Basic principles of development of green and open spaces in the structure of the historical city on the example of the cities of Dresden, Stuttgart

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Abstract. The purpose of this study is to develop basic principles for the development of green and open spaces in the structure of the modern historical city on the example of Dresden, Stuttgart. This could serve as an important tool for the analysis of the functional and planning features of other major historical cities and would suggest the main directions of optimization and expansion of recreational zones in the design. Sources for the article were literary publications about the past and present Dresden, Stuttgart, cartographic materials, historical photographs and photographs taken during the in-kind survey. As a result, the main provisions concerning the prospects of green areas valuable for creating an enabling environment are formulated.

1. Introduction
Because of development of urbanization there is an urgent need to analyze the favorable and negative conditions for the conservation of green and open spaces in cities in general and in historical cities in particular. Analysis of the functional and planning structure of urban fabric, its features and potential is going to help to solve some problems of preserving a favorable environment for the local population. The problem of maintaining the attractiveness of the historical environment for tourists is also acute and is one of the priorities, as tourism for European countries is one of the main sources of income. Development of the main directions of development of recreational spaces will allow to clearly formulate problems and their solution, which can be used in design.

2. Materials and methods
By systematizing information from various sources (literary sources, maps, historical photographs of the late 19th and early 20th centuries, photographs taken during in-kind survey when visiting some cities of Germany) it was able to make a comparative analysis of the condition of the recreational areas and draw certain conclusions, which is set out in this article.

3. Results
Based on an analysis of the information on Dresden and Stuttgart and the main provisions of the conceptual plans for the development of these cities [1], general objectives and seven basic principles for the development of green and open spaces are proposed:

1. Preferential development of internal greening over external
The future development of the city and the architectural improvement of fragmented urban green and open spaces will be successful only if the internal development of the city gets an absolute advantage over the external one. This will require clear concepts in the placement and hierarchy of green and open spaces, both in relation to the urban center and taking into account the peculiarities of the development of the city-wide structure of greening and the function of parks.

2. Short paths as the simplest way to connect different objects and green spaces of public importance
The sustainable development of the urban centre requires as many small elements of greening as possible, mixing a variety of functions into one diversified and compact centre structure. The advantages of open and green spaces in this approach are obvious: residents and guests of the city are offered a dynamic and vibrant center with its atmosphere and aura. Trade, services and cultural institutions benefit and benefit from the effect of interaction with open and green spaces. Public and private infrastructures are being developed efficiently and economically. There is also a growing sense of security in busy and green urban areas. Proximity and comfort of greening in various objects of public service provide a high level, reduce ways of movement saving costs of transport and excluding its accumulation.

3. Impact of rational location, greening and formation of the city image on the attractiveness of the territory
The expansion and modernization of green and open spaces in the center, as well as the integration of them into a network with a city-wide system, improves the quality of life. A compact network of full open spaces creates an attractive environment for living and working. The rational location of high-quality places for play and leisure in the structure of such a network is an important factor for settlement. Attractive spaces of streets and squares, as well as richly green areas, which are closely related to each other, play an important role in the transfer of the main image of the urban landscape of Dresden and Stuttgart to small (peripheral) residential areas.

4. Separation of greening functions between the city centre and residential areas
The different efforts and capacities of individual residential neighborhoods and districts contribute to the division of greening functions between the centre and interconnected areas. In addition to housing, important intra-urban functions aimed at the further expansion of green and open spaces are urban public facilities such as theatres and museums, hotels and food retailers, government authorities, branches of economic enterprises and domestic service mills, research and development centres, and educational institutions. In the center of the city there are objects of historical and architectural value of the city with the highest degree of identification, as well as the highest value are gardens and parks. At the same time, the combination of greening with promenade, pedestrian street, urban market claim that their location is considered central among public use facilities. Thanks to the active role of green and open spaces in framing trade objects, the largest cities position themselves as the most important centers of the regions. Some mixed-use urban areas and interconnected areas create appeal by having large green areas of their own. Recognizable places that meet high requirements and conditions, with a large share of housing, maintain the balance of urban public facilities. They provide potential territory for future demand for new housing and for various projects using free spaces for experimentation and local economy. The development and temporary use of empty areas by start-up entrepreneurs with creative initiative can lead to a new perception of critical areas and thus prepare land for profitable use in the medium and long term.

5. Spatial concept of greening and step density principle
The creation of an urban centre in the traditions of European cities can be realized, for example, in Dresden only through precisely defined boundaries of spaces and a quality network of green and open spaces. The concept of most European urban development projects presupposes moderate density in the centre and in related territories, as well as continued positive trends in the inclusion of green spaces. The previously planned increase in building density going from the city center to the surrounding neighborhoods is gradually being replaced by an intense association with a network of green and open spaces, improving the quality of life. The principle of step density and concentration of housing in the city center, combined with different green forms, as a suitable response to expectations of increasing density of development and increased requirements for the quality of housing in the city.

6. High population mobility and attractiveness of urban green spaces
Meanwhile, the experience of long-term reconstruction and constant changes in historic gardens and parks with increased value and improvement of open spaces have made a sharp leap forward. Attractive built-up and green spaces create a pleasant appearance and encourage citizens to identify with their city.
The increase in visitors to public spaces extends its influence also to neighbouring areas, the value of which thus increases. As a result, attractive green spaces can initiate promising projects and investments. Active urban communities need advanced mobility. The best accessibility of the center is the accessibility of commercial places, domestic service centers, cultural institutions. All this requires an optimal division of transport. Activities to improve the culture of mobility in the future include improving the environment and reducing private vehicles. At the same time, the comparison of high mobility and the presence of attractive urban spaces does not carry any contradiction. Creative management of mobility in the city, the equipment of walking and cycling paths combined with the green network of the city, as well as the removal of motor vehicles from urban areas most affected by it are necessary.

7. Arrangement of new objects
The location of new attractive parks on promising plots and greening on unused plots is aimed at investing in high quality of life. New gardens on the river spaces, uncomfortable for the construction of relief areas, the favorable location of the center with interconnected peripheral areas contribute to the tourist popularity of the city and the comfort of the local population.

Analyzing the historical (early 20th century) [Figure 1, 2] and contemporary photographs of the cities of Dresden, Stuttgart, one can conclude that the tradition of giving importance to greening a unique historical environment continues. In certain cases, the design of various forms of plants of quays, parks and parks is even more developed in modern times [Figures 3, 4]. On other frames, the forms of greening have become simpler and more concise in favor of new trends in fashion, or thanks to the acceleration of the pace of life of modern man, the replacement of manual work with automated work [Figures 5, 6].

![Figure 1. Embankment in Dresden. Photo of the early 20th century. [2]](image1)

![Figure 2. Bobser is a district of Stuttgart. [3]](image2)
Figure 3. Embankment in Dresden. Photo of the early 20th century. [4]

Figure 4. Embankment in Dresden. Modern photo. [4]

Figure 5. Topiary forms of the park in Dresden. Photo of the early 20th century. [4]
4. Discussion

The problems of greening in the unique environment of the historical city require an early solution. Theoretical searches and practical world experience help from numerous options to choose the necessary, applicable by certain parameters to a certain urban territory, to a certain established spatial and functional system. Working on the composition, the architect takes into account new data of sanitary and hygienic science, microclimatology, ecology. In this regard, it is necessary to identify such techniques of organization of green plantations, park improvement and urban landscape in general, which are most effective both in aesthetic and health terms, as well as create better conditions for the development of vegetation in the city environment. [5]

Each European country has its own individual features of climate, relief, culture, economy. And in each individual case we get acquainted with the unique experience of preserving the green environment in historical cities, whether it is mountain Andorra-la-Vella [6], foggy London, sunny Barcelona. In many modern cultures, the garden is an integral part of human life. Located on the roofs of houses in England or a Spanish city park, they can become open galleries for works of art and sculpture or become the basis of complex landscape architecture and design, or take on the role of conservation of rare plants [7, 8].

As an example, the functional planning organization of Stockholm can be considered. The idea of interconnecting the architectural and planning organization (morphotypes) of the neighbourhoods and larger planning elements with their key location and distribution in the urban landscape, laid down in the master plan (1997), allowed to preserve the natural component, increase the level of urbanization without perimeter expansion of the city, at the same time reduce the loads on the historical core and increase the attractiveness of peripheral areas. [9, 10, 11]
Open and green spaces as part of the natural and recreational framework of the historical city are considered in the monograph «Morphogenesis of architectural and planning structure and principles of reconstruction of the historical center of Irkutsk» (Bolshakov A.G., Belomestnyh S.S.). The method of morphological zoning of the city is proposed by forming three frames (natural-recreational, urban, historical-cultural). Combined with the principles and techniques (decompaction (clearing the space of blocks), rebuild (adding elements)) of regulating the morphotypes of neighborhoods, the three frames will successfully preserve the identity of the city while developing its urban appeal. One of the most important principles is the principle of correspondence of the morphology of the quarter to its location relative to the main urban planning, natural axes and historical and cultural values [12].

For the preservation and restoration of natural territories was also proposed by Bolshakov A.G. "method of geoplasty." In the analysis of the site key points (points of intersection of two frameworks come to light (natural and functional and planning). For these points, a concept of landscape reclamation is developed, with an increase in the share of greening in its morphotype, with restoration of aquatic, soil, plant conditions. Then the issues of the combination of functions of urban and ecological (equipment and development of the territory without damage to the ecological potential of the landscape) are solved [13, 14].

5. Conclusion
Analysis of problems of development of green and open spaces in the structure of European historical cities showed that in the strategy of development of urban planning systems methods and tools of integration of green urban structures in various large-scale levels and stages are used. In the development of plans for the strategic development of historical cities, the method of layers is used, in which the greening of urban spaces is planned by a special team with the harmonization of the main provisions in the overall strategy of urban development. The benefits of green urban structures go beyond traditional urban strategies and policies to determine the competitive image and quality of living in the city. Alternative theories and criteria have been used to develop basic concepts for the development of green urban spaces of European historical cities in the field of spatial organization, provision and management of urban greening, which in general forms the basis of the sustainability of cities, as well as the development of a critical view of its own urban environment.

![Figure 7. Urban morphology of Stockholm](image)

![Figure 8. Greening in the centre of Dresden. Modern photo.](image)

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