

## THE VOLUME-SPACE ARRANGEMENT OF THE TREE PLACEMENTS IN NOVOOLEKSANDRIVSKY PARK IN MELITOPOL

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### Abstract

This work depicts the plan of the volume-space arrangement of the Novooleksandrivsky park in Melitopol, Zaporizhzhya region, Ukraine. All of the landscape composition structures are present in the park plan. Nevertheless, in some cases the ornamental plant species and forms of the trees aren't regularly used. The low percentage of open spaces doesn't permit to create multiplan compositions. Some species like *Platycladus orientalis*, *Juniperus virginiana* tend to lose their ornamental properties, reducing their aesthetic values. It is not characteristic of a national monument of gardening art.

**Key words:** functional areas, landscape pictures, planting structure, viewpoints.

### Introduction

Park is one of the most important elements of green spaces, implementing functions for improvement of the environment, city landscape enrichment and favouring the environmental protection and recreation organization.

The most important characteristic of the recreation plantings is their spatial structure, which makes them dependent on the aesthetic features of the park (Kolesnikov 1974, Kucheriavyi and Styranivska 2011). The volume-spatial landscape structure consists of the volume (morphological forms, trees, shrubs and grass plantation forms, big buildings and

small forms) and planal (pools, lawns, meadows, etc.). There are several types of three-dimensional structures – closed, semi-open and open (Nehuzhenko 2011). Their proportions make dependent the functional and ornamental importance of the landscape.

Novooleksandrivsky park (in the past – Gorky park) was settled in 1926, as an initiative of I. O. Alekseev, the senior forest keeper of the Staro-Berdianske forest mass. Initially, the area was 3.5 ha. Nowadays it occupies an area of 31.87 ha. During these years, the park has been reconstructed and redesigned (Bilokon et al. 1999, Haritonova 2003). In 1990 it has gained the title of a state monument

of gardening art (MENRU 2013).

Nevertheless, nowadays, despite the numerous reconstructions and its title, the park is planned in a typical way for the most post-Soviet parks of that era. According to Chongova (2013), such 'typicality' has certain disadvantages in the planning structure, the use of the composition techniques, selection of the range of plants, failure to comply with architectural and construction regulations lack of dynamism of the park environment, etc.

The life of modern society imposes new conditions for the complex spatial organization of the park landscape. Few works by both domestic and foreign scientists have been devoted to this issue, namely: historical aspects of the development of the urban park landscape as a liminal space in an increasingly urbanizing world (Jones 2018); communication activity of the park space and valuation (Lv et al. 2013); principles of formation of modern recreational park spaces (Dudarenko 2020); the correlation between modern urban culture and planning and park planning and organization (Shaigardanova 2018); the current state of urban park landscapes (Kovalevskyi et al. 2008, Galey et al. 2017) and others.

The recreation park is a multifunctional space that is able to adapt itself by zoning to the individual requests of the city residents. The global changes in the urban space form the future trends, which, at their turn, are represented in the park development and reconstruction. Therefore, a detailed study at all levels of artistic formation of the landscape will be the basis for work on the renovation and modernization of this park.

The study of the architectural and planning component of the park as an object of landscape art is especially relevant, where the aesthetics of landscape com-

positions come first.

This work aims to characterize the modern volume-space arrangement of the Novooleksandrivsky Park in Melitopol, which is a gardening art monument. Another objective is to develop the recommendations for the park landscape optimizations, considering the regional specificities.

## Materials and Methods

The volume-space arrangement evaluation was used by uses of N. Tiulpanov landscape classification (Tiulpanov 1975). This evaluation was related to the normative values for the certain climatic zone and established their ratio to the standard values for a certain natural and climatic zone (Kucheriavyi and Styranivska 2011).

The planning structure evaluation was made by the methods of Kucheriavyi (2005) and Theodoronsky (Theodoronsky and Bogovaya 2003). The planting structure was characterized by Gostev classification (Gostev and Yuskevich 1991).

The landscape views were characterised by Nikolaev methodology (Nikolaev 2005). The landscape views were characterized by horizontal (<30°), sectoral (30–115°), panoramic (120–240°) and circular (>240°) projections with short (till 50 m), medium (50–100 m) and far (>100 m) depth.

## Results and Discussion

Novooleksandrivsky Park plays the most important role in the green system of Melitopol. As an object of landscape architecture, the park is a green territory with a functional planning structure, typical for recreation parks. The flat terrain of this

area led to a predominantly regular type of layout of the road and trail system of the park. The territory of the park has five functional areas: Silent resting and jogging zone, Cultural events zone, Sports

zone, Garden-keeping zone, and Lunapark zone (Fig. 1). The zoning type is developed by natural climatic conditions, territory measures and placement in the urban recreation system.



**Fig. 1. Map of the functional-planning structure of Novooleksandrivsky Park.**

**The Silent resting and jogging zone** is designed in a landscape style, including garden arrangement, system of pedestrian walkways and alleys, small architectural forms (sculptures, flower-beds, lanterns, benches, recycle bins). The pedestrian walkways are covered by a solid grey concrete pavement and one of the alleys has colourful coating in the form of Ukrainian traditional dress. The others are ground paths. The zone occupies up to 60–70 % of the total park area.

**The Cultural events zone** is represented by a park central square. It has a round shape and surrounded by the gardening sections from deciduous breeds. The shrub pale is formed on the square margins. In the centre of the park, in the composition axis intersection, a big fountain is situated. It is surrounded by the square and the flower-beds landscape zone, alongside the lawns of the perennial herbs, stable to stepping over them.

This zone contains small architecture elements – benches, recycle bins, lights, information stands and some buildings – summer stage and cinema. The territory is used for events like Carnival, Municipal Feast, Independence Day, etc. Thus, the plan structure of the central part of the park possesses a regular structure, being used generally for events. The zone occupies up to 8–10 % of the total park area.

**The garden-keeping zone** maintains the park functions and occupies up to 1–2 % of the total park area. It is an administrating complex containing the garden-keeping area and the administrative building.

**The Sports zone** is represented by the ‘Spartak’ football stadium and small sport playgrounds. The IV light athletics facility category was attributed to the stadium in 2017. It permits to host national competitions. The zone contains up to 10–12 % of all the park territory.

**The Lunapark zone** occupies up to 11–14 % of the total park area with significant number of objects, including dancing poll, kid playground, different attractions, marketplace, museum, café, planetary, shooting gallery and a pool.

The ratio of spatial structures of Novooleksandrivsky Park is different from the normative value, considered for this region (Table 1). As a comparison, the recreation park '250-year-old oaks' in Zaporizhzhya with 57 ha has nearly the same values as the standard (Chongova and Bessonova 2013). This joint reduces the landscape diversity and, as consequence, reduces its picturesque value, which is not

characteristic of the gardening monument parks. But from the point of view of climate control, this position increases the sanitary and hygienic implementation, which is especially actual for the Southern zone. The open areas include the path system, sports playground, football stadium, lunapark territory and fountain square.

Novooleksandrivsky Park plantings possess their different structure, defined by the peculiarity of use of the plant material (Table 2).

The most widespread unit of the park plantings is forest massifs, having up to 81.05 % of the general number. This type is characteristic of landscape-planned

**Table 1. The landscape type relation for gardening monument Novooleksandrivsky Park in Melitopol, %.**

Monument park	Type of spatial structure		
	Closed (0.7–1.0 filled)	Semi-open (0.3–0.6 filled)	Open (<0.20 filled)
Southern steppe recommended value	55	25	20
Novooleksandrivsky Park, Melitopol	75	16	9
'250-year-old oaks', Zaporizhzhia	80	15	5

**Table 2. The planting structure in Novooleksandrivsky Park.**

Planting structure		Number of species / percentage of the general number of trees in the park
Solitaires		5 / 0.05
Groups	'bunches'	9 / 0.10
	Small	59 / 0.64
	Medium	29 / 0.31
	Mig	75 / 0.81
Curtains	Uniform	194 / 2.10
	Mixed	80 / 0.87
Aligned plantings	Alleys	222 / 2.40
	Rows	221 / 2.39
	Pales	1499 / 16.23
Masses		6271 / 67.90
Non-formed		572 / 6.19
Total		9236 / 100

parks. Novooleksandrivsky Park has two main mass types – protecting massifs and principal massifs. The plantations of the first group is located on the periphery of the park area and separated it from the roads and protected again wind, dust and noise. The main arrays are plantings that create a background for landscape paintings.

An equally important spatial structural unit are the curtains, which include 3.54 % of all trees and shrubs in the park and 2.51 % of them are uniform and formed from only one plant species. The curtains are a transition element between the forest masses and a more ordered plant group. In the park, they are either part of the array or collected in a separate group. The last of them form a semi-open landscape, manifesting the ornamental properties of the correspondent species. Most parts of the uniform curtains are represented by coniferous tree species (*Pinus pallasiana* D. Don., *Platycladus orientalis* (L.) Fran-

co, *Juniperus virginiana* L.). For example, the curtain of *Juniperus virginiana*, situated in the western part of the park, is part of the gardening sections from deciduous breeds. It provides a contrast between them, provoking the feeling of changes on a crossing route.

The next unit of the park plantations is a group. The groups may be big (11–13 trees, with crown diameter up to 80 m), medium (6–10 trees, with crown projection up to 50 m) and little (2–5 trees, with crown projection no more than 25 m). In Novooleksandrivsky Park it was found that 2.22 % belong to group plantings.

The bunch group has an attractive appearance in the park. This type of plant composition is situated generally in the centre of the park as separate accents in a tree-bush arrangement. The groups are uniform and represented by species like *Morus nigra* L., *Robinia pseudoacacia* L., *Juniperus virginiana* (Fig. 2). Unfortunate-



a



b

Fig. 2. Bunch group with: a) *Morus nigra*; b) *Robinia pseudoacacia*.

ly, this old structural technique is not often found in the system of greening the cities of our country. In Novooleksandrivsky Park, it is correspondent to only 0.12 %.

The solitaire plantings in the park are represented by trees (*Salix babylonica* L., *Quercus robur* L., *Platycladus orientalis*, *Piceae pungens* Engelm.), consisting only 0.06 % of the total. Some of them are spontaneous, therefore, their planting hasn't been thought from architectonic point of view and therefore they do not have a high architectonic effect.

One more method of the use of the plant material for park arrangement is the aligned plantings – alleys and hedges – an element of the regular style of gardening landscape. The aligned plantings form up to 5.73 % of the total park trees. The investigated territory contains two metric alleys of closed type, formed by *Pinus palasiiana* and *Tilia cordata* Mill., separating the space from the planting massifs. The main alley of closed type, which acts as a composite axis and starts from the northern entrance to the park, is represented by a single-row *Quercus robur* plantation in combination with a hedge with *Ligustrum vulgare* L. The flowerbeds are situated along its central line with the same interval. This structure forms the impression of façade character and directs the visitors to the main composition node, which is the fountain. The pales are represented by differently kept (cut and grown) shrubs. The low pales (up to 0.5–1 m) with total length 1049 m in some places have a lack of ornamental and protecting function, due to the gap formation in the entire row.

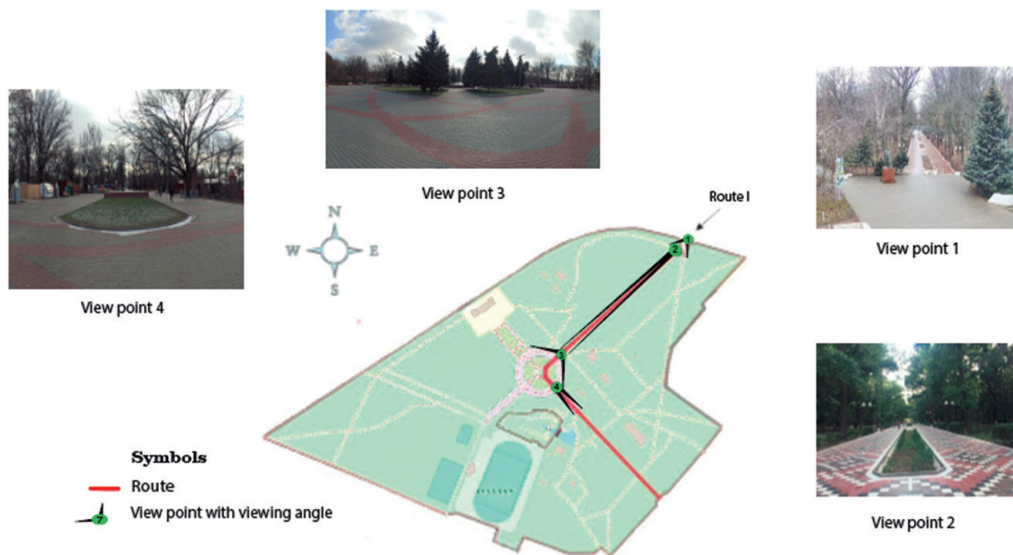
The non-formed plantings form an indefinite structure unit of the parks. They are situated generally in the territory, in which a winter skating-ring was used to be, being a remain of previously formed plantings. According to Table 1, 7.40 % of

total tree plants are non-formed.

The next equally important stage of the study of the three-dimensional structure of the park's plantations is the analysis of the system of species disclosure of landscape paintings. We studied three pedestrian routes – central, walking and transit. The first and second routes start from the main entrance to the park and cover the central alley and the area where the monument to M. Gorky and the fountain are situated. The main part of the central route is represented by two alleys with closed spaces, which are formed by mature mixed plantations with a predominance of *Robinia pseudoacacia*, *Fraxinus excelsior* L. and *Celtis occidentalis* L. The alleys are decorated with ornamental paving in the form of a Ukrainian national ornament. The peculiarity of this route is that it combines the central entrance to the park with the secondary. The length of the central route is 719 m and has 4 viewpoints that are common to the second route (viewpoint 1, 2, 3, 4) (Fig. 3).

The second part of the walking route runs along the pond and café, and then moves to the Lunapark zone. It is characterized by a semi-open space formed by mature mixed plantations with a predominance of *Robinia pseudoacacia*, *Fraxinus excelsior* and *Gleditsia triacanthos* L. The entire second route has a length of 841 m, without height differences. There are six viewpoints on this route (Fig. 4).

There are two transit routes in the park. One of them (route III A) has a length of 705 m, and the other (route III B) – 548 m (Fig. 5). Analyzing these routes, it was found that 80 % of the territory is open and semi-open spaces and 20 % are closed. The open space on these routes is represented by the central square with a fountain, and the semi-open space is represented by two alleys: the Alley of Mem-



**Fig. 3. The schematic plan of the viewpoints in the pedestrian route of the Novooleksandrivsky recreation park.**

ory (route III B) and the alley leading to the Sports zone (route III A). The alleys are formed on both sides by low-density plantations with a predominance of *Robinia pseudoacacia* and *Fraxinus excelsior*. The difference between them is that the Alley of Memory contains *Styphnolobium japonicum* L. Schott and the other – *Pinus pallasiana*. The central part of the Alley of Memory is divided by a green strip framed by *Betula pendula* Roth. The central part of the second alley is represented by a flowerbed of regular geometric shape with plantings of *Juniperus scopulorum* Sarg. and chrysanthemums of the 'Multiflora' group.

Viewpoint 1 is situated on the central entrance in the park and is characterized by a wide horizontal angle of the sector type ( $80^\circ$ ). Nevertheless, its observation depth is short, being 40 m. The frontal plan of the perspective, with Gorky monument and the fir tree geometrical forms with the flowerbeds in the medium is active.

Viewpoint 2 has a perspective ( $30^\circ$ ) narrow observation angle and far observation depth, equal to 320 m. The medium prospect contains a rabat, which makes blink the view from the far object to a near one. A bilateral prospective frame forms the green backgrounds. Their monotonicity leads the spectator to the main landscape focus, which is the main square.

The landscape view of point 3 is also characterized by a positive horizontal angle of the panoramic type ( $130^\circ$ ) and has observation depth of 80 m. The frontal prospect contains the stalls, based on a pool and the geometrical forms of the fir-tree. The medium prospect is characterized by the central fountain. The rear prospect has the main park tree massifs, forming a margin of the main view and forming the rear plan of the landscape picture.

Viewpoint 4 is situated on the central square with a fountain and has a viewing angle of  $40^\circ$  and an average viewing

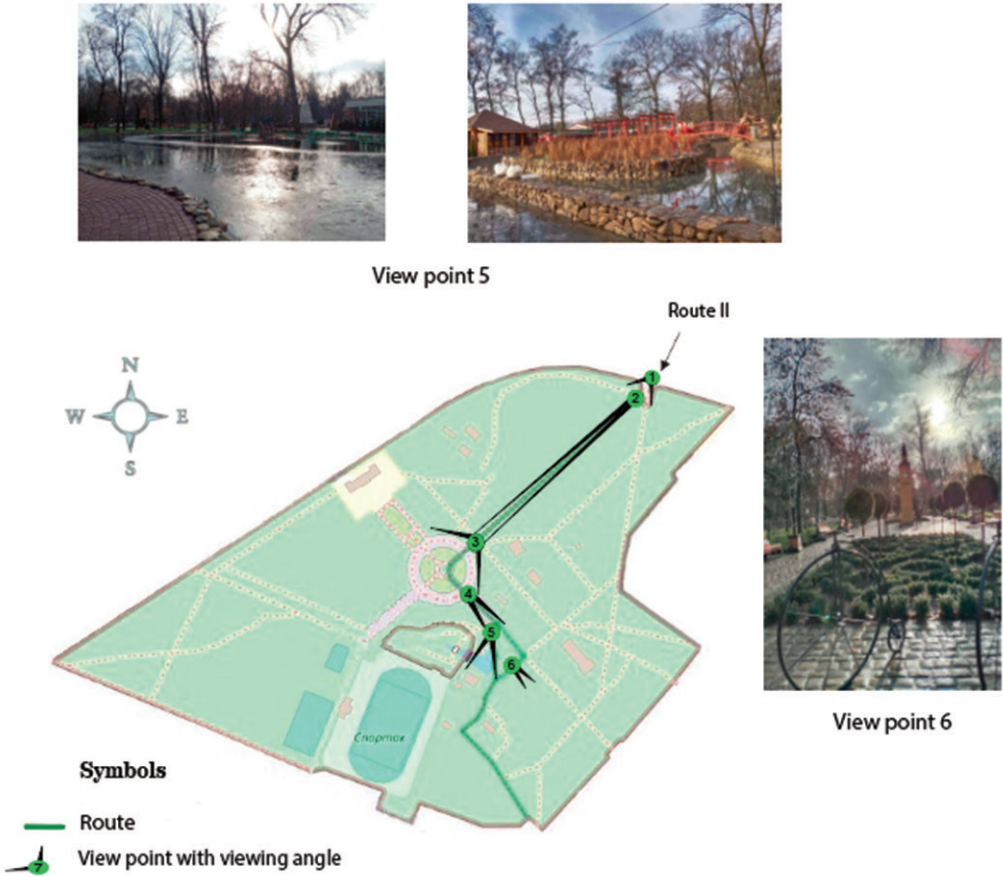


Fig. 4. The schematic plan of location of viewpoints on the pedestrian route of Novooleksandrivsky Park.

depth of 70 m. From this point the view, a small area is revealed with a lawn and a summer stage in the central part. The semantic accents are posed on both sides of the square: on the left side there are busts of poets and writers, and on the right side there is an original installation of a hand holding a 90-year-old oak tree, which symbolizes a careful attitude to nature. On the opposite side to the same area opens viewpoint 8 with a horizontal viewing angle (70°) with an average perspective of the landscape (72 m).

Viewpoint 5 opens onto the pond

through a semi-open space and it is characterized by a sector viewing angle of 70°, as well as the depth of the perspective, which is 50 m. This view is an interesting multifaceted perspective, where the picturesque shores of the reservoir are observed against the background of mixed plantings of *Robinia pseudoacacia*, *Celtis occidentalis* and *Fraxinus excelsior*. After the reservoir, the closed space continues. In the middle plan there is a water structure in the form of a cascade on a stone base.

From viewpoint 6, a view of the 'English





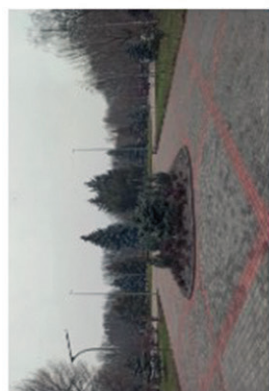
View point 8



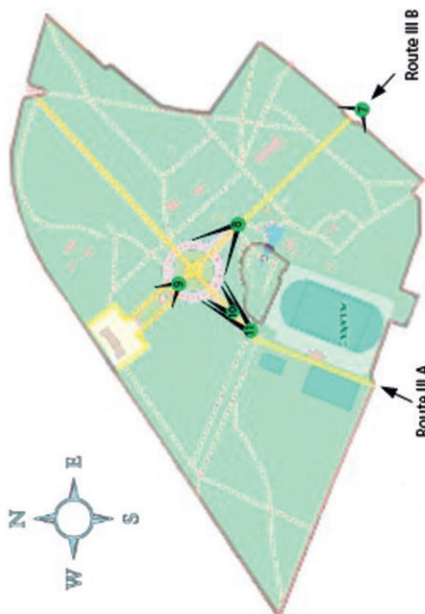
View point 7



View point 9



View point 10



View point 11

**Symbols**

- Route
- View point with viewing angle

Fig. 5. The schematic plan of location of viewpoints on the transit route of Novooleksandrivsky Park.

Square' reveals, which forms a horizontal viewing angle (35°) with a short depth of perspective landscape (40 m). The territory is framed on both sides by ordinary plantings of *Prunus divaricata* Ledeb. In the foreground there are two bicycles of the popular 'Penny Farting' model in the 1880s, and in the background there is a parterre flowerbed with geometrically shaped arabesques from *Buxus microphylla* Siebold & Zucc. and stable vertical accents formed by *Thuja occidentalis* L. The background is represented by the main compositional dominant of this corner – a miniature copy of Big Ben. Next to it are figures of Police Officer Bobby with a dog, which complete the English-style compositional ensemble.

Viewpoint 7 is situated in front of the second main entrance to the park and is characterized by a wide horizontal angle of sector type (100°), however it has a short viewing depth of 11 m. Its compositional structure is represented by capital letters of the old name of the park and the stele with a bas-relief of M. Gorky. In the background of this landscape picture is an array the park that frames the main entrance.

After passing the central fountain, the visitor can see viewpoint 9 of the sector horizontal viewing angle (60°) with a short depth of perspective opening of the park picture (29 m), the compositional focus of which is a monument to internationalist soldiers surrounded by *Juniperus virginiana*.

Viewpoints 10 and 11 (viewing angle 35° and 40° and viewing depth 24 m and 60 m, respectively) have a common centre of the one-storey landscape – a flowerbed with oval perennials. But here we observe the dynamic disclosure of the park picture along the route III A. Thus, from point 11 reveals a view of the flowerbed, which is conditionally framed in a frame of

*Pinus pallasiana*, which limits the field of view. Conversely, the openness of space is a characteristic of viewpoint 10, which provides contemplation of the flowerbed, namely the vertical of conifers, which is visually continued by a coniferous group in the background.

## Conclusions

So, on the territory of the park-monument of landscape art Novooleksandrivsky to some extent there are all main compositional structures are present.

The stylistic park formation is presented by the combination of regular and landscape park development elements. Nevertheless, in some cases, the ornamental species and forms of the ornamental plants are not used and combined correctly. The low percentage of the open spaces doesn't permit the multiplan compositions, and the existing groups of these spaces haven't been kept for a while. Some of the plants in the compositions, like *Platycladus orientalis*, *Juniperus virginiana*, lose their ornamental qualities, and, therefore need to be totally substituted or cut in order to make them regularly treated. In order to meet the requirements of the status of the park as monument of landscape art of national significance, it is necessary to increase the level of artistic value and expand the range of species composition of plantings with unique specimens of trees and shrubs species. Therefore, to improve the park landscape, we recommend:

- to increase the share of semi-open and open types of the park landscape according to normative values, which would increase their artistic value and practically do not affect the phytomeliorative and sanitary-hygienic properties of plantations (trends in increasing the artistic value and

comfort of park plantings are dominant today);

- to expand the range of ornamental trees and shrubs of the park by including such species as *Albizia julibrissin* Durazz., *Maackia amurensis* Rupr., *Spartium junceum* L., *Koelreuteria paniculata* Laxm. and others in park compositions.

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