purpose of the research is to identify the regularities in the formation and to construct a historical - genetic model that reflects the successively formed evolutionary system that constitutes cultural heritage. Preservation of the system should ensure integrity, value-based territorial zoning and aid in the choice of development forms.

The main objectives of this research are: to establish the origins of the urban plan structure and its fundamental and stable qualities and properties that remain unchanged in the plan structure; to identify the formative process of urban plan structure, which would provide the knowledge of the regularities of its formation as the basis for developing the historical - genetic model.

The fundamental provisions, reflecting the processes by which these regularities are molded, are revealed in the results of the research through the following sections:

- The research of the geographical conditions of the site, natural features (relief, climate, landscape);
- The research of the historical role and socio-economic significance of the settlement;
- The research of the position in the original settlement system, the analysis of genetic relationships with neighbouring settlements and the cities of the higher hierarchy;
- The research of the origin, of the initial forms of urban-planning structures (requires knowledge of the conditions of the emergence, initial functioning and existence forms, which predetermine the modern form, the semantics, type of use, cultural and aesthetic idea of the settlement);
- The research of further planning structure development, the features of the layout, associated with the genesis of the structure and stages of evolution;
- The research of the principles of interrelation of urban-planning zones and elements,
- The research of the basis and genesis of the spatial compositional system;
- The research of regional traditions (urban planning and architectural typology, planning organization);
- The research of the influence of symbols, spiritual traditions on the urban-planning principles of the spatial organization.

III. EVOLUTIONARY, HISTORICAL AND GENETIC RESEARCH AS A BASIS FOR STRUCTURING AND PROJECTING THE FORMS OF SETTLEMENT DEVELOPMENT

The fundamental knowledge of the regularities in the formation of urban-planning structure is inevitably connected with the study of evolution, the awareness of the origins of the settlement in the historical settlement system and the nature of the historical development. The research method consists of studying evolution as a developmental process and tracking stages and structural changes. Another component of the method is the historical and genetic analysis, which investigates how the new parts interrelate with the ancient parts, how the dominant elements are positioned, and how they correlate with the territories (the interposition of genetic parts and ensembles); correlation with the rivers and natural dominant elements; the location of large public complexes and monasteries in the structure; the relationship between the urban fabric and the layout [1]. However, these research issues are rarely taken into consideration when it comes to project solutions justification. Meanwhile, it is the historical and genetic analysis that illustrates the idea of how a settlement grows and develops. The historical and genetic analysis provides the opportunity for detecting the parts that were once genetically related to the settlement, but were left out of its historical territorial boundaries.

Formation of the urban-planning structure of a settlement is a centuries-old process. The urban-planning structure is a complex organism that ties together the layout and the urban fabric, natural elements and the territory with its archaeological, spiritual, historical and memorial heritage. Rivers, as central elements in the structure of many Russian cities, naturally divide the territory. In the cities of the Volga region, as a rule, the left bank of the river is the flooding bank, and in many cities it is less intensively developed and built up, often due to the lack of bridges. Nevertheless, the names of the zones according to the geographical and topographical principle have been ingrained in the territorial division of cities. City, as a complex system, is capable of self-organization and organic development, following its internal genetic code. Evolution as a method of studying the urban structure, allows identifying this process. In this context, there are differences in the patterns of the initial and subsequent stages of the development. Particular qualities are detected, at the initial stages, a transition from a multitude of elements to an ordered structure, and finally to a single, dominating this multitude of elements, organism. And then the development of the settlement itself takes place.

The formation of a city could have initiated at the time of the ancient settlement - the hill fort (i.e. Pereslavl, Kholmogory, Staritsa, etc.). Meanwhile, its evolution could be interrupted, and the settlement could be continued in a different place. It was rather common that the ancient beginning of a settlement is outside the boundaries of the modern settlement (like Totma, Pereslavl, etc.) The Kremlin or fortress or "Detinets" (central fortified part of a city) are considered the initial part of the settlement. Thus for example, in the 12th century Yury Dolgoruky founded a fortress not on the bank of Lake Pleshcheyevo, where the ancient Kleschin, the city of Vyatichi, was located, but on the road to Rostov.

The recommended scientific propositions are aimed at studying the initial stages of the settlement formation at the "proto-city" stage, which are documented in historical topography and the layout.

IV. HISTORICAL AND GENETIC MODEL AS THE BASIS FOR VALUE-BASED TERRITORIAL ZONING AND DEVELOPMENT STRATEGY

The origins or the beginning of the creation of a settlement (city) is the most important stage of both the genesis of the structure and evolution. It was then that the fundamental characteristics of the urban structure were laid.

Among the ancient parts of the urban planning structure were "Detinets", "Krom", Kremlin, and "Krepost" (Fortress) often referred to as the "city". Around the Kremlin appeared "posads" — trading quarters and settlements around a fortified city, also fortified. Sometimes they were also called "predgradie" (in Chernigov). In Kiev, the names of the city parts, "Upper Kiev" and "Podol" (Lower Kiev) were established. The names of the zones according to the geographical and topographical principles became widespread in Yaroslavl: Zavolzhye, Zakotoroslie, Byvshaya Manufaktura (in Yaroslavl), Romanovskaya part (in Tutaevo),

Zauchie (in Lyubim, Yaroslavl Region); in Nizhny Novgorod: Zaokskaya part, Sotsgorod. They became rooted in the territorial division of the cities. Detinets as the initial form of city formation can be found in the schematic plan of 1108 (see “Fig. 1”).[2] In other regions, the historical fortified centre was called “Krom” (in Pskov) or “Krepost” (Fortress) (in Lyubim, Yaroslavl Region) [3]. The archaeological data proves the existence of the Detinets in Vladimir. In the western direction, its borders approached the earth ramparts of the Pecherniy city, the city of Monomakh. The Zapadnyy (western) Posad (“Novyy city”) was a commercial city, the eastern, “Vetchanoy city”, was the city of artisans (see “Fig. 2”) [4].

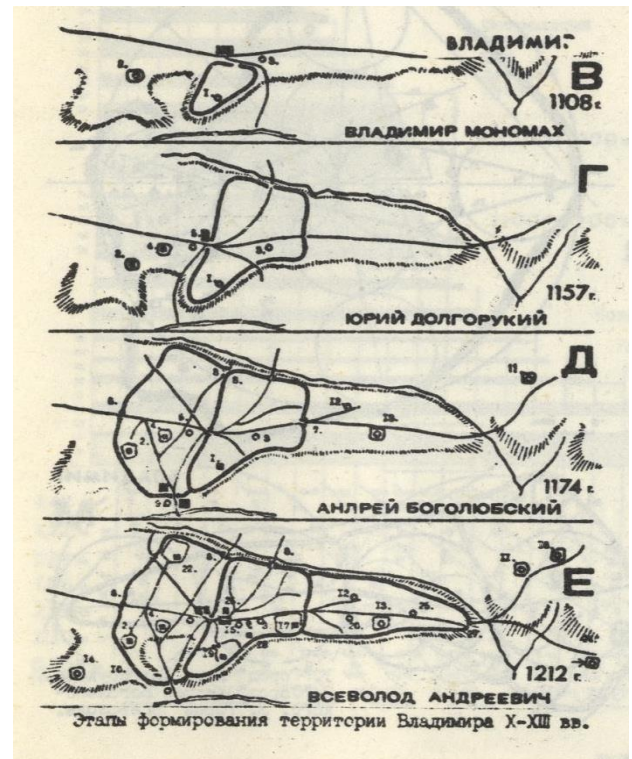


Fig. 1. The city of Vladimir.

^a The initial stages of urban-planning structure development of the XII-XIII centuries. (I.S. Krasovsky) [2] B - the city under Vladimir Monomakh, 1108;

Г - the city under Yuri Dolgorukiy, 1157;

Д - the city under Andrei Bogolyubskiy, 1174;

Е - the city under Vsevolod Andreevich, 1212.



Fig. 2. The city of Vladimir — the plan of the XIIth-XIIIth centuries (from the book by N.N. Voronin “Vladimir. Bogolyubovo. Suzdal. Yuryev-Polskoy”, 1974).

^a I - The city under Monomakh (“Pecherniy city”), 1108; II - “Vetchanoy city”; fortifications of 1158-1164; III - “Novyy city”, fortifications of 1158-1164; IV - Detinets (central fortified party of a city), 1194-1196. 1 - Church of the Savior; 2 - Church of St. George; 3 - Assumption Cathedral; 4 - Golden Gate; 5 - Irene’s Gate; 6 - Copper Gate; 7 - Silver Gate; 8 - The Volga Gate; 9 - Dmitrievsky Cathedral; 10 - Ascension Monastery; 11 - Christmas Monastery; 12 - Knyaginina Monastery; 13 - Trade Gate; 14 - Ivanovskiy Gate; 15 - Detinets Gate; 16 - Church.

Inside the “city” or the Kremlin, fortified by wooden walls and moats, there usually was a cathedral with a cathedral square, administrative buildings (voivode’s

courtyard, administrative office, prison, etc.) and smaller lots with houses and monasteries [5]. “Posad” is a developed town unit, formed around the main centre – the Kremlin or

fortress. In Nizhny Novgorod, there were two posads – the Upper and the Lower, in Tver - four. They were inhabited by artisans and service people. Trade was a vital part of the city life, the location of the market places (called “Torg”) shifted, and they evolved together with the city. Meanwhile, the market squares offered remarkable panoramic views and unveiled dominant urban elements [6]. In order to identify the incremented part of the plan, a comparative analysis of the plans from different periods is required. The city of Vladimir can be taken as an example [7]. Comparing city plans of 1715 and 1767 demonstrates that over the fifty-year period, within the general centricity of the spatial system, the

territorial growth was due to boundary incrementing of territories. This principle was also consistent in the subsequent period (see “Fig. 3”). Genetic parts of the 12th-13th centuries became rooted within the modern-day structure of the city. The town plan structure is characterised by stability and immutability. The territorial growth of the city was in direction of Moscow. As demonstrated in the graphical analysis, the territory was increasing within the same spatial orientation system, as set out along the rivers Lybid and Klyazma, already shaped in the 13th century. This territorial funnel-shaped opening expands and splays out towards Moscow (see “Fig. 4”).

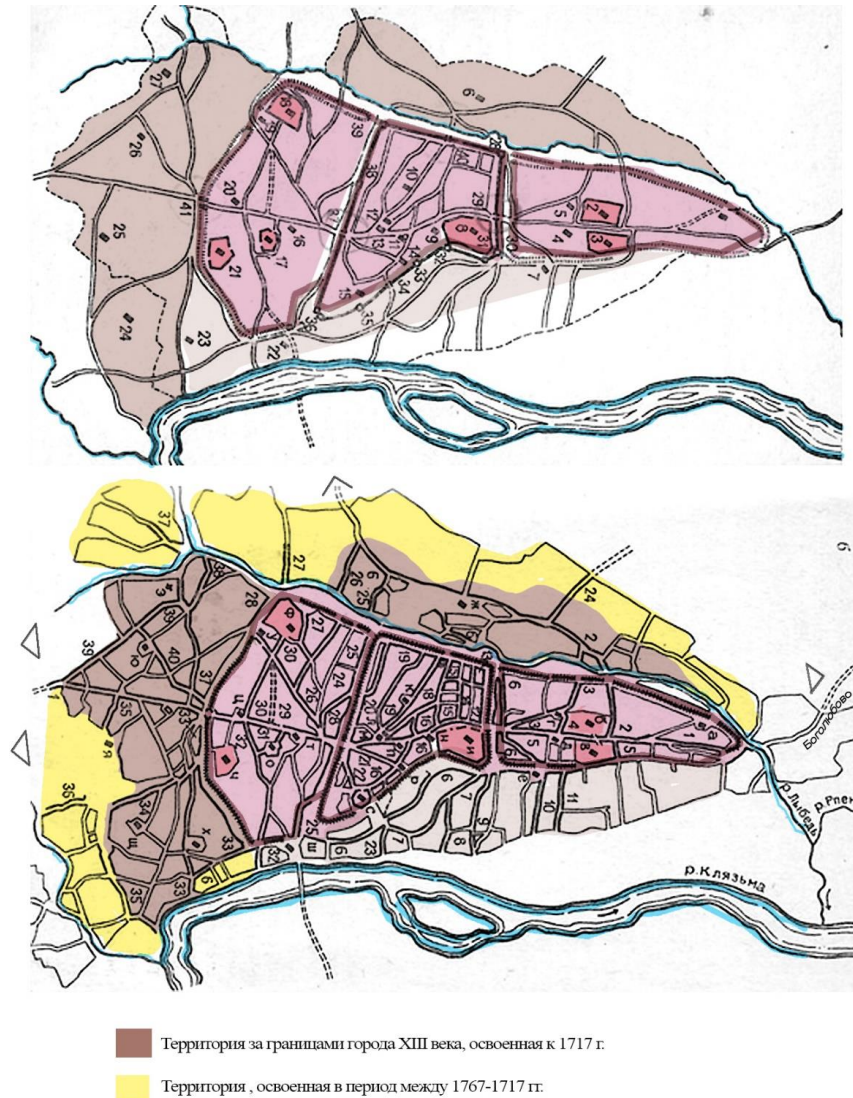


Fig. 3. The city of Vladimir — A - City plan of 1715; Б - topographical plan of 1767. Comparative analysis of the territory growth.



Fig. 4. The city of Vladimir — historical and genetic model and the code of development (The scheme by L.I. Kubetskaya).

V. CONCLUSION

The results of the study of the urban site allow constructing a historical - genetic model of the urban structure. It presupposes applying the method of value-based territorial zoning, for each genetic part has some specific features of planning organization, the principles of defining the dominant elements, the peculiarities of building typology, and even the identity of urban planning traditions. These characteristics should be documented in the planning and building regulations in the project documentation.

The recommended scientific provisions aim at studying the initial stages of settlement development. This is then that the interpositions of the ancient genetic zones, the main planning directions and historically established genetic connections are laid. The genetic model is stable; the development regularities correspond to the genetic code inherent to a particular settlement. Neglecting these regularities may lead to the loss of urban traditions, integrity and cultural values of a historical settlement [8].

The historical - genetic model should be the basis for regulating new construction. Attributing a status to each historical zone is a primary step. Only then functional and building regulations can be established. Such action is likely to contribute to identifying cultural heritage sites and preserving the urban heritage of Russian cities as a national asset.

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