The Modern Trends of an Architectural Parterre Formation

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Abstract. Theoretical prerequisites for the appearance of term of “architectural parterre” with the aim of its further use have been considered in the article. The historical prerequisites for an architectural parterre formation in the urban environment are given and the main types of spatial elements of a city structure are enumerated. The peculiar features of human perception of the urban environment in an architectural parterre zone are described. The analysis of the conditions of a dwelling unit density, allowing an architectural parterre formation, has been conducted and the acceptable physical dimensions of an architectural parterre have been derived. A list of urban design elements of an architectural parterre structure has been revealed. Three aspects of increasing the quality of an architectural parterre, namely: ergonomics, ecology and esthetics have been derived on the basis of modern features in open spaces organization in the urban environment. Subsequently, modern trends of an architectural parterre formation have been revealed, namely: the engagement of the public into the formation of design tasks in the process of creating an architectural parterre spatial elements; removal of the carriageway from the streets or “de-mulling”; transforming spatial elements into “places” distinguished by their unique design solutions and architectural metaphor; creating a “hybrid zone” in front of a dwelling unit; providing multiple tasks of an architectural parterre spatial elements or “mixed use”; including of an architectural parterre spatial elements into the system of green corridors of an urban environment.

1. Introduction

Rapid expansion of urban territories and the population growth in the industrial era create specific conditions for urbanists when organizing the urban environment. The urban design appeared as a definite professional sphere aimed at the search of different designing measures for transforming certain districts in conditions of increasing requirements of a modern society to the urban environment. Now the urban design at all levels of its introduction tends to increase the quality of the urban environment in its entirety completely. The urban design transforms the existing spatial connections between buildings, streets, squares, parks and water ways. A dwelling unit density is considered to be one of the main criteria of the urban environment quality. It forms the image of the urban environment in separate urban units. The increase of a dwelling unit density often leads to the increase of the number of floors in buildings. Multistory building system forms environmental image, which cannot be perceived by a person entirely. Furthermore, the index of the number of inhabitants on a certain territory increases and it requires the creation of a hierarchic system of open spaces.
Organization of open spaces stimulate an increase of social activity in cities. For this purpose, special attention is paid to walking routes and landscape recreation spaces. The tendency of organizing green ways in cities aims at providing pedestrians with a whole network of landscape recreation objects. It is in the footway part of the urban environment that a person realizes a larger part of social processes. The most widespread way of providing safe environment is the removal of a traffic way from the streets. The main aim of creating a network of footway spaces in the urban environment is the integration of cultural and natural resources into the urban environment.

Because of the variety of social activities in a city it is relatively difficult to reveal exact indices of a dwelling unit density. Rather diverse way of living of contemporary people does not allow to calculate average indices of the impacts on the territory with acceptable accuracy. Urban design interferences become more local and aim at satisfying the needs of certain communities. The possibility of realizing social processes outside is one of the main criteria of urban spaces quality.

The relevance of the research:

The relevance of the research is determined by modern tendencies of footway spaces formation in large cities with high dwelling unit density and great number of floors in buildings. Therefore, the urban environment differs greatly from the natural surrounding medium. An architectural parterre may serve as transitional space between natural and anthropogenic urban territories. The formation of an adequate transitional space for a person will allow to reduce harmful influence of the urban environment on a person and to create comfortable conditions for realizing vital activities.

The aim of the research:

Which dwelling unit density index causes the formation of an architectural parterre and how are a dwelling unit density and physical dimensions of an architectural parterre connected? Which elements of the urban design are included into an architectural parterre by reference to the peculiarities of an architectural parterre perception? In which main aspects does the formation of an architectural parterre occur by reference to the main requirements to footway spaces formation in the urban environment?

2. Structure of the research

2.1 Methods of the research

The research is based on the analysis of the theoretical and practical experience of footway spaces formation of the urban environment in conditions of a high dwelling unit density, in particular, an investigation of interrelation of a specific index of the population impact on the territory and its influence on the number of floors in buildings. The data obtained are compared on the basis of peculiarities of human perception of the urban environment. Subsequently, an average index of a dwelling unit density, appropriate for an architectural parterre formation, is revealed.

The description of the derived architectural parterre elements due to which an architectural parterre is formed, has been made on the basis of the analysis of the conditions of an architectural parterre formation, peculiarities of the perception and the main ways of its formation.

The specifics of the formation of open footway spaces in a modern urban environment and the prevailing tendencies in their organization have been analyzed. By reference to the tendencies in footway spaces organization and the elements of urban design, the generalization of the main aspects of increasing the quality of spatial elements of a modern city architectural parterre has been made.

Three modern trends of the formation of an architectural parterre of a modern city are derived on the basis of the data on space formation, perception peculiarities, elements of urban design in an architectural parterre, as well as aspects of increasing an architectural parterre quality.

2.2 Theoretical basis

An architectural parterre as an environmental object appeared in the 1960s-1970s. The tendencies of the growth of cities due to an increase of the number of floors in buildings led to the creation of the system with optimal subjects and spaces from the point of view by their dimension. Le Corbusier wrote about the necessity of putting large skyscrapers to the background out of sight: “If skyscrapers raise their floors
higher than 200 meters, the boulevards with the attached buildings with one, two or three floors with shops, restaurants, cafes … will be situated between these giant structures and the center of open spaces. A street will be reconstructed mainly with the help of elements, corresponding to a human scale” [1].

V. Glazychev characterizes “an urban parterre” as “the realm of urban design” in his book “Urban science”. “We do not often have enough free time for perceiving a city entirely. More and more often a city is perceived by us like a room interior by a child who needs to raise his head to see the adults’ faces or a plat-band. In other words, our attention is focused on the objects which are at eye level or a bit higher. It is the level, at which the architecture of buildings, if it is higher than two floors, is perceived only fragmentarily. It is the realm of urban design, which has been a natural constituent of architecture until recent times, but in the XX century it detached and started moving to the forefront” [2].

Forward thinking architects tried to erase traditional barriers between the interior space of a building and its environment, at least visually, psychologically (organic architecture by Frank Lloyd Wright, modernism by Mies van der Rohe and Alvar Aalto). Glazing of in-built floor-to-ceiling holes with minimal area of separating slips provided visual connection of spaces, while a slab of outer paving, included into the interior, became the extension of outer environment in the interior.

The quality of an urban landscape is the main factor of cities’ quality perception. The physical character of a city is determined by the nature of its streets, squares and other open spaces from the point of view of their formation by means of including elements into the structure. The term “architectural parterre” is defined in the article as an environmental object in the structure of the urban environment with the systems of interior and exterior spaces, limited by the buildings facades at the level of two-three floors of buildings and including the elements of pedestrian streets and small open spaces, limited by a dwelling unit.

2.3 The formation of an architectural parterre

The appearance of an architectural parterre is connected with the concept of increasing the number of floors and the density of cities. The increase in the number of floors has led to the formation of an architectural environment not proportioned with on a human scale. An architectural parterre spaces are different from the point of view of their functions and composition location in the urban environment.

The formation of an architectural parterre often occurs in the existing urban construction conditions. These conditions are: a dwelling unit density, dimensions of squares, the width of pedestrian parts of streets, etc. The width of pedestrian ways is determined on the basis of human scale, flows intensity and acceptable distances for different kinds of pedestrians’ activities.

The main types of spatial elements of an architectural parterre in the urban environment are:
- Linear space. These are pedestrian streets, street elements outside the traffic area, footways inside a dwelling unit.
- A corner joint of two streets. It may have different compositional features: it may be an outer or inner corner, additional building, etc.
- Outdoor carol or a courtyard.
- Spaces protecting from external influence such as portico, gallery and others.
- Interior spaces, integrated into the outdoor space due to design solutions.

The peculiarities of an architectural environment perception

Depending on the dimensions of pedestrian spaces certain visual perception angles of the buildings facades and spatial elements of an architectural parterre occur. The perception of an architectural parterre occurs at two levels: optical and sensory. Different kinds of sensory receptors are used at each level of the urban environment perception.
Figure 1. The main types of spatial elements of an architectural parterre.

At the sensory level of the environment perception peripheral vision and different kinds of analyzers are used. A person feels a touch, perceives olfactory and acoustic information. Such information may include: the texture and slope of paving, object elements when in touch, surrounding temperature, aerodynamic changes under the influence of the surrounding objects and others. When the peripheral vision is used, a floor line, located in 6-6.5 meters from a pedestrian, is usually perceived [3].

Figure 2. The sensory level of the environment perception.

At the optical level a zone of high visual activity is used. A person perceives the environment inside the angular range of 30° vertically and 60° horizontally. When a building is very high this angle allows
to scan only the first 2-3 floors of a dwelling unit to the full extent, depending on the width of a pedestrian corridor and the height of floors.

Figure 3. The optical level of the environment perception.

The perception of an architectural parterre may occur either vertically or horizontally, depending on the location of objects in reference to the visual conus of a person. The most comfortable conditions for human perception are those that can be perceived completely, at the same time having rather strong degree of space barriers. The perception of the urban environment occurs in the system of space barriers.

3. Results
3.1 Physical dimensions and dwelling unit density

Physical dimensions of an architectural parterre are determined by the dimensions of its elements in the structure of an autonomous territorial formation in the urban environment. The spaces of an architectural parterre are public territories inside a dwelling unit of a city block with an accessible footway for everyone irrespective of the form of property.

The mechanisms of studying the demographic situation and the peculiarities of social activity of people in a certain territorial formation become more and more popular in modern methods of calculating a dwelling unit density of separate territories. These research aims at studying the most accurate pattern of the territory load. But for revealing the average indices of a dwelling unit density, when an architectural parterre is formed, the use of average data on the population proportion per territory is quite enough [4].

In conditions of a certain index of a dwelling unit density a certain number of floors is formed. In case of 100 people/ha the number of floors is 1-2 floors, 100-200 people/ha – 3-4 floors, 200-300 people/ha – 5 floors. When the index is about 500 people/ha the number of floors is 9-10, 700 and more – 15 floors and more. So, the formation of an architectural parterre can be revealed in conditions when the number of floors allows a person to have a high degree of space protection.
Figure 4. A dwelling unit, which density is 200-300 people/ha.

Figure 5. A dwelling unit, which density is 500 people/ha.

Figure 6. A dwelling unit, which density is 700 and more people/ha.
An architectural parterre starts its formation when the number of floors is five and more and when a dwelling unit density is 200-250 people/ha. In such cases the physical dimensions of an architectural parterre may vary on the average from 0.5 to 5 ha, depending on a dwelling unit density and the total area of open spaces, which can be referred to an architectural parterre.

3.2 Urban design elements in the formation of an architectural parterre

Filling an architectural parterre with the elements of urban design depends on the types of human activities. Human activities in the urban environment often become diverse and unpredictable, cause some difficulties in any unification of the urban environment, and make it less urgent.

When an architectural parterre is formed the urban design occurs at the level of separate object and space formations in a city. The means of the formation are listed below:

Design solution of the facades at the level of the first two-three floors of a dwelling unit. In conditions of the diversity of human activities in a modern city the first floors of a dwelling unit with a high density are rather multifunctional. Marking of the facades at this level allows to limit the urban environment visually, which can be perceived entirely within a vertical angle of sight. In this case, attention is focused on the first levels of a dwelling unit and multisitory buildings become less massive and heavy for visual perception. Design means are rather diverse in such situation. They may include a style contrast, structural marking, compositional accent etc.

Landscape design. The use of natural elements when forming an architectural parterre allows to reduce the harmful influence of anthropogenic environment on a person, as well as to create visualization of a natural environment familiar for a person. Natural elements are manifested in landscaping of an architectural parterre spaces, vertical gardening, container planting, water elements etc. Unlike the traditional ways of using a landscape design, it is implemented in an architectural parterre in conditions of prevalence of artificial territories over the natural ones. It leads to a great deficit of territories, applicable for the landscape gardening. The following means are used for solving this problem in an architectural parterre: vertical gardening, container planting, water elements, green barriers etc. Artificial landscape forms, requiring no additional care, are also widely used.

Small architectural forms. These elements form the most diverse content of the urban environment. They include shaded shelters, alcoves, fountains, public transport stops, kiosks, information stands, telephone booths etc. Considered as architectural monuments, works of landscape architecture and territorial improvements, small architectural forms can emphasize the urban environment. They are also used for decorating streets, main roads, parks, squares and yards and can fully reflect originality of natural environment, ethnic charm, uniqueness of a created object, as well as perform their function.

Street graphics. Street graphics include the works of fine arts, which are integrated into the urban environment. Such elements are the cheapest way of avoiding monotony and utility of the urban environment, wherein continuous end blank walls and commercial firms with simple facades become the main field for activities.

Urban sculpture. Sculpture compositions are often integrated into the structure of an architectural parterre alongside with small architectural forms and upgrading elements of territorial improvement. The materials and the stylistic component of sculptures are quite diverse and often depend on the area image in the formed town planning conditions. Sculptural forms create the image of an architectural parterre due to their thematic and semantic components and their scale, which is optimal for visual perception.

High technological objects. High technological objects are used in the structure of an architectural parterre for increasing comfortability, informativity and functional substance of the urban environment. Such objects include thermometers, clocks, TV screens, security cameras, cash machines, solar batteries etc. These elements become smaller in size, more dynamic, functional, wear-proof and informative. It is necessary to foresee the conditions for easy assembling and disassembling of these elements.

Street furniture. Street furniture includes benches, shop-windows attached to the facades, artificial barriers etc. The use of street furniture allows to provide the use of an architectural parterre for recreation and informal communication. The synthesis of object and urban design, emphasizing the image of the
environment, is also provided. Ergonomics of these elements is considered to be the main criterion for creating these elements.

Light and color design. Light and color design forms the image of the urban environment at night time, making it more artistic, safe and attractive from the commercial point of view. Lighting can emphasize the plastics of facades at the level of the first two-three floors of a dwelling unit, preserve the composition and image of the space elements of an architectural parterre. Façade lighting, street lighting and lighting of separate object forms as well as technical lighting are used for this purpose.

Means of visual communications. In the structure of an architectural parterre these means of the urban design are used for improving orientation and increasing the informativeness of the urban environment. These are advertisement, info panels, sign boards, type compositions. Rational use of means of visual communication make the common urban life processes.

3.3 The main ways of increasing the quality of an architectural parterre
According to modern standards in creating open spaces in the urban environment three main ways can be derived:

Universality of design. This approach to designing aims at providing full access and possibilities of the environment usage by the widest possible range of people [5].

An access to footways. Providing an access to footways aims at connecting the starting street elements, parking lots, recreational objects and buildings. Predetermined context of streets usually prescribes the strategies of designing, therefore, the urban design in such conditions stresses the correlation between space elements: interiors of buildings, recreation zones, parking lots, entrance groups etc [5].

Full level of access to public spaces. The system of providing an access to public spaces is the most applicable strategy of recreational territories organization. It aims at providing pedestrian transit due to multi-functionality and integral perception of recreational territories. A wide system of means of visual communications and spatial references is also used [5].

Among the main aspects of organizing a comfortable environment of an architectural parterre one can derive three main standards, namely ergonomics, esthetics and ecology.

Ergonomics. In an ergonomic aspect of the formation of an architectural parterre the possibility of creating a comfortable urban environment is studied. High indices of psychological and emotional comfort are achieved and the pedestrian space for performing human public activities is provided in this environment. Recreation spaces, rational system of visual communications and advertisement are created in an architectural parterre, a system of night lighting is organized and the objective high technological content along with street furniture are added.

Modern tendencies in the organization of an architectural parterre are becoming more focused on the creation of public spaces, with the goal of increasing the social activity in urban streets. An architectural parterre is a resource for the informal communication of people. A comfortable environment of an architectural parterre becomes interesting for the community and stimulates the social processes.

Esthetics. In the esthetic aspect, a complex of means of the urban design for creating a unique artistic solution is used when an architectural parterre is formed. The possibility of creating a semantic artistic solution, allowing to avoid unification and to diversify the urban environment, is also investigated. Esthetics is also applied in the images of an objective content under conditions of certain stylistics of an architectural parterre space.

Ecology. In the ecological aspect the application of a complex approach for protecting a person from outer external sources of pollution and preventing pollution from an architectural parterre as well as the use of alternative energy sources are researched. The use of safe building materials and lighting devices is also provided in this aspect.

In conditions of the urban environment, an architectural parterre becomes the space capable of combining cultural and natural urban space. In this case a rational system of footways, allowing a person to get from work or home to the system of natural recreational urban territories, is formed.
4. Conclusion

On the basis of the analysis, modern trends of an architectural parterre formation have been revealed, namely: the engagement of the public into the formation of design tasks in the process of creating an architectural parterre spatial elements; removal of the carriageway from the streets or “de-mulling”; transforming spatial elements into the “places” distinguished by their unique designing solutions and architectural metaphor; creating a “hybrid zone” in front of a dwelling unit; providing multiple tasks of an architectural parterre spatial elements or “mixed use”; including of an architectural parterre spatial elements into the system of green corridors of an urban environment.

The engagement of the public into the design of an architectural parterre space elements. The development dynamics, the existing quality and the demands in a modern city are in elaborations of an object level, architectural details and local design solutions on certain areas. An architectural parterre formation turns into cooperation, experience exchange and allocation of responsibilities in different processes. It is caused by the interaction of a public demand increase and scarcity of municipal budgets. Long-term plans and trends of a city development interact with the increase of a number of human and enterprises ideas. An architectural parterre formation is a relatively new sphere in urban planning. New techniques of an architectural parterre formation can be obtained while studying completed projects connected with the activities of different communities in an urban environment.

“De-mulling” or removal of the carriageway from the streets for widening a vehicle-free sector in a city. In conditions of automobilization, the problem of separating pedestrians from vehicles became urgent. People can’t use a street in a way they had done it before. They got used to a new concept with pavements and crosswalks, while children were removed to the playgrounds. The formation of pedestrian precincts allows to use streets as public spaces, where people could gather and exchange information, their children could play and the streets themselves could turn into the extension of interior spaces.

“Place-making” or transformation of space into a place. Public spaces, maintaining human relations and economic interactions, are formed in an architectural parterre. These are constant processes occurring inside the space elements with functionality and environment improvement. All these processes occur due to people, their assembly areas and interpersonal relationships. In the process of “places” formation, all participants, including local residents, enterprises workers and local authorities can become co-designers and modifiers of an architectural parterre space object. This process aims at creating places with individual designing solutions and specific metaphor on the basis of an architectural parterre spatial elements.

The formation of a hybrid zone in front of a dwelling unit facades allows people to create personified spaces on the public area in front of their houses. In this way, they create a security zone between the private and public parts of a street. It can be achieved due to the agreements with the local authorities. With creation of a hybrid zone, people obtain the space where they can spend their free time and observe the urban life.

“Mixed use” or broad-spectrum use of an architectural parterre space elements. This trend forms the spaces for use by different groups of people, namely: age groups, professional communities, informal groups and others. Mixed use allows to provide the relevance of an architectural parterre space element in a long-term perspective.

“Green corridors” of modern cities form a recreation network of spaces from the spatial elements of a city by using landscape architecture. An architectural parterre is the first link in a chain of a “green belt” of an urban environment, uniting the cultural and natural urban resources. Due to this system a person has a pedestrian way to the natural recreation areas in an urban environment.

An architectural parterre formation provides the optimum vision response of a “green corridor” due to an accessible scale and conveniences of an urban design elements.

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