IN SEARCH OF A NICHE FOR A NEW BOTANIC GARDEN: AN APPROACH THROUGH CULTURAL AND NATURAL REGIONALISM

A Master Plan for Šiauliai Botanic Garden, Lithuania

by

Jurgita Tamutytė

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Thesis Committee:
Associate Professor Elizabeth Brabec, MLA, J.D.
Adjunct Assistant Professor David Michener, Ph. D

ABSTRACT

The mission of the botanic garden as an institution has changed drastically since its inception in the XVI century. The objectives for a contemporary botanic garden are so complex that its message often gets lost in the development program, and even more so in its actual spatial expression. The goal for Šiauliai Botanic Garden (Lithuania) is not to imitate other gardens, but to look for the particular niche to express its uniqueness. While program elements are drawn from the *Action Plan for Botanic Gardens in EU*, the design elements, forms and their sequences are inspired by folk art, cultural symbolism and bio-geographic regions of Lithuania. The resulting Master Plan outlines the proposal for future development as a tribute to the rich cultural and natural heritage of the country.

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INTRODUCTION

Šiauliai is my native town where I grew up and lived until leaving my home for undergraduate studies at the age of 17. Šiauliai Botanic Garden was not in existence at that time as it was established only in 1997 – the year I no longer resided in Lithuania. I established the basis for a collaboration with Šiauliai Botanic Garden during a summer internship at the Auksučiai Farm and Forest Center, Lithuania in 2003: Šiauliai Botanic Garden staff helped me to obtain information on endangered species, to build a network of people involved in this subject and allowed me to collect seeds of certain plants from their collections.

Vida Motiekaityte, Director of Šiauliai Botanic Garden, proposed that I design a master plan for long-term development of the garden. The botanic garden does not have a landscape architect on staff and the detailed site plan has never been completed. I delightfully accepted the opportunity to blend the professional interests in my home country with my thesis opus at the University of Michigan.

The thesis briefly looks at the historical development of the botanical gardens to establish a framework of the main functions at the set of institutions. Existing site features, relevant goals established by network of botanic gardens, and staff intentions are discussed in order to distill the program for the design of the master plan. Drawings are the main product of the design process. The explanatory text is provided to communicate the design intent and the meaning of elements, which may not be easily translated between the cultures.

Part of the project was submitted for the Bursary Award at the LivComm Competition administered by IFPRA (International Federation of Park and Recreation administration). The design proposal for the Display of Lithuanian Regional Plant Communities was shortlisted as one out of ten finalists to be presented in La Coruna, Spain (2005). For this purpose, but not part of the original thesis plan, preliminary area documents were prepared for cost estimates and are presented as Appendix 3.

MISSION OF BOTANIC GARDENS

Definition of the institution at its inception in the XVI century

Botanic garden, as a term, is quite controversial, since a garden, with a very few exceptions, is a place where woody or herbaceous plants are cultivated – thus, strictly speaking it is botanical. The widespread acceptance of this common term for the institution rarely poses a question why the word “botanic” was initially chosen over another descriptive adjective for the title. In order to investigate the reasons behind the naming of the conceptually new institution at its inception, it would be beneficial to look into how a *botanic garden* was different from a *garden*. It is important to note that the following discussion covers only development of western botanic gardens and information about gardens in ancient China or Mexico is limited. “We know all too little of the gardens of these ancient civilizations, but sufficient to realize that landscape gardens in the West bore as little resemblance to theirs as children’s first efforts with pencil and paper to the finished works of great masters” (Rohde 1936, 200).

The earliest botanic gardens, such as the Orto Botanico at Padua, the Botanic Garden at Oxford or Hortus Botanicus at Leiden were established in XVI century. All of these gardens were affiliated with universities and were created to support scientific research. Botany became an official subject at the university level only in 1550 at the *Faculté de Médecine* of the University of Montpellier. This date correlates very well with the establishment of the first botanic gardens – 1544 at the University of Pisa, followed by Padua, in 1545. Until that time plant research focused on medicinal properties of plants and only plants of some value to physicians were included in collections of *physic gardens*. In the first *botanic gardens* plants were included in collections and classified even if they had no obvious medicinal properties. Thus, it is reasonable to draw the conclusion that the gardens next to universities were established to support research of the science of botany and therefore were named *botanic gardens*, thought the more adequate term for their purpose, would have been “gardens of botany” or

“botanic research gardens”. By contrast, the Chelsea Physyk Garden, established at a later date, was not directly associated with university, but with the Society of Apothecaries. Though it was functioning in some fashion as a botanic garden it is not called so in its title as the garden was focusing on the plants with medicinal values and supporting medicinal studies, rather than the subject of botany.

Early botanic gardens were encyclopedias of live plants where logical placement facilitated easy access to every specimen. The primary function of the institution was to provide information to a select group of people – students and professors of the university, and also, to serve as a laboratory for experimentation with plants. If a garden is a place where plants are grown by humans, and some kind of plant choice and control of a layout is exercised, a *botanic garden* could be defined as a type of garden, where:

- the plant choice is determined by scientific purpose;
- the layout has to adhere to some kind of system.

Though nowadays botanic gardens are no longer necessarily affiliated with universities, the key defining elements remain the same.

Expansion of functions

As years passed, botanic gardens added many new functions. I would like to focus on the three major areas of change throughout botanic gardens in XVII-XX centuries:

- economic service;
- public access;
- aesthetic needs.

Economic service. The earliest botanic gardens focused their research on anatomical studies, classification of the plant kingdom and medicinal properties of plants. As new plants were brought from other countries and continents, botanic gardens assumed new roles in helping with plant acclimatization and

propagation. Soon major discoveries were made – quinine (a cure for malaria), coffee and rubber were brought to Europe – and botanic gardens started to function like nurseries to multiply plants of economic importance not for scientific purposes, but solely for economic gains. To understand the magnitude of the effort to hunt for new plants, it is worth to note, that “by 1726, all captains shipping out of the French port of Nantes were given a royal order to bring back seeds and plants from all their trips” (Soderstrom 2001, 62) and most of these materials were sent to the Jardin in Paris. In addition to new plant acquisition there was an intense competition among countries, especially between the Dutch and French, to cultivate plants of economic importance and establish plantations in the colonies. Jardin du Roi constructed its first heated greenhouse to house coffee plant seedlings obtained from the Dutch with the purpose to send them to coffee plantations around the Caribbean.

Botanic gardens in the colonies, directed by botanists from the major botanic gardens in Europe, are in part accountable for stealing economic value from indigenous people. After a plant was successfully introduced for cultivation in the colonies there was no longer a need to acquire it from the countries of its native habitat. One of the most notorious cases is the story of rubber trees, *Hevea brasiliensis.*

Until the end of the XIX century, Europeans shipped wild rubber from the Amazon basin. In 1876, Kew’s director, Sir Joseph Hooker, managed to arrange *Hevea* seeds to be shipped to the Royal Botanic Garden. Seven thousand seedlings were germinated in the botanic garden, to be moved later to the Singapore Botanic Garden, directed by Kew-trained botanist Henry Ridley. It would be difficult to name the operation of this scale “research”. Economic gains of this introduction were huge, as by 1920 more than half of the world’s rubber was produced in the Malaysian peninsula. This was “what botanical gardens were supposed to be doing, according to nineteenth century thinking” (Soderstrom 2001, 101).

Public access. The earliest botanic gardens were affiliated with universities and focused on the needs of professors and students. I did not find any information on the attitude of these institutions towards the non-scholastic visitor. It is not even clear if the general public could access the grounds of botanic gardens at Pisa, Padua, Leiden or Oxford. The Jardin des Plantes (initially Jardin du Roi) at Paris is more an exception than the norm, since lectures and demonstration there were available to anyone since its establishment in 1635. Significantly, all information was presented in French, not Latin. The garden was purposefully established beyond the gates of Paris in order to promote free investigation of the natural world that would not have to conform to the teachings of the Church and would be available to the public.

The Royal Botanical Gardens, Kew, still a royal residence at that time, opened its grounds to the public in 1776 – the Richmond Lodge gardens were open for visitors only on Sundays and Kew section only on Thursdays. There was no admission charged and the Kew Bridge railroad station opened in 1858 to help people from the greater London reach one of the finest gardens.

Botanic gardens established in the XIX-XX centuries were already planned with public access in mind. Henry Shaw, the philanthropist solely responsible for the establishment of the Missouri Botanic Garden (opened in 1859) during his consultations with Sir William Hooker at the very early onset of the institution, indicated the necessity for it to be a public garden rather than development of his own estate. The New York Botanic Garden, founded in 1891 and opened well before the automobile age, deliberately had chosen its grounds near a railway line with the main entrance across from the train station. This clearly represents that in addition to scientific research the institution was planned for public access and enjoyment.

A botanic garden was no longer a hermetic arena for the selected and exclusive group of scientists in the particular field of study, but became “a center for gardening information and provided a meeting place, horticultural library, recreation, park, courses of study and more, for the benefit of the citizenry” (Stephenson 1960).

Aesthetic and recreational needs. The earliest botanic gardens, such as the ones at Padua, Pisa or Oxford, were not created for leisure walks – they were grounds for scholars. These gardens resembled medieval monastic gardens. At that time there was still hope to re-create the Garden of Eden – the plant kingdom of the world in a chamber. Christian symbolism of *Hortus Conclusus* was noticeable not only in enclosing walls, but in other features such as central fountain at the intersection of its main paths. The aesthetic qualities of the place were seen in a very allegoric way – the garden was a somewhat sacred ground, full of mystic harmony of powers, not necessarily seen by our eyes. The botanical garden was also an encyclopedia and long narrow planting beds in geometric arrangements assured easy access to each plant for close observation. The "walled" botanic gardens did not evolve into leisure grounds, but there were leisure grounds, which did become botanic gardens.

Royal Botanic Garden, Kew was started as pleasure grounds. In the early XVIII century the garden was maintained in the English country style as a picturesque landscape for the royal family. It was only half century later that the goal changed to establish a garden which would "contain all the plants known on earth" (Hill 1788, 7-8). Only under supervision of Sir Josef Banks, who became "appointed" at Kew in 1773 and organized expeditions, did Kew become a premier botanic garden in Europe. However, landscape architect's Wiliam Nesfield's persistence not to diminish aesthetic criteria may be credited for Kew's attractiveness today. In the middle of the XIX century, Sir William Hooker, director of The Royal Botanical Gardens at Kew had contradictory sets of priorities while working with Nesfield, who was developing an expansion plan. While Hooker insisted on maintaining the botanical relationships, Nesfield's concerns were about grand vistas and pattern between woods and clearings. Similarly, principal agreement between Charles Sprague Sargent and Frederick Law Olmsted, that the design has to satisfy both scientific and aesthetic requirements, may be credited for the Arnold Arboretum's success.

Recreational need came hand-in–hand with public admissions. The botanic garden as an institution was no longer oriented to one particular group of people. At the beginning of XX century, about 3 million peoplevisited the Royal Botanical Gardens, Kew each year. A visitor directed that an arboretum or botanic garden “should be more than a museum. It should be a work of art…” (Simonds 1925).

Contemporary areas of focus

Susan Lathrop, former executive director of AABGA (American Association of Botanic Gardens and Arboreta) noted that she “is not aware of a single new botanic garden in United States that is being designed primarily for purposes of botany” (Posner 1989, 55). The 1972 year report, published by the Holden Arboretum on the prospective role of arboretums and botanic gardens, stated that “research now has little or no direct connection with the living collections” (Columbia University 1972, 13). It is obvious that the worldwide mission of the botanic gardens evolved over the centuries and a different set of priorities currently govern their development strategies and daily functions. I would like to focus on the following issues, currently gaining the most attention at the botanic gardens across the world:

- public education;
- preservation of biological diversity;
- collaboration and networking;
- competition for a visitor.

Public Education. It would be difficult to find a botanic garden or arboretum which does not have any educational goals. If the botanic garden has at least some of its plant material labeled for the visitor, rather than marked with identification tags for the staff, it is already disseminating botanical information for the public and therefore – educating.

Education in public gardens can be divided into two major aspects: botanical “encyclopedic” information (e.g. taxonomy, plants in cultures, design styles) and of conservation relevance (e.g. awareness about loss of biodiversity). Education may be formal, nonformal or informal (Olien 2001). Formal education was part of the mission of botanic gardens since their inception: it was available only to selected groups of people affiliated with the institution, typically, students of the university, which was funding the botanic garden. Education of visitors began with public access, but became an emphasized goal of botanic gardens only during last decades of XX century as the priorities shifted from researcher-centered studies to public-oriented programs.

Nonformal programs for public audiences range from hour long presentations or guided tours to series of courses, which may last a few years and culminate with some kind of certification. Nonformal programs are planned in advance and have a leader or mediator, therefore they are more demanding on resources compared with self-directed learning, as they require a dedicated staff member, or at least a docent who would lead the program. This type of education is more common at large institutions, though many small institutions may have seasonal programs or short presentations by guests.

Informal education can take many different forms: the information to visitors can be delivered through interpretational signage, temporary exhibits, “educational stations”, thematic compositions or verbal interpretation – staff or docents simply available to answer visitor’s questions. Demonstration gardens, where visitors can get very practical information, became very popular, too. Even such reputable gardens as Missouri Botanic Garden, Chicago Botanic Garden and Longwood Gardens installed areas to showcase the plants, vegetables and flowers appropriate to grow for each homeowner. The key aspect of informal education is to make information available to visitors for self-directed learning.

It is not easy to achieve an optimal balance between educational interpretation and recreational/aesthetic need - visitors come with a variety of goals and educational material “right in your face” may repel the group of visitors who come to the garden for passive recreation and want emotional rather than

intellectual enrichment. One of the ways to achieve this dual goal is to build in the educational message into the spatial structure of the garden, collection or their sequence, but provide more information only in a handout. Chanticleer Garden handled even labeling of the plants in that fashion: well-drawn plans with species names are available in discretely hidden boxes. Handouts provide on-site reference for a botanically sophisticated visitor and even can be purchased at the exit. According to my observation, this kind of labeling not only allows the garden to be kept as an intact composition for emotional enjoyment, but also encourages self-exploration as the visitor has to analyze unique plant features (height, leaf size, shape, color) to match the plant with the appropriate name.

Preservation of biological diversity. Raising concerns regarding loss of biodiversity influenced a renaissance of botanic gardens during the last decades of XX century. The horrible prediction that 20 to 25 % of currently existing species may disappear within next 30 to 40 years raises the urgent need to search for undiscovered plants and halt the loss of wild plant diversity. The first World Conservation Strategy was published in 1980 and followed by the Botanic Gardens Conservation Strategy in 1989. The Convention on Biological Diversity (CBD) – a document, outlining major conservation goals worldwide - was signed at the Rio Earth Summit in 1992 by 168 countries. Following CBD, The Global Strategy for Plant Conservation was approved in the Hague in 2002. Two out of sixteen outcome-oriented targets outlined in the Strategy are especially relevant to botanic gardens. The global Target 8 requests by 2010 to maintain “60 percent of threatened plant species in accessible *ex situ* collections, preferably in the country of origin, and 10 percent of them included into recovery and restoration programmes” (*Global Strategy* 2002, 8). Target 14 requests to have “ the importance of plant diversity and the need for its conservation incorporated into communication, education and public-awareness programmes” (*Global Strategy* 2002, 10).

While the large botanic gardens that have both financial and scientific resources may choose to direct their conservation efforts worldwide and conduct

research in the economically disadvantaged countries, smaller botanic gardens should focus on conservation issues of their own region or country rather than attempt to gather “bits and pieces” of worldwide diversity. The collection and cataloging of the local flora should take place before the attempts to establish collections of exotic species. However, collections of exotic plants may be very important for educational purposes to illustrate for the local community how complex is the kingdom of plants and at the same time point out that the local native plants, possibly “well-known” and “non-exotic”, do play a certain role in a worldwide context. A conservatory or a collection of exotic non-hardy species may be an appropriate measure to illustrate biodiversity if it helps to explain the importance and relationship of native species in the context of the concern regarding loss of biodiversity worldwide.

The Royal Botanical Garden, Kew has a long history of supporting the idea of stewardship worldwide, but currently the institution is setting a wonderful example to start conservation “at your own yard”. The Millennium Seed Bank project administered by the Royal Botanic Garden, Kew has set an ambitious goal to collect and conserve seed of 10% of world’s flowering plants by 2010, but started seed collection at home. Initially all but 32 species of the 1,400 native to United Kingdom had been deposited in the seed bank. The conservation efforts were made very visible to visitors – many flower beds, including ones lining a representational walk from the entrance to the Palm House, were filled with native wildflowers and grasses.

Botanic gardens are also promoting in *situ* or on-site conservation and teaming-up with other institutions or preserves to provide research and methodologies for plant reintroduction and restoration of native habitats. An increasing number of gardens maintain natural vegetation within the boundaries of the gardens and can exhibit exemplary practices of management of these sites. A local example would be Dow prairie at the Nichols Arboretum of the University of Michigan, Ann Arbor, where a restoration project is undertaken by seasonally conducting prescribed burnings.

Collaboration and networking. In the era of globalization, co-operation among botanic gardens plays an increased role. Collaboration is no longer just an exchange of plants between botanic gardens to enrich their own collections, but an active participatory approach to address large-scale issues, like conservation of plants or maintenance of seed banks. Local ecosystems, which seem to be important and rare in one country, may be abundant in adjacent countries, but abundant ecosystems at a local scale, e.g. in Lithuania, may be unique at global scale, e.g. in Europe. This large-scale approach to conservation may revise short-term and long-term goals of the particular institution.

In order to target the task of coordination and efficiency many international network organizations were created: International Association of Botanic Gardens (1954), Botanic Garden Conservation International (1987), North American Plant Collections Consortium (1992), Planta Europa (1995) and many others. Many documents were prepared to coordinate efforts among individual institutions, such as Action Plant for Botanic Gardens in European Union and African Botanic Gardens Network Action Plan. "2010 Targets for Botanic Gardens" (draft) was an outcome of the 2nd World Botanic Garden Congress in Barcelona (2004) as a contribution to Global Strategy for Plant Conservation.

Dr. Peter Raven, director of the Missouri Botanic Garden, noted that "people who live in developing nations – 77 percent of the people in the world – have 80 percent of the world's biodiversity but only 15 percent of the money" (Raven 1999). Therefore, the institutions which are in the position to make contribution in the area of conservation, are stepping in to conduct research in the countries which lack resources to start creating national parks or botanic gardens. Missouri Botanic Garden is conducting major cataloging and research projects in the tropics – Southern Mexico, Central America and the Malay Peninsula. Similarly, New York Botanic Garden has ongoing research projects in 20 countries. These world premier institutions have resources and funding to carry research in the foreign countries and are in a race with time rather than with their foreign colleagues. However, each and every botanic garden or arboretum

plays an important role, especially in interpreting local knowledge from botanical, ecological and cultural standpoints.

Competition for a visitor. A few centuries ago public access to a garden was a privilege. Today gardens conduct studies and surveys, create programs and provide all kinds of services to attract a visitor. Currently people have many choices for their leisure activities and botanic gardens are in great competition with theaters, museums, cinemas, amusement parks and children's programs for the visitor's time to be divided among the institutions. As public education is one of the prioritized goals for botanic gardens, quantity of visits to the institution directly relates to the accomplishment of this task: more visitors enable the institution to reach larger audiences with educational message. Financial incentives – administration fees and related income - are also the matter of interest.

At present many of the botanic gardens rely heavily on admission fees as a source of income. Some of them might have never opened to the public if the financial crisis not struck them. However, the public is not willing to pay admission just to see somebody's scientific research. Therefore, additional funds bring additional needs for fascinating displays every season, interpretation and compliance with codes, like adequate number of bathrooms, parking spaces and accessibility.

A visitor to a contemporary botanic garden is very different from one in the XIX century. Only part of the audience is coming to enjoy nature and have a relaxing stroll along the paths. Only a limited audience is interested in plants themselves – their scientific names, place of origin and growing conditions. Therefore, more and more emphasis is placed on computer interactive screens, volunteers giving live presentations and all kinds of eye-catching signs or hands-on demonstrations. Sometimes measures taken to attract a visitor "spill over the top" and botanic gardens nowadays somewhat risk becoming "entertainment parks". Chicago Botanic Garden's solution to hire an actor dressed as Linnaeus in the Heritage Garden and that way to reach more visitors in teaching about

plant classification is one such example. Stybing Arboretum purchased 20 drums and started drumming sessions to capture attention for talks about ethno-botany. Children's gardens resembling playgrounds and oversized "talking" plant displays became a norm, rather than an exception. Computerized inquiry stations display sophisticated graphic images. But is an average child more interested in information it conveys or opportunity to push some buttons? Peter Olin, director of the University of Minnesota Landscape Arboretum, expressed his worries about gimmicky tricks to attract people: " I'm concerned that we think we have to try a Disney World approach in order to get the people there" (Olin 1989).

Perhaps vivid displays help to reach visitors with an educational message, but aren't we making a huge sacrifice by no longer teaching a person careful observation and plant appreciation in his/her own unique way? Are we tipping the scale towards intellectual learning rather than achieving a balance with emotional learning? Monet's Garden at Giverny has no signs or interpretive elements; yet, 500,000 visitors visit it every year. The garden does not have any outreach programs either. "Its message is simple: beauty is in the eye of the beholder." (Benfield and Benfield 2000, 13). Are botanic gardens helping to train that eye?

This overview of changing goals in the botanic gardens during last centuries is only a brief introduction and by no means covers the full spectrum of issues in the development of institution or strategic goals in the contemporary botanic gardens. The purpose of this chapter is to illustrate how changing needs of the society changed the mission of botanic gardens during last centuries. While botanic gardens at Pisa, Leiden and Oxford were leading institutions in the field of botany in XVI century, they cannot be considered as models for establishment of a new institution today. These gardens were established according to the need of XVI century society and their value today is primarily as historical institutions allowing access to old specimen plants, herbaria and archives. A new garden modeled after an institution of historic value would be just a mere repetition, which no longer meets the need of science and society. Reliance upon old solutions would appear as a cultural anachronism.

LAYOUT OF BOTANIC GARDENS

Introduction

A layout, or form, is a spatial expression of organization. At the inception of a botanic garden as an institution a layout of collections had to adhere to some kind of system. The relationship between conceptual organization of the institution and its layout changed through the centuries. With no attempt to an in-depth analysis of the evolution of form in botanic gardens, I would like to focus on how their layout was or was not used as a tool for interpretation of the collections in different periods of their development.

The information available about this subject is sparse and literature about landscape design styles does not cover well the development of botanic gardens. This is especially relevant to the institutions developed in the last century. During numerous hours of catalog search, including visits to the Library of Congress, I was not able to find any single publication devoted to the development of the form of the botanic gardens, with the exception of the article by Warren T. Byrd in the January 1989 issue of *Landscape Architecture*. Though the author includes a brief overview of current trends in the layout of the institutions, he admits that there are no clear patterns in development of the spatial pattern and form. "It is generally accepted that botanic gardens and arboreta have a specific mission that combines scientific, educational, aesthetic and recreational needs. Yet it is by no means clear as to how priorities in these institutions should be expressed in design form" (Byrd 1989, 43).

Form – a tool for interpretation

Walled garden. The earliest botanic gardens of XVI-XVII century, like Padua (1543), Leiden (1572), Leipzig (1580) or Oxford (1621), had a mission to collect, study and display the richness of plant kingdom. Most of them were functioning under the philosophy of natural theology and the primary reason to

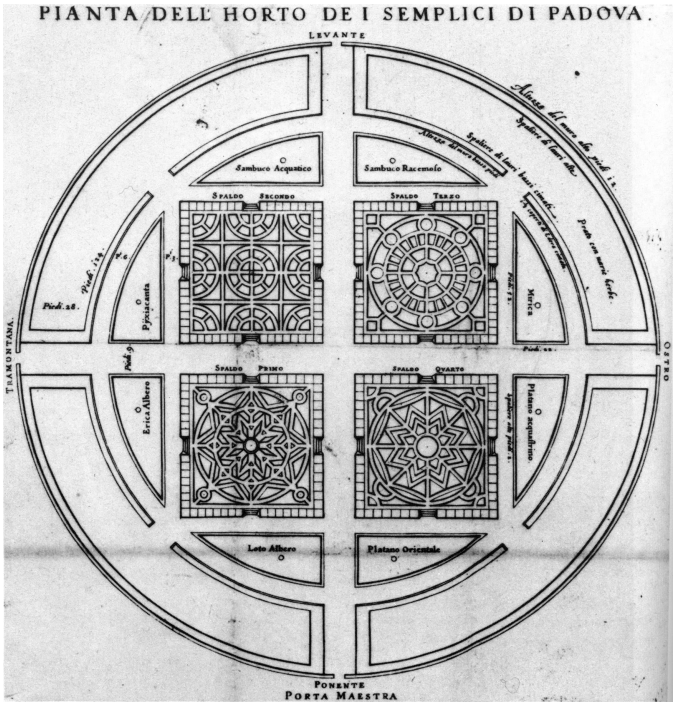

Figure 1. The plan of the Garden at Padua.
Porro,G. 1591. L'horto de i semplici di Padova (Prest 1981, 44).

indulge in the study of nature was to reveal the Creation of the World and its Order. The form was following the best interpretation of the Garden of Eden. Just as the Garden of Eden had boundaries, the early gardens had high enclosure walls. Walls also provided some shelter to create a temperate climate since it would resemble an Eternal Spring, as it should have been in the Garden of Eden. Typically the garden was derivative of the four-square motif (Figure 1). Four-parted division is referenced to four rivers mentioned in the book of *Genesis* or four regions of the earth, often each quarter being planted with species according to their geographic origins of four continents: Europe, Asia, Africa and America. Without further analysis regarding origins of quarterly division, it is important to mention that the four part motif was prominent in garden design long before creation of the "physick garden" and was present in eastern cultures. In ancient Vedic symbolism, Asia was represented as a four-petalled lotus flower, a plant representing purity and beauty of water. Moghul gardens - Emperor Babar's watered gardens laid out between 1508 to 1528 - took the form of four rectangular plots surrounded by a high enclosing wall. Thus, the quarterly division and presence of a fountain in the center of medieval and early Renaissance gardens may be equally drawn from both the Mosaic interpretation of the Garden of Eden and the symbolism of eastern cultures.

Each quarter of early botanic gardens was geometrically divided into the long, straight, and narrow beds, called *pulvilli* (Figure 2). A *pulvillus* was an

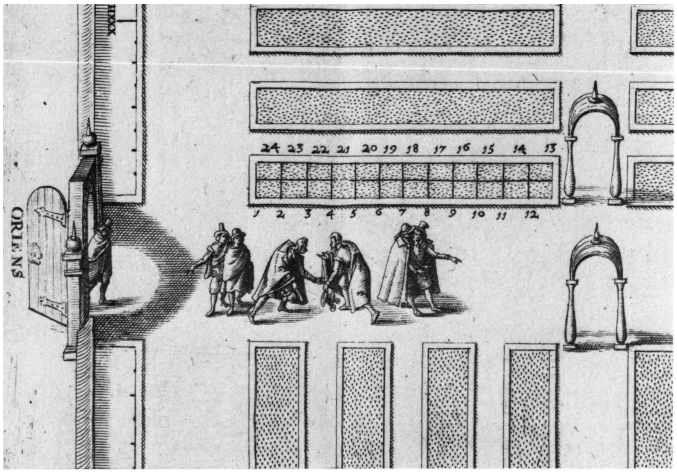

Figure 2. Detail of the Garden at Leiden showing pulvilli. P.Paaw. 1601. Hortus publicus academiae Lugdunum-Batavae (Prest 1981, 6).

organizational element, which constricted form of the garden to geometrical arrangements. It was not only a tribute to the science of mathematics, reborn in Renaissance, but *pulvilli* also provided easy access to the plants of each and every genus. As botanic gardens were living encyclopedias, it was essential to have access to each plant in its assigned location in order to touch, smell and sketch from the walk. A *pulvillus* was a critical organizational element in the garden structure and the form of the garden was dependent on the relationship and layout of its elements.

Overall, at that period the form was absolutely instrumental to carry the mission of the botanic garden. The layout was an integral part of the collection and its primary purpose was not to serve aesthetic needs but to reinforce the philosophy behind Creation of the world and the plant kingdom.

Beyond the walls. While the *pulvillus* remained the main organizational element in most botanic gardens established in XVI-XVIII centuries, there were a few attempts to organize a part of the garden in a different manner. Chelsea Physic Garden, though not a botanic garden, but clearly structured with *pulvillus* as the organizational element, had naturalistic areas with irregular winding paths. There is no doubt that design of these areas was influenced by the naturalistic style of landscape as the English school was beginning to make its way into institutional settings.

The earliest botanic garden to display several natural habitats was the Jardin du Roi in Paris (Figure 3). Besides four-parted typical gardens with regularly divided beds it had a hilly area, a meadow and a marsh. As Preston

describes in his book “The Garden of Eden”, it was the garden which John Evelyn, a well known English gardener, wanted to adapt for an ideal philosophical garden “Elysium Britannicum”. Though this garden was never built, it was supposed to feature a four-sided mount. The mount would allow exposition of shade loving plants in the North, wetland and aquatic plants to the East and West of the mount (in place of excavation) and sun loving plant in the South. Not only there would have been different habitats because of different exposures, but also the 72-foot mount would have allowed demonstration gardens of different altitudes.

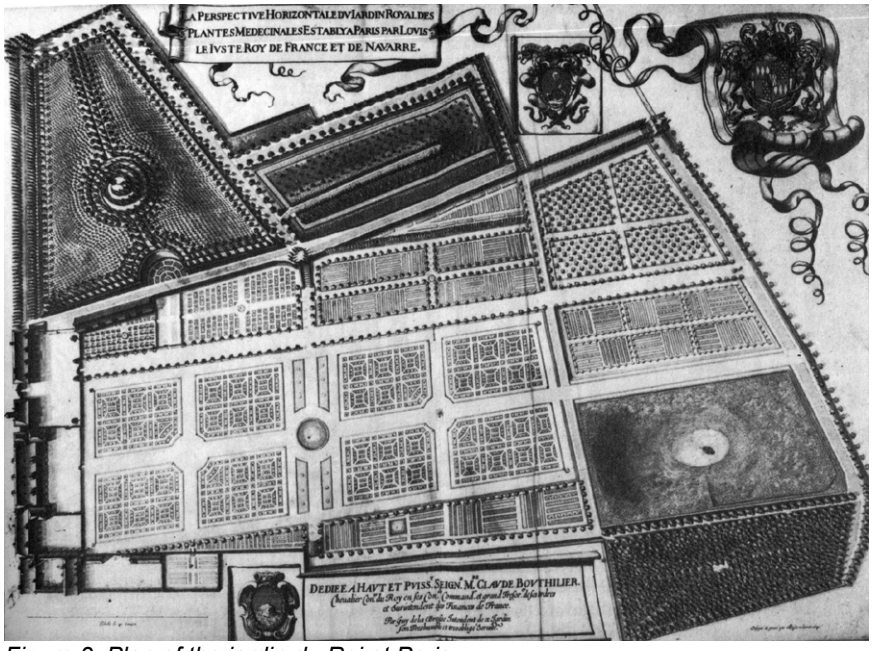

Figure 3. Plan of the jardin du Roi at Paris.
G. de la Brosse. 1641. Reliquae operas historici plantarum. (Prest 1981, 49).

The attempts to establish collections beyond the Walled Garden did not disrupt the main organizational system based on the *puvillus.* The layout was still geometric, but no longer completely dependent on rigidly controlled geometry within perimeter of the walls - more naturalistic layouts were functioning like satellite gardens where rigid geometry was no longer limiting spatial expression.

Influence of Linnaeus. In XVII-XVIII centuries new expeditions were intensively organized to conquer the yet undiscovered word and the botanic gardens were exploding as new plants were coming in with every ship from all parts of the world. It became a problem to plant all these new introductions in

one walled garden and as early as 1685 Sir William Temple suggested that parts of the garden should be “like rooms out of which you step into another” (Temple 1720, 186). When the idea to collect all plants of the Earth into one place and re-assemble the Garden of Eden became questionable, a single geometric enclosed garden started to disintegrate into multiple spaces. However, the botanic garden still was ruled by order – God’s Creation could not have been anything like wilderness. The order was expressed in straight lines, regular intervals and uniform tree rows. When Linnaeus published *Species Plantarum* in 1753, his binomial classification came to dominate botanic gardens as an organizational system and it became increasingly difficult to organize collections in a linear fashion, since newly arriving plants were supposed to find the place according to their genus. If there were significantly more species of one genus than the other, the rest of the collection had to be moved to make more room for new arrivals.

Though I was not able to find any written sources discussing the influence of Linnaeus’ work to the form, I believe that the binomial system just hastened division of one unified garden space into separate areas: as the plants were classified into “families”, it was much easier to compartmentalize garden into “rooms”. The *pulvillus* was equally well suited to plant species for observation according to the new system. The same structural element served different organizational system and was successfully used for layouts. The botanic garden’s mission to classify plants according to the binomial system did not manifest itself in the strong form. It gave many options how to organize collections according to family or genus.

Evolution or disintegration?

As the binomial system started to make its way into botanic gardens, form was no longer an essential element behind the philosophy and as a result became more or less an aesthetic expression of the designer. In some instances it was affected by the prevailing landscape design style.

The Arnold Arboretum is a successful example how a scientific collection was organized utilizing principles of the English landscape school. In 1877, Charles Sprague Sargent commissioned Frederic Law Olmsted to create a layout for the arboretum. Sargent was determined to arrange the plant collections by family and genus according to then generally accepted classification system of Bentham and Hooker. This classification system was based on plant evolutionary sequence as determined by floral parts: plants producing separate floral parts were considered most primitive and therefore placed at the beginning of the system, followed by plant families of increasing morphological complexity. It was intended to view the collection from a carriage and Sargent wanted to avoid stiff borders and lines in the sequence. Olmsted ingeniously managed to follow the system requested by Sargent and at the same time create a seamless picturesque landscape clearly influenced by English landscape school. In this case form was ruled by design style, rather than philosophy, but it was still a tool for interpretation – an expert visitor could observe the classification system by following the path and roadway layout.

Unfortunately, in many botanic gardens the collections started to fracture into separate gardens that create no cohesive experience, unlike the case observed in Arnold Arboretum. Collections became fractured into “rooms” according to genus or family, e.g. Oak, Maple or Viburnum collections. Unfortunately, in many cases there was no guiding principle how these “rooms” were placed in the landscape. Perhaps some of the collections were located according to the most suitable growing conditions or “where there was enough space”, but there was no logical relationship between separate segments of the garden. Layout of paths was mainly designed for circulation with respect to aesthetic qualities of the site, thus, mainly serving recreational purposes.

When botanic gardens became segmented into separate self-contained collections according to genus or family, at least all of them were arranged according to the same parameter – taxonomic classification. As the mission of botanic gardens started to change and new priorities, such as education, conservation and visitor’s experience became more prominent, new type of

collections emerged. Today there are collections focusing on culture (Japanese, Chinese or First-Nations (indigenous people) Gardens) or gardening style of a certain period (Monastery, Victorian or English Walled Garden). There are habitat based collections (Alpine or Aquatic Gardens, Prairie) and collections acknowledging one special aspect of plants (Medicinal, Poisonous, Economical or Rare Plant Gardens). Other collections are specifically designed for a particular group of people (Children, Youth or Enabling Garden) or emphasize one kind of perception (Fragrance or Kitchen Garden). A plant relationship with wildlife is the key message in Butterfly and Insect Gardens. Since these thematic gardens are assembled according to different parameters, it is nearly impossible to establish any hierarchy or sequence among them in one institution.

Contemporary botanic gardens face the challenge to integrate separate areas into a continuous and unified exhibition. Critics sum up that from the more sophisticated visitor's viewpoint, a botanic garden resembles a "patchwork quilt", "safari park for plants" or "botanic shopping mall". A botanic garden often is a set of separate gardens under management of one institution and occasionally that fact even gets acknowledged in semantics of the title by using the plural – Royal Botanic Garden, Kew, Denver Botanic Gardens or Matthaei Botanical Gardens.

Structural element and organizational structure

The revenue-driven need to please a visitor and the scientific/ educational goals of the institution often determine a multitude of desirable features of the garden. Is there any way they could be organized into a sequence to give a more sophisticated audience a continuous experience? Are there any ways to interlock separate collections/ thematic gardens as pieces of a puzzle into one picture? The basis of the cohesive experience in the historic gardens was provided by a unifying structural element, like *pulvillus* in XVI-XVIII century garden, or clear organizational structure, like the classification system in the Arnold Arboretum. Could that united experience be redefined for contemporary institutions?

Structural element. Some botanic gardens successfully introduced a new structural element, unifying the whole exposition throughout the garden. The Botanic Garden of Barcelona, opened in 1999, has clear conservation goals: to showcase and safeguard the flora of Mediterranean climates around the world. The botanic garden was established on an old solid waste landfill site. The institution is organized with a very clearly defined structural unit – the natural plant community. The definition of the structural unit influenced the layout: to resemble natural growing conditions of Mediterranean climates the planting beds are irregular in shape and placed on a slope. The beauty of this approach is that there are clearly established parameters regarding the structural unit – plant communities of certain climate. The possible future expansion could be seamlessly integrated into the existing composition like apples with apples. The problem of how to mix apples with orange or potatoes is eliminated from the beginning.

The North Carolina Botanical Garden in Chapel Hill developed a master plan based on different habitats across the state. While I cannot comment on implementation results, a habitat seems to be a very defined structural element. Given the botanic garden's territory of 600 acres this structural unit clearly dictates a naturalistic approach of layout. The placement of the habitats imitates their relationship in the state of North Carolina and dictates a logical sequence of the collections. Unfortunately, this kind of garden may not be very appealing for every visitor. G. Rausch, a partner in EPD – a firm working extensively on contemporary botanic garden design - points: "exquisite native-habitat gardens will appeal only to people who are very sensitive. Most of our visitors are not that way. They are interested in bright colors. And if you depend on revenue, you have to build things that people want" (Mays 1997, 51).

It is important to note that the large and established gardens, which evolved through centuries, like the Royal Botanic Garden, Kew, are no longer in a position to introduce a new unifying element. Thus, the definition of a consistent structural element is relevant only to newly established botanic

gardens or the ones which are fundamentally revising their exhibits, conducting new land acquisitions or master planning their undeveloped areas.

Organizational structure. In the first botanic gardens, form was an interpretation. Many contemporary gardens have nearly randomly placed collections, interconnected by paths and roadways, which serve the mere function of circulation. A layout is only a framework, like walls in a museum, not the exhibit itself. Organizational structure was no longer a foundation, like the philosophy behind the form of the first botanic gardens, or the unifying landscape style in Olmstead's design of Arnold Arboretum. Two main approaches to compensate for a lack of unifying organizational structure can be noticed: visual and verbal interpretation with entertainment elements and spatial composition.

Some institutions develop separate Interpretive Master Plans as overlays on the physical plans of the garden. With an attitude to "have it all", something that was successful in one garden becomes nearly "a must" in the others as long as the budget can be stretched to accommodate a new installation. The problem is that trendy installations are rarely mapped on a 15-30 year development master plan as part of overall garden scheme. New destinations are inserted in a piecemeal approach. Due to the lack of overall organization, the visitor has to be guided to find the separate installations and there is a need to provide him/her with site maps and way-finding signs.

If the separate gardens of the same institution have nothing thematically in common, the signage may be a spider-web at least indicating linkages among different exhibits. Sometimes signage is only way-finding arrows to guide visitor traffic. In other cases the same design of the signs, color-coded by the location may indicate that it is "still" the same institution. Is it strong enough to be offered in lieu of structural organization?

At the other end of the spectrum, there are elaborate interpretive displays, incorporating visual, audio and sensory stimulations supported by the newest technology. Suddenly it becomes questionable: is it still a garden or an outdoor science museum? My concern is that in these instances interpretation is an

exhibit by itself, possibly attracting a visitor more than the collection it is supposed to explain: the youngster touching imprints of the leaves in the children's gardens or enjoying information on a computer screen may pay no attention to the actual plant next to the display.

An interpretive overlay may be a wonderful addition to the well-planned garden, but it cannot substitute for a good design. Signs or docents leading visitors through the garden may be attractive for the first-time audience, but a returning visitor not only no longer benefits from the information, but may find it distractive to enjoy expositions at an emotional level. A good comparison may be exercise stations along fitness paths in parks. Very trendy in a park design at a certain period, they never really became popular - people preferred scenery along the path, not written instructions next to exercise stations. Interpretation provides only intellectual enrichment and it would be very sad if botanic gardens would fail to provide emotional enrichment. Certain discoveries can be made only through sensory perception. If over-interpretation will overshadow our feelings, eventually there would be a need to place signs like "Look at the color of that flower!" or "Doesn't it smell wonderful?" There is a precedent - we are indicated when to laugh when we watch sitcoms….

Form, even if it is no longer part of the interpretation, as it was in institutions of the XVI century, is powerful enough to help "tell the story" of the garden. It is the layout that helps to integrate all parts of the garden into cohesive experience. While the walls at the museum are providing only a framework for the exposition, it is their arrangement that leads the visitor's eye from one piece of art to another, not in a random, but very well defined way.

One example could be demonstration gardens – a new phenomenon for botanic gardens. While XVI – XVII century gardens were a living encyclopedias for individual plant species planted in *pulvilli*, some demonstration gardens in a similar fashion have geometric monocultural patches to display plant texture, color or practical usefulness for a homeowner. Though this kind of exposition, as seen in Longwood Gardens, is a fast way to "shop" for appropriate species for your home garden, it reminds me of shelves in a grocery story. Does this kind of

arrangement give any suggestions about composition or appropriate companion plants? Does it help to make aesthetic suggestions for a homeowner looking to beautify his property? However, if monocultural plantings are arranged in a meaningful way, e.g. placed in a cultural context, form becomes an interpretation and the collection serves dual purposes. For example, the Quilt Garden at the North Carolina Arboretum displays different groundcovers and at the same time pays tribute to one cultural aspect of North Carolina's history.

The sequence of displays in museums may be chronological, thematic or grouped according to an emotional message. In a similar way, garden layout may organize a visitor's experience around special themes and even provide different experiences in the same garden depending how the sequence of spaces is arranged.

Visual and verbal interpretation or entertainment elements focusing the visitor's attention are only temporary patches to the lack of unifying organizational structure. Interpretational signs, no matter how well designed, are not going to provide the visitor with the emotional enrichment as the one achieved by progressive sequence of spaces. I believe that only a well-defined spatial composition – form of the garden – may unify the visitor's observations into a cohesive experience.

VISUAL INTRODUCTION TO ŠIAULIAI BOTANIC GARDEN

Location

Figure 4. Map of Europe.

Lithuania is a country in Eastern Europe, situated next to the Baltic Sea. Geographic coordinates are approximately 56°00’ North of the Equator and 24°00’ East of Greenwich. Lithuania shares the border with Latvia in the North, Belarus in the East, Poland and the territory of the Russian Federation in the Southwest (Figure 4). Coastal border stretches for 99 km along the Baltic Sea. Lithuania occupies an area of approximately 65,000 sq km, which would be slightly larger than West Virginia in the United Sates. The population of Lithuania is ~ 3,600,000 people.

Lithuanian landscape mainly consists of lowlands separated by hilly uplands, with the highest elevation at 292 m. The climate is transitional between maritime and continental. Temperature and precipitation is quite different between coastal and eastern parts of Lithuania and plant hardiness zones, comparable to the USDA Zones 4, 5 and 6, in Lithuania stretch parallel to meridians (Figure 5). The climate in Lithuania is relatively well suited for horticulture, but somewhat restrained by harsh winter conditions and relatively short growing period. Lithuania has deep agricultural traditions – arable land occupies about 45% of the country’s territory. Even today about 20% of labor

force is related to agriculture. Many inhabitants have private fruit and vegetable gardens to meet the needs of the family.

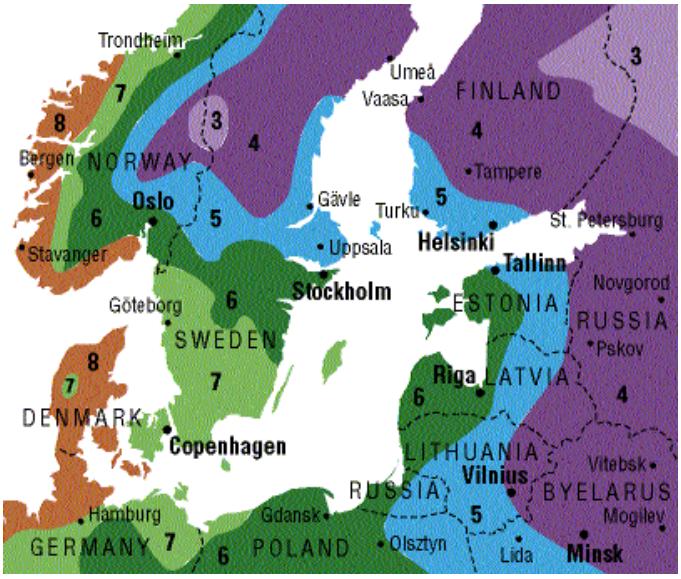

Figure 5. Map of hardiness zones around the Baltic Sea.

Figure 6. Location of botanic gardens in Lithuania.

Currently there are four botanic gardens in Lithuania. The Botanical Garden of Vilnius University and Kaunas Botanic Garden are well-established institutions as they were founded in 1781 and 1923, respectively. Klaipeda Botanic Garden and Šiauliai Botanic Garden are very new institutions still trying to define their developmental goals. Šiauliai Botanic Garden was established in 1997 and is a newest botanical garden in the country. The institution is affiliated with Šiauliai University, but partially subsidized by the state.

The city of Šiauliai is situated in the northern part of the country (Figure 6). The landscape is relatively flat, at the elevation of 107 m (351 ft). The winter and summer temperatures are close to the national average, but average precipitation is the lowest in the country and amounts to 550 mm per year. The lake Rėkyva (within boundaries of the municipality) is the largest one in the county. Peat from bogs next to this lake is exported to 12 countries in Europe.

The site

Šiauliai Botanic Garden is located on the western edge of the city of Šiauliai (Figure 7). While the territory initially was developed as an Agrobiological station in the countryside, exurban development soon will reach the boundaries of the Botanic Garden. A high voltage utility corridor runs along the urban straightened stream Vijolė (Figure 8). The unbuilt strip is functioning as a greenway, connecting forests north of the city with natural areas around the lake Rėkyva (Figure 7). The territory along the stream could be utilized to build a bike/ hike trail, potentially providing a convenient pedestrian access to the botanic garden: the institution could become a great recreational destination for residents of the southwestern part of the city.

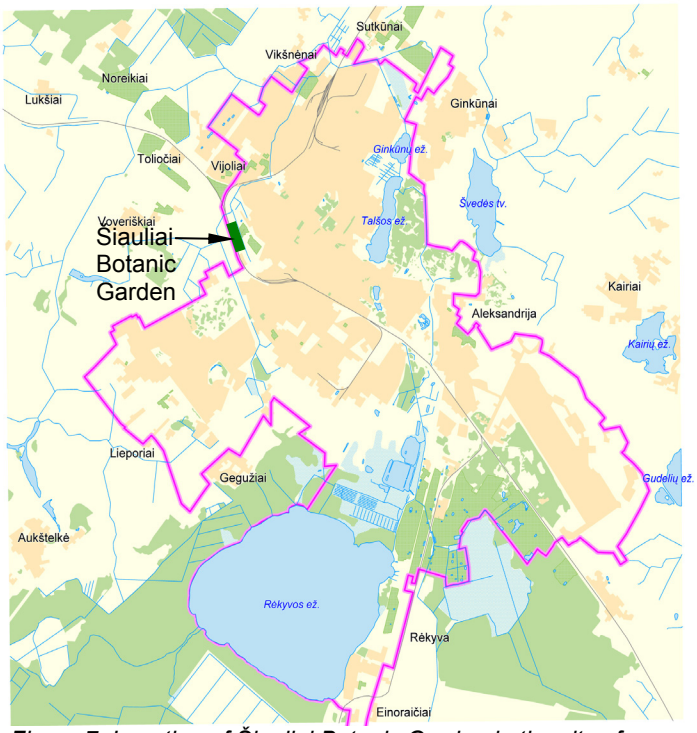

Figure 7. Location of Šiauliai Botanic Garden in the city of Šiauliai.

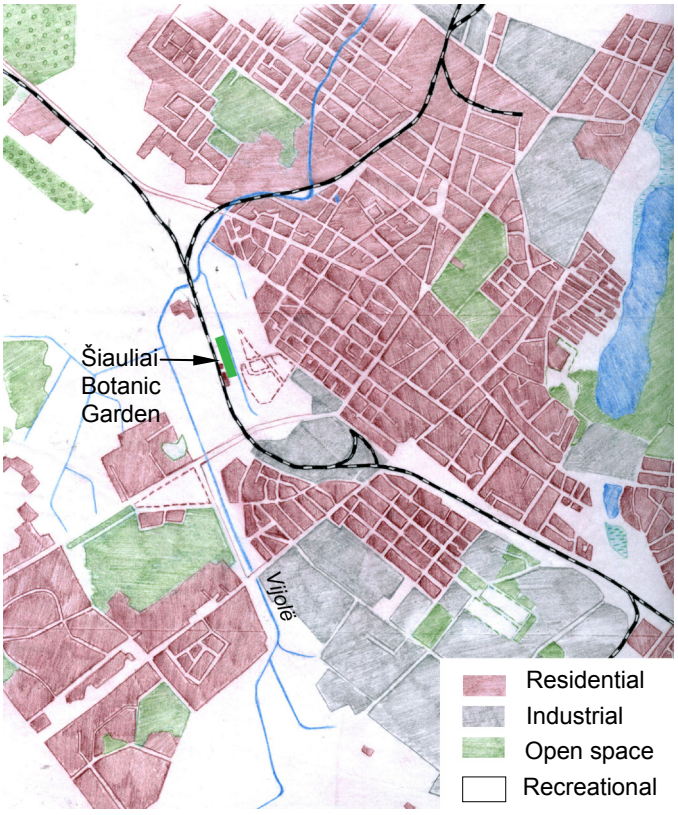

Figure 8. Land use in the municipality of Šiauliai.

Šiauliai Botanic Garden occupies a 4,48 ha site and was established at the former site of the Agrobiological Station. Currently the Botanic Garden is situated in an un-built semi-natural area, but the territory, adjacent to the botanic garden is already subdivided for residential development and lots are available for sale. A single-family residential district have been planned on the adjacent land, but no green space was preserved for community needs (Figure 9).

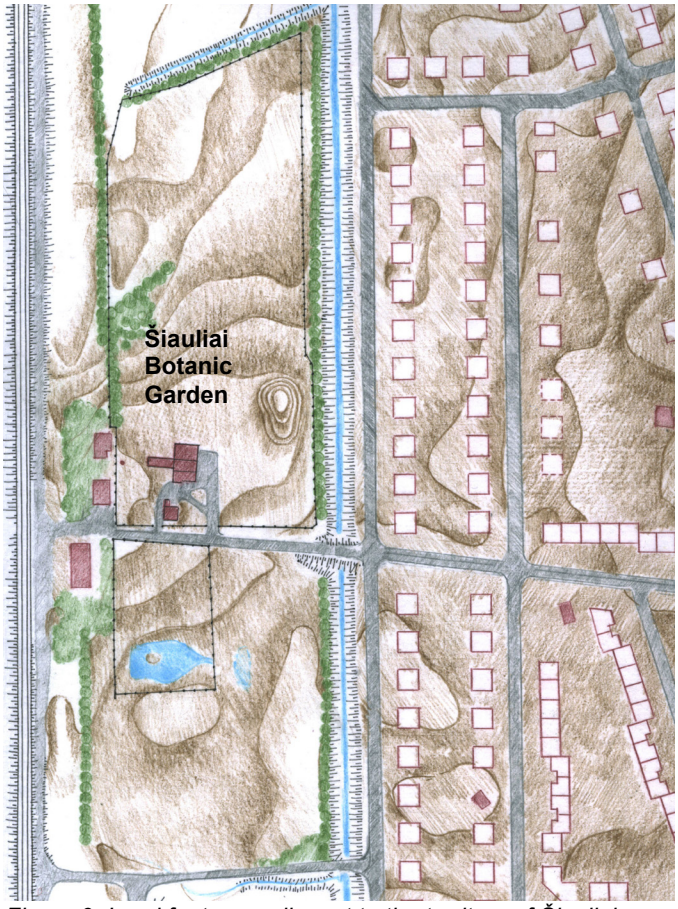

Figure 9. Land features adjacent to the territory of Šiauliai Botanic Garden.

The botanic garden may be a “green oasis” for the nearby residents, once the neighborhood becomes established. The road, planed on the other side of swale to service the new neighborhood, may increase the noise and it is important to plan noise reducing measures and visual screening.

Figure 10. Exurban development adjacent to the botanic garden.

Figure 11. Railroad tracks on the West side of the garden.

Figure 12. Drainage swale on the East side of the garden.

The site of Šiauliai Botanic Garden is framed by the railroad tracks on the West side and the water canal on the East side. In addition, this elongated rectangular property is bisected by a local gravel road, which terminates at the railroad and provides access to 4-5 families residing in one multifamily house next to the property of the Botanic Garden. The City Architect verbally assured me that there are no plans to extend the road to the other side of the railroad tracks and a traffic increase should not be anticipated.

Figure 13. A gravel road bisecting territory of the botanic garden.

Collections and infrastructure

Figure 14. A yard of administration building.
The new addition to the maintenance building, visible in the distance, is a gathering space for the "Friends of Botanic Garden".

Figure 15. Secondary entrance to the West of administration building. Recently established dwarf evergreen collection is visible left of the driveway. Water tower is used to heat up water from the artesian well, as municipal water is not available on the property.

Figure 16. Main entrance to the East of administration building.

A picture is worth of thousand words. Existing conditions at the Šiauliai Botanic Garden are illustrated by providing pictures, grouped according to the location on the property, which is indicated on the key map (in purple).

Figure 17. View from the road towards Systematic Garden.

Figure 18. Panoramic view of Systematic Garden form Alpinarium.

Figure 19. Hill of Alpinarium.

Figure 21. Maintenance building as seen from Alpinarium. Endangered Species (Red Data Book) Collection (upper right corner) is visible across the lawn.

Figure 22. View from Alpinarium toward research plots. Great Oak is a landmark on the site. Oak Grove (right of the picture) is a favorite place in hot summer days. Herb Garden is visible in front of the Oak.

Figure 20. New plant introduction area.

Figure 23. Coldframes.

Figure 24. Wood storage shed.
As wood burning stove is the only means to heat the administration building. Thus, wood storage is an essential need. It is placed in the least visible location – behind the greenhouse – and is screened with a fence.
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Figure 25. Grove of trees behind greenhouses.

Figure 26. Rhododendron collection.
This collection was established in the place of an old orchard. While the old apple trees are getting replaced by pines to provide shade, the shade net provides some relief from summer heat.

Figure 27. Propagated stock is grown on South property.

Figure 28. A log bridge to the pond island.
Before the artesian well was installed on site, the pond was used for irrigation purposes, which caused the water level to fluctuated significantly during the season. The island occasionally gets flooded in spring.

Figure 29. Panoramic view of the pond.

Figure 30.Visitor with a stroller.
Universal access is critical not only for a wheelchair access, but even more so for parents with youngsters in strollers.

Figure 31. A senior in a wheelchair.
Medicinal plant exhibit was interesting for visitors of all ages.

Figure 32. Parking on the road.
The difficulty to find a place for cars becomes a limiting factor for events at the Šiauliai Botanic Garden. The institution can not accommodate tourist groups arriving by bus as busses can not turn- around on site.

OBJECTIVES AND PROGRAM FOR THE ŠIAULIAI BOTANIC GARDEN

Introduction

A Master Plan for the garden should be based on a fundamental vision of the purpose for that institution, typically summarized in a mission statement. Currently Šiauliai Botanic Garden does not have a mission statement. Thus, one of the primary goals would be to define Šiauliai Botanic Garden's mission based on long-term objectives and formulate a mission statement in writing. The mission statement should be a visionary outline of the garden's purpose, which would outlive temporary trends, management practices and influence of individuals. The mission statement should be used as the primary filter to select future goals and activities and to evaluate collections, programs and policies at any given time in the development of the garden.

I was not provided with a strategic plan for the development or the program for the master plan and had to undertake a task to distill the goals myself. In order to justify that the program is more than my own vision, I had to come up with a framework to determine the objective goals. By visiting and analyzing other public gardens and reviewing discussions in periodical magazines, especially publications in *Public Garden*, I was able to determine the key sources for the program elements. They would be as follow:

- priorities for the botanic gardens in worldwide context as determined by international networks;
- current situation: environmental site conditions, circulation, existing collections, typical visitor profile and management practice;
- staff and designer's preferences and subjective wishes.

Action Plan for Botanic Gardens in European Union was selected as the most relevant document for Šiauliai Botanic Garden to help outline institutional goals in the worldwide context. The analysis of Action Plan objectives was

instrumental to distill specific goals to be targeted at Siauliai Botanic Garden and was a valuable tool to develop a site-specific program for master plan according to recommendations. The recommendations based on the Action Plan are followed by a brief discussion on how site features and staff preferences modified the program for the Master Plan.

Objectives for botanic gardens in European Union

Before 7 new countries, including Lithuania, joined the EU in 2003, there were 424 botanic gardens in the European Union including 77 in the United Kingdom alone. Over 50,000 species are grown in these living collections and many thematic collections focus on special plant groups such as medicinal, aromatic, economic plants, plants of ethno-botanic, historical interest or plants of special climatic, geographic or ecological zones. Nowadays, botanic gardens perform diverse roles and functions, with emerging trends for environmental education, habitat restoration and focus on cultivation of native flora of their own region.

Recognizing the need for coordination among institutions, Botanic Gardens Conservation International (BGCI) was established in 1987 with a specific goal to become a major networking organization for botanic gardens in Europe and worldwide. With recognition of the need to unite efforts of EU botanic gardens BGCI published, in April 2000, *Action Plan for Botanic Gardens in the European Union*.

The purpose of this document was to define multiple responsibilities and obligations of botanic gardens and define a shared mission and work program for EU botanic gardens. I believe that *Action Plan for Botanic Garden in European Union* should serve as a guideline in creating Šiauliai Botanic Garden mission on a large scale, help to define goals and prioritize activities for implementation.

The Action Plan distilled more than 30 objectives emphasizing priorities on different categories of botanic garden activities (Appendix I). The goal of such a broad spectrum of objectives was to make them relevant and important to

different types of botanic gardens at different periods of development. Each of the gardens may choose objectives relevant to their mission and adapt recommendations of the Action Plan to target them. The recommendations in the following section are based on objectives of the Action Plan (re-cited in outlined boxes) relevant to Šiauliai Botanic Garden, and are presented in the same format and sequence as the EU Action Plan.

Recommendations for Šiauliai Botanic Garden based on the *Action Plan*

Objective A1: Promote Botanic Gardens as resource centers for scientific research (Cheney et al. 2000).

Contrary to the US, where typically only a specially funded project is considered research, in Lithuania it may to be any kind of intellectual study, ranging in scope from student term papers to collaborative multi-institutional scientific efforts.

Current situation. Šiauliai Botanic Garden currently does not conduct research as an institution, but rather serves as an experimentation base for research of staff at Šiauliai University. The similar situation could be noted at the Matthaei Botanical Garden at the University of Michigan, Ann Arbor. This kind of organizational structure poses many challenges. Most critical issue is the temporary nature of research collections, which become a burden on the institution after the particular staff member leaves the university or discontinues research in the specific area of study. This setting also makes it difficult to prioritize establishment and maintenance of the collections. As each staff member secures funding for her/his project, the institution may be inclined to prioritize implementation of the collection with readily available or prospective funding without thoroughly assessing its relevance to the mission of the garden. Finally, individual needs of staff members pose difficulty in creating a long-term master plan and that eventually leads to piece-meal development and fractured experience for the visitor.

Current indoor facilities at the garden have very limited use, as the maintenance building does not have a permanent heating system, except a wood burning stove. This severely limits the propagation period and acquisition of species not hardy in Lithuania, as there is no place to store them over the winter. The botanic garden would like to build a conservatory in the future and additional heated facilities to house seed storage and plant records over the winter.

Recommendations.

- Clearly identify primary and secondary research objectives for the Šiauliai Botanic Garden as an institution. List and publicize future collections, which may support research topics currently not carried at the institution. Use these criteria in coordination with the university to attract new staff members and to secure future funding.
- Develop promotional material on research carried at the botanical garden. Identify relevant research institutions, inform them regarding current status of research and collections to promote collaboration and periodically update on results. Post this information on a web site to share with the broader community.
- Publish research results in scientific and horticultural journals, report at local and national conferences, in the media, in special exhibitions.
- Investigate the need for a conservatory and its relevance to the mission of the botanic garden. According to my assessment of the current situation, the efforts should be focused first on establishing a convenient place to prolong the gardening season, rather than creating an exotic four-season display for visitors.

Master Plan Program Goals

- Determine site for prospective conservatory to facilitate longer gardening season.

Objective A4: Consolidate botanic gardens as centers for research on identification, biodiversity conservation and sustainable use (Cheney et al. 2000).

Current situation. During the last decade Lithuania acceded many international conventions, including Convention on Biological Diversity (CBD, Rio de Janeiro, 1992, acceded in 1995) and Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention, Benr, 1997, acceded in 1996). CBD recognizes an important role of botanic gardens and their role in implementation of certain conservation measures.

Šiauliai Botanic Garden is the only botanic garden in Lithuania which established the collection of endangered and threatened species ("Red Data Book" collection). Unfortunately the collection is not utilized for research and is not labeled for the public. The Red Book collection has no coordination with other conservation efforts, like Natura 2000 network in Lithuania, Important Plant Areas (IPA's) project administered by Planta Europa or targets of European Plant Conservation Strategy. The collection does not have clear scientific, educational or aesthetic/ display purposes determined.

Šiauliai Botanic Garden collaborates with Kurtuvenai Regional Park, yet the nature of the collaboration is not formally defined.

Recommendations

- Utilize existing *ex situ* collections to carry research (especially seed biology and germination ecology) in order to support conservation efforts.
- Strive to acquire genotypes from different regional populations to promote further study of genetic material and possibilities of re-introduction.
- Coordinate Šiauliai Botanic Garden's conservation goals with larger scale projects to provide support at national and local levels.
- Develop a database of areas for natural occurrence of endangered plants linked to the collection. Use it as a tool to identify sites to be investigated for future protection by land regulations.

- Work with state-level protection agencies in helping to develop policies on how occurrence of endangered and threatened species should affect establishment of protected areas.
- Actively promote conservation and sustainable land management for private landowners and develop a brochure to assess value of their land from the biodiversity standpoint. Assist with identifying important biodiversity sites on private land.
- Work with government agencies to assure incentives or compensation mechanism for notification about endangered species on private lands, cooperation and possible restriction of activities.

Objective B4: Promote an appreciation of landscape and garden styles in botanic gardens. *(BGCI, 2000)*

Current situation. The Šiauliai Botanic Garden site initially was developed as an Agrobiological station with no predetermined site plan. It was not designed for public access and was not intended to be visited for recreational purposes. Thus, the beds were arranged in rectangular rows to assure convenient access and clear order. Though some beds were re-arranged, the main organizing elements, such as long hedges delineating main paths, remain and pose difficulty to change the form and arrangement of displays. Some collections utilize existing site features, which occurred without advanced planning for the current use. In particular, the Alpinarium hill was created after dredging and cleaning a nearby drainage swale. As the topsoil in most areas was already improved, the management of Argobiological station came up with the decision to place the dredging material into one pile rather than spread it as a uniform layer on top of existing beds. The pond was excavated to provide water for irrigation, as there was no artesian well until very recently.

Recommendations

- Develop a long-term master plan, establish procedures to comply with it and define process for approval for implementation of new site features.

- Stimulate interest in contemporary landscape architecture and strive for a design specific to the needs and purpose of a botanic garden.
- Arrange plants into aesthetic compositions in addition to maintaining the collection's scientific or horticultural purpose. Carefully consider the visitor's experience as he/she may appreciate the site for different purposes, such as recreation, education or visual and emotional retreat.
- Clearly establish priorities and sequences for construction of buildings, paved surfaces, garden features, pedestrian paths and thematic gardens.
- Prepare planting plans before implementation of thematic gardens or collections to avoid sporadic layout and future transplanting.
- Designate design decisions of particular displays to one person or a specific group of people to promote a continuum of one style through prolonged periods of collection development.

Master Plan Program Goals

- Determine multi-functional purposes of each collection to assure its appropriate location.
- Incorporate program elements into the Master Plan as an integrated features of one exhibition, rather than separate displays connected by paths.
- Define program elements as separate entities for implementation at different phases and prioritize construction in a logical sequence to allow further improvements as the funds become available.

Objective B6: Safeguard and document important artifacts, structures and collections of historical and cultural importance (Cheney et al. 2000).

Current situation. Currently Šiauliai Botanic Garden does not have any collections of historical and cultural importance. According to my knowledge, there is no institution in Lithuania which would maintain the collection of culturally important plants. This poses an urgent need to investigate Lithuania's gardening

history before the process of land privatization and reform destroys the remaining sites for interpretation of the country's botanical and horticultural heritage. There are two primary venues for investigation: rural/ countryside gardening heritage based on folklore and ethnic beliefs of the farmers and estate/ mansion gardening heritage based on European influence of the period gardens and availability of planting material.

The significance of particular genera can be easily noticed in Lithuanian folklore and art and therefore, I believe, that such a collection is essential not only for illustration of aesthetical preferences, but for better understanding of rituals and traditions. Historically significant plants bearing symbolic meaning often are not native Lithuanian plants (like *Aster, Dahlia, Lilium, Peony* etc.). An example would be *Ruta graveolens*: the clear association of this plant with virginity can be found in numerous songs and rituals from birth to marriage. As the habits and traditions slowly disappear or get modified, the symbolic meaning of plants gets lost. Certain genera could be typical found next to countryside homesteads, were culturally acceptable and formed aesthetic preferences. I am afraid that soon the average Lithuanian will have easier access to information regarding species used in a typical English border than in the typical Lithuanian countryside garden. To document and safeguard not only genera, but the particular cultivars or hybrids, expeditions to historical homesteads may need to be made. As the expeditions to record folk songs have to be organized in the urgency of time to reach the generation who sang them, culturally important species can be documented only until the land gets redeveloped. New land use rarely recognizes historical value of plantings to preserve them.

Renovation of mansions and country estates poses very different needs. These cases may lead to restoration projects, rather than be limited to establishing archival records or rescuing remaining plants for historical collections. Šiauliai Botanic Garden should try to help owners in educating, locating and propagating the plants of the period and encouraging reestablishment/ renovation of historical collections on site, rather than using imported and/or new "trendy" cultivars.

Recommendations

- Recognize the importance of culturally and historically important plants and network with other institutions to get information if it has been documented.
- Establish a collection of Lithuanian heritage plants.
- Search for funding to recruit Master or Ph. D. students for in-depth research of culturally and historically important plants and develop guidelines regarding acquisition of genera and species in this collection.
- Organize expeditions to historical homesteads to establish archival records and to rescue species for living historical plant collections.
- Develop educational materials, which would clearly define the importance and meaning of this collection for a visitor.
- Maintain a datable of the Heritage collection. Document the criteria why the plant is included into the collection. Indicate if this is the closest possible match to written sources or is it the actual species available at a historical site? Seek for information on the country of origin and how it may have been imported to Lithuania.

Master Plan Program Goals

- Include the Heritage Garden as a separate collection and meaningfully integrate its location into the Master Plan.

Objective B7: Promote botanic gardens as tourist attractions (Cheney et al. 2000).

Current situation. Šiauliai Botanic Garden opened to the public very recently, but does not carry educational programs or provide adequate services to the visitors. Only last year it had the first two planned events – Iris festival (June) and Žoline (August 15, Assumption of the Blessed Virgin festival, when the importance of herbs is recognized), which were actively advertised to local

residents. Though signs at the main roads give minimal way-finding directions, there is no designated parking, nor clear entrance to the grounds, which makes a visitor feel he is an intruder into private territory. Occasional group visits, mainly of professional interest, have encountered difficulty to enter/ exit the site by large buses, as there are no convenient options to turn around on site.

The institution has no adequate visitor facilities (currently there is only one pit toilet), signage or staff members to welcome visitors and provide orientation. Many paths are not accessible in a wheelchair or with stroller, which may limit visitors, especially families with young children. Though there are some seating options in the garden, it is not sufficient for larger events.

Currently Šiauliai Botanic Garden does not have a separate web-site – just a brief description of the institution at the web-site of Šiauliai University. Some web links to the institution (e.g. from Plant Europa web page) do not function properly and lead only to the university web-site, which is difficult for foreigners to navigate, as it is in Lithuanian only.

Recommendations

- Develop an institutional policy relating to visitor services and tourism to ensure that visitors may experience and understand Šiauliai Botanic Garden's mission.
- Ensure that physical needs of all visitors are met by meeting basic needs such as convenient parking, bathrooms, drinking water, and places to rest. Provide adequate access for elderly, children and handicapped visitors.
- Provide staff and specific hours when general public could consult with garden staff.
- Publish self-help information for visitors on plant collections, research and conservation in the form of brochures and interpretational signage.
- Establish an independent web site to attract wider audience and to educate the public about garden's mission.
- Work with local, national and international tourism authorities to publicize and promote Šiauliai Botanic Garden.

Master Plan Program Goals

- Determine a site for the new Visitor Center to provide adequate facilities for the visitors.
- Establish a vehicular circulation pattern to accommodate convenient access by bus.
- Create a parking plan to facilitate increasing number of visitors.
- Design a designated entry to welcome the visitor and to place informational signage.
- Consider sufficient width and appropriate materials for new construction of main paths to increase accessibility.

Objective C2: Develop management of *ex situ* collections (Cheney et al. 2000).

Current situation. Šiauliai Botanic Garden has an *ex situ* collection of endangered and threatened species of Lithuania ("Red Book" collection, Appendix II). However, there is neither an established collection policy nor a well-organized database. According to my understanding not all species in the collection are of local genotype, as some of them were acquired though exchange with foreign institutions. The exact place of origin is not provided in the database and typically only one genotype of species is acquired. *Global Strategy for Plant Conservation* in its Target 8 clearly defines the conservation goal for the institutions: to conserve "60 % of threatened plant species in accessible *ex situ* collections, preferably in the country of origin, and 10 % of them include in recovery and restoration programmes" (Global Strategy 2002)

Recommendations

- Ensure that the environmental conservation (Red Book) collection's importance is recognized in the mission of the institution.
- Coordinate management of *ex situ* collection with *Ex Situ Action Plan* as outlined in *Biodiversity Conservation Strategy and Action Plan* (1998).

- Prepare collection management and exchange policies, which should carefully consider international conventions acceded by Lithuania, in particular:
    - Convention on Biological Diversity (CBD, Rio de Janeiro, 1992);
    - Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES, Washington, 1973).
- Obtain and utilize published guidelines (e.g. by Center for Plant Conservation) for *ex situ* management of threatened plants to avoid potential diseases and hybridization in cultivated stock.
- Maintain a database of environmental conservation collection. Document where, when and how specimens where acquired, environmental conditions of natural habitat and available information of geographic dispersal. Periodically update records on any research activities, seed collection and any changes in maintenance regime.
- Clearly establish seed collection, drying and storage guidelines to assure seed conservation based on the best possible principles.
- Utilize the collections for the purposes of biodiversity education.
- Conduct research to better understand the reproductive biology and population dynamics of endangered species in order to support recovery and restoration programs.

<u>Master Plan Program Goals</u>

- Incorporate the Red Book collection into Master Plan as the key collection and ensure its meaningful placement for both research and display purposes.
- Determine place for appropriate seed storage facility.

Objective C3: Develop management and analysis of data and information (Cheney et al. 2000).

Current situation. I have been provided with very little information on database of the botanic garden and most of the recommendations are based on observations during site visits.

Šiauliai Botanic Garden annually publishes an *Index Seminum* for seed trade and actively participates in seed exchange with other institutions. As I observed, the seed drying and storage conditions are very primitive and do not follow any established policies. The labeling does not include source of propagated stock. Most of the species have only temporary identification and much of the information could be obtained only from the staff, rather than any written documentation. Plant finding maps or planting plans, if any, are at the level of internal use only and are very likely to be understood only by the party who prepared them.

Recommendations

- Thoroughly document collections and establish a clear catalog system to prevent loss of information and ensure easy transition should the staff member in charge of the collection leave the institution.
- Prepare information on management of the collections and particular species as written documentation and share it with the broader public.
- Prepare fact sheets of floristic data and local habitats for Red Book collection species (similar to Plantlife International plant fact sheets).
- Look for multiple ways to disseminate information, should it be publications, web pages or interpretive programs on site.
- Contribute to electronic networking of data, such as botanical gardens' flora database on the BGCI homepage.
- Actively contribute data and participate in identification of Important Plant Areas (IPA's) in conjunction with Planta Europa.

Objective C5: Implement and influence national and international biodiversity policies (Cheney et al. 2000).

Current situation. As it was mention above, Lithuania acceded to many international conventions, including CBD (Convention on Biological Diversity), Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats) and CITES (Convention on International Trade in Endangered Species of Wild Flora). Šiauliai Botanic Garden is a member of BGCI (Botanic Garden Conservation International) and Planta Europa. I am not aware how familiar is staff with documents of these institutions, such as the Global Strategy for Plant Conservation.

Recommendations

- Make sure that all staff members are aware of major documents of conventions as they relate to the botanic garden's mission (especially CBD) and follow procedures to implement them.
- Conduct strategic review of the garden's policies to ensure that the CBD is not violated.
- Take all possible measures to ensure that plant trade conducted by the garden does not violate CBD or other conventions acceded by Lithuania.
- Prepare and follow an institutional code on collecting and acquiring material.
- Obtain sources and documentation of new accession and check credentials of the other parties involved in trading. Follow the same procedure with donations.

Objective D1: Develop botanic gardens as centers for environmental education (Cheney et al. 2000).

Current situation. Šiauliai Botanic Garden currently does not run educational programs or have specific educational displays. However, the

collections are used by the students of Šiauliai University, especially the ones majoring in applied ecology. Some classes use the garden as a living encyclopedia, especially the Systematic garden. Some students are employed at the garden during summer months and some use the grounds to conduct their research.

The City of Šiauliai does not have any other institution which could take an important role in environmental education. Thus, it is essential that Šiauliai Botanic Garden would seek funding to establish environmental programs. Specific areas of urgent need for public awareness would be invasive species, rainwater harvesting and runoff treatment.

I can see many opportunities for volunteers in environmental education. Many Lithuanians of an older generation have an in-depth knowledge of agricultural practices and emotional ties with Lithuanian natural and cultural heritage. Some of them were displaced and no longer have immediate access to the farming/ gardening plots. Their experiences could be utilized in educating youngsters and could promote connections between generations. The oral transfer of their knowledge has an immense emotional charge and may make a much stronger impact than any written information.

Recommendations

- Seek for funding to employ the staff member to run educational programs and recruit, train and coordinate volunteers.
- Determine the priority group for educational programs (e.g. pre-school age children, school-age children, tourists, local residents, home gardeners). For the Master Plan's purposes, children (ages 3-8) and local residents seeking refuge from urban environments, were determined to be the groups of priority.
- Prepare information and actively promote environmental responsibility regarding:
    - invasive species or impact of exotic species on cultural landscapes;
    - pest management;

- runoff treatment;
- rainwater harvesting.

Program goals for Master Plan development

- Investigate possible locations for children's garden and its relationship to other collections.
- Utilize runoff water for specific display garden as a demonstration project for local residents.

Objective D5: Promote botanic gardens to the public as centers for information on plants (Cheney et al. 2000).

Current situation. Currently Šiauliai Botanic Garden is not a visitor-oriented institution, though the public is allowed to access the grounds. It should be noted that many residents in Lithuania still have access to gardening plots, should it be a private garden, collective/ allotment garden or family/ relative farm in the countryside. Thus, many people are still quite knowledgeable in gardening, but in most cases it is limited to vegetable gardening and food production. Horticultural knowledge is limited to culturally familiar plants. As the trade with other countries reaches an unprecedented degree, an immense amount of new plant material gets imported from abroad. Yet, it is not easy to obtain information regarding new species and how to take care of them. Commercial publications in the bookstores are limited to direct translations from foreign languages and often information presented there may not be relevant to local climate, soil, tools and practices.

Recommendations

- Compile all available published horticultural and scientific information and establish a library for both - horticulture specialists and general public - to use materials on-site.
- Provide written documentation from the garden experimentation plots regarding acclimatization and success with new or exotic species.

- Provide brief data on plant's requirements for environmental conditions, such as soils, sun/ shade tolerance, water availability, tolerance to urban pollution to enable assessment of plant's suitability for home gardener.
- Organize workshops for local gardeners.

Master Plan Program Goals

- Determine the site for new Visitor Center and include the library and reading/ information area into architectural program.

Objective E2: Develop and strengthen networks to improve conservation of biodiversity (Cheney et al. 2000).

Current situation. Šiauliai Botanic Garden actively maintains relationships with other botanic gardens in Lithuania: Vilnius University Botanic Garden, Kaunas Botanic Garden and Klaipėda University Botanic Garden. According to my knowledge, an official network of Lithuanian Botanic Gardens was established very recently. However, I am not aware of any official agreements or specific collaborations on projects among institutions.

Lithuania is a small country, thus establishment of collections should be carefully coordinated among institutions so that the same thematic collections or very similar projects would not be initiated in different institutions. Exception should be made for conservation collections. As Šiauliai Botanic Garden has a collection of endangered and threatened species, it is imperative to assure its protection. The garden should secure that in case of natural or man-made disaster the most important living specimens would have a back up. Thus, it may be useful to collaborate with another institution and provide them with stock to safeguard as propagation material in case the originals would be destroyed for whatever reason.

Another important conservation effort is establishment of high-quality storage facility for a seed bank. As each institution has difficulty to secure funds for the appropriate technical solution, especially cold temperature storage facility,

the effort should be made to establish one serving multiple institutions or at least send some of the seed to abroad institutions such as Millennium Seed bank.

Recommendations

- Coordinate establishment of the collections among institutions.
- Secure back up of the most important living specimens with another institution.
- Collaborate on projects, which may never get adequate funding in one institution, but may receive funding for multi-institutional effort.

Objective F1: Build effective management of resources (Cheney et al. 2000).

Current situation. As it was discussed above, Šiauliai Botanic Garden does not conduct its own research as an institution, but rather facilitates research interests of individual staff members. Often this setting creates conflicting situations, as it is difficult to prioritize funding, location and maintenance staff for the particular collection.

Recommendations

- Prioritize collections according to the mission statement of the botanic garden.
- Clearly prioritize the importance of all collections. Determine which collections should be maintained if the funding would decrease.
- Establish an institutional policy: which collections have importance at the national or international level to safeguard their continuation even if the institution would be disassembled.

Existing site features and collections to remain

It is important to note that some of the existing site elements were not planned in advanced and appear to be in a random location (e.g. hill of Alpinarium and pond), but there may be no possibilities or resources to change their location. Similarly, even if it is difficult to justify the establishment of certain collections at Šiauliai Botanic Garden, the staff feels that they have invested too much time, energy and resources simply to deaccession them due to the lack of relevance to the mission of the institution. It became very important to inventory what parts of the property have to remain intact and what may be reconstructed of completely redesigned (Figure 33).

Key:

A – Entrance yard and administration building
B – Maintenance building
C – Greenhouses
D – Systematic Garden
E – Alpinarium
F – Rhododendron Collection
G – Mature trees
H – Pond with an island

Figure 33. Existing site features of ŠBG to remain.

The pond and the Alpinarium hill are prominent landforms on the site and would require significant resources to be eliminated. The pond is no longer used for irigatrion and its water levels should remain more level during summer. It could become an attractive feature of the botanic garden and be utilized for the exposition of the collections. The hill as a site feature it is utilized with a purpose relevant to the general goals of the botanic garden – to display plant collections. The alpine collection should remain at its current location and be integrated into the Master Plan. Finally, the site where the Heather (primarily Rhododendron) collection is established has a lot of imported soils. As the native soils at the botanic garden are not favorable to Ericaceae, they were amended by peat. This is a determining factor why the collection has to stay in its current location, though its path system and exposition could be changed.

As funding for the garden is very limited, the currently existing buildings could be utilized for purposes unrelated to visitors even after the new visitor center will be built, e.g. the administration building could be utilized as a seed storage facility help to enclose an "employee only" zone. The maintenance building should remain in its current location.

One of the most restricting elements of the site is the public road which bisects the property of the Šiauliai Botanic Garden into two parcels. The attempt to close the road and to reroute access to the single multifamily residence it services was unsuccessful. An alternative suggestion to install a gate (which would be locked at night) was opposed by the fire department, since it would restrict access to the residence in case of emergencies. As currently there are no options to eliminate this restricting site element, it is a design objective to establish a clear entrance to the institution and clearly identify that both properties along the road belong to the same institution.

Staff's wishes and designer's intent

The existing Systematic Garden is the most controversial collection of the Botanic Garden. Though the collection is very well tended, it is not clear what is

the purpose of this collection and how plants are selected. Priorities for plants in one publication are listed as follows: “plants from various phytogeographic regions, rarities of local flora, medicinal plants and pot-herbs” (Tamm and Jaak 2004). This outline of priorities does not seem to be specific enough and poses a question why rarities of local flora are placed in Systematic Garden, when Šiauliai Botanic Garden has a separate endangered and threatened plant collection. What phytogeographic regions are important to be represented and how species from that region qualify to be appropriate? After numerous discussions it became clear that despite the fact that the collection has no defined goals for the future the botanic garden’s director, Ms. Motiekaitytė, is proud of its existence and is not planning to reorganize the area where the Systematic Garden is situated. However, an interest to establish a new entrance to the garden through the Systematic Garden was clearly expressed and I tried to accommodate it into my design proposal.

The existence of Rhododenron Collection is also a subjective wish of the staff with no obvious connection with the institutional mission. While introduction and acclimatization of ornamental plants is considered one of the research areas, it is not clear why is it be conducted with rhododendrons, especially, when most of them arrived from Babite experimental station of Latvia University, which is located basically in the same climatic area. As it was mentioned above, there was a significant investment to prepare soils for this collection and also to acquire propagation stock. Rhododendrons attract visitors during blooming time, as they are still rare in Lithuania. The current collection was not planted as a display, and though it will remain in its current location, the intent is to redesign its layout to be more appealing as an exhibit, rather than as a propagation area.

Both the botanic garden staff and I, have expressed interest to display more native vegetation, preferably in plant communities as seen in different regions of Lithuania. As Šiauliai Botanic Garden is affiliated with Šiauliai University, it would be beneficial to display species of the Lithuanian flora as they are studied in the required courses.

Botanic Garden staff would also like to include an Iris collection and Butterfly Garden into long-term development plan.

Though the botanic garden does not propagate any plants specifically for sale, some plants do get sold to the visitors. Unfortunately, only the ones who are brave to ask or know botanic garden staff members are able to purchase plants, as there are no signs or prices to understand what and where any might be for sale. I believe that for a garden which is struggling financially, revenues generated from plant sales, are acceptable, as long as a good policy is developed and a designated person is responsible for the sales department. Therefore, a separate plant sales area, easily accessible by cars, was considered for the program of the Master Plan.

Program for the master plan of Šiauliai Botanic Garden

The easiest way to overview the program elements for the Master Plan was to develop a matrix, indicating existing and new site features/ collections according to the source of how it was initiated (Figure 34).

SITE FEATURES TO REMAIN	ELEMENTS FROM EU ACTION PLAN	STAFF'S WISHES OR DESIGNER'S INTENT
• Administration buildings • Maintenance yards • Greenhouses • Systematic Garden • Alpinarium • Rhododendron collection • Pond with island • Mature trees	• New visitor center • Roads and parking • New visitor's entrance (gated) • Entry Garden • Heritage collection • "Red Data Book" collection • Children's Garden • Water treatment location (bioswale)	• Display of Bio-geographic Regions of Lithuania • Iris collection • Sensory Garden • Private outdoor space for Garden Club members • Plant sales area • Alternative gate for semi-trucks • Outdoor gathering space • Butterfly Garden

Figure 34. Program elements for the Master Plan.

The development of proposed thematic gardens and infrastructure is targeted for a 15-20 year span. This program is supposed to direct the design process in order to develop a graphical product – a Master Plan for the entire site. Upon conceptual placement of individual elements, the character and layout of individual thematic gardens will be developed.

Unique niche

One of the most difficult question to ask myself about Šiauliai Botanic Garden was:" How is it going to be different than other botanic gardens?" I did not feel that the establishment of the institution is enough to justify its existence. The great abundance of botanic gardens in Europe forced me to search for an unique niche for Šiauliai Botanic Garden. It is very clear that the institution has a limited budget and is not going to conduct scientific research in foreign countries like the Royal Botanic Garden, Kew. Exotic plants often demand many recourses to keep expositions in good shape. In addition, with increased mobility, people have opportunities to visit foreign countries and see exotic plants in their native setting or at other botanic gardens. These thoughts led to the idea to focus on the uniqueness of the flora in Lithuania and the significance of the plants in Lithuanian culture. Ian Robertson noted that it is not an easy task "to catch the attention of local residents and make them value what grows under their noses in the same way that they appreciate exotic floras" (Robertson 2004, 10). At the same time, I. Robertson gave me hope, that I may have a somewhat unique viewpoint towards "common" in Lithuania: "My favorite definition of an expert is "an ordinary person a long way from home"; in other words, a component of expertise lies in possessing views that differ from the local faith" (Robertson 2004, 10). After a decade spent overseas I realized that not every nation has this deep awareness of the plants. While the majority of people admire ornamental values of the plants, the respectful appreciation is developed only through generations. Lithuania was the last country in Europe to be Christenized. The long history of worshiping trees, knowledge of medicinal values and usage of all

parts of plants for daily needs is still alive, but on the verge of extinction. Therefore, the uniqueness of Šiauliai Botanic Garden could be established by displaying culturally important (not necessarily native!) plants in each and every thematic garden in addition to the native flora. This approach would make each exhibit unique due to its regional interpretation.

DESIGN AS A TOOL FOR INTERPRETATION

Objectives for design

Form is a powerful tool for creating a mood and character of a place. As was discussed in the chapter “Layout of Botanic Gardens”, form lost its interpretational power in contemporary botanic gardens. My goal for the design process was to search for a layout of spaces which would provide a journey through the institution relating separate elements into the meaningful “story”. The intent was to create an experience, which would read like a poem with appropriate pauses between the lines. Each collection should be perceived as a part of the “whole”, not a destination by itself.

When we read an intriguing story, even if we admire the current scene, we are always looking forward to discover how the events will unfold. My goal was to move people through a space in a similar manner. A visitor should feel eagerness to discover the next “room”, to move beyond the visual curtain obstructing the next scene and feel satisfaction at the end by understanding “the story” or by immersing himself into self-discovery.

The following objectives were set to meet the targeted continuous experience:

- clear circulation for visitors and maintenance;
- logical connectivity between collections;
- mystery and intrigue to invite a visitor to explore;
- structural views for long-term property management;
- areas of tension and release to provide a dynamic sequence of experiences.

Schematic layout of the program elements

One of the most problematic site elements restricting design solutions is the Pataičiu Street – a local gravel road bisecting the property into two separate parcels. The division is so dominant that it seems to be impossible to make a connection between both parcels fluid and seamless. Therefore, instead of trying to eliminate the problem, I took an approach to acknowledge the presence of the road and utilize it to divide the site elements and gardens into two major themes – each of them located on a separate parcel.

After carefully examining proposed future collections and how they relate to the uniqueness of the flora in Lithuania, it became obvious that some collections could solely display the country's native vegetation, while the others better convey cultural interpretation of plants. This determined the distinct character of the expositions on North and South parcels – one focusing on cultural heritage and the other – on natural heritage of the country (Figure 35).

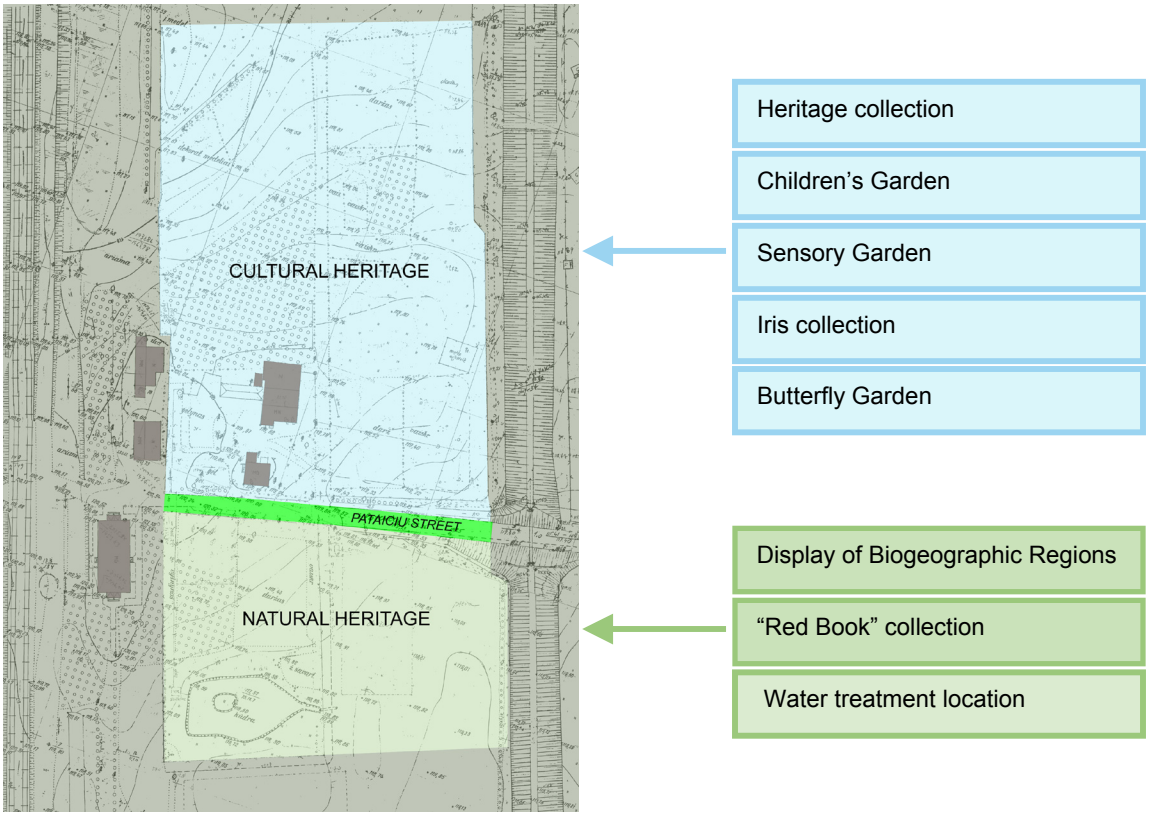


Figure 35. Schematic division of the collections.

MASTERPLAN: NORTH PROPERTY

Design intent

My design goal for the development of the North property was to come up with the form which would help to interpret the meaning and sequence of the collections. As the exposition would primarily focus on cultural heritage of Lithuania, the intent was to choose forms and patterns, which would be distinct for Lithuanian culture as well. The search led me to look for cultural expression in folk-art and I found the most intricate design, expressed by patterns, rhythms, and colors, in traditional woven belts (Figure 36).

Figure 36. Traditional Lithuanian woven belts.

Most of the patterns of Lithuanian belts are very dynamic, comparing with woven pieces in other cultures: an eye constantly keeps moving from one node to another. My intention was to capture the movement of the eye along woven lines and transform it into the circulation patterns among the flowerbeds in the garden design. The Heritage collection – the spine of the North property - took the form of the traditional belt pictured in Figure 37. In addition to the path system, diamond-shaped beds are intended to be utilized as structural units. The decision on how to group plants into units would be left to the staff, but it is important to keep some kind of coloristic uniformity throughout the season to make the pattern visible from the Alpinarium (Figure 40). As it was briefly discussed under *Action*

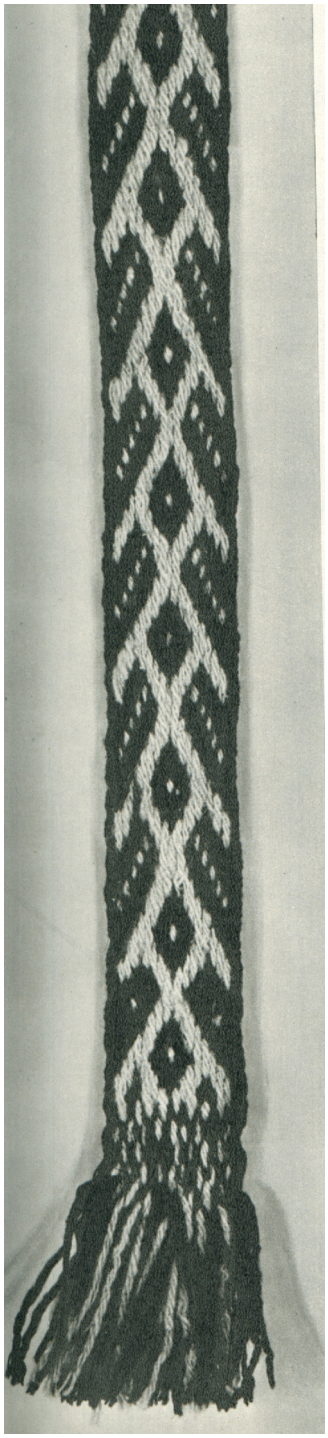


Figure 37. Lithuanian belt.

Plan for EU goal B6, the plants included in the Heritage collection would be of cultural importance, but not necessarily native. Certain genera, though clearly of foreign origin, like *Dahlia, Lilium, Paeonia, Rosa,* and *Ruta,* gained symbolic meaning in most forms of the folk art and traditions. These flowers carried allegorical meaning in songs and folk-tales, were carved into wood, knit into mittens and scarves, embroidered on linens and table-cloths and included with great respect into rituals and traditions from birth to death. The woven belt of the Heritage collection ends at the naturalized meadow. The fringe - a typical ending element of the belt - would be expressed in mowed and non-mowed streaks of the meadow, interplanted with species from the Heritage collection. This detail would emphasize that only by understanding our immediate environment – homestead garden – one may gain appreciation of the nature at large.

The concept of woven belts led to other design solutions. The children's garden, expressed as a coil of belts, signifies the conceptual beginning of life-long experience. However, only one path uncoils into the Lithuanian Heritage collection – the other two lead to the Rhododendron garden and Butterfly Garden/ Alpinarium. The metaphoric meaning of this layout points that childhood experiences influence understanding and appreciation of Lithuania: some youngsters are raised in cultural "context" while other parents take cosmopolitan approach in understanding relationships with nature and plants.

The theme of weaving is carried into the concept of the Sensory Garden. Each path, focusing on one of the senses, could be perceived as a thread, subsequently woven into Heritage collection. By contrast, the Sensory paths are abruptly ended by the Rhododendron collection as it does not have any relationship with Lithuanian culture and is a self-focused exposition, inherited from the institution before the development of the Master Plan.

The staff expressed a wish to establish an Iris collection. The proposed location of such a collection is incorporated as an extension of the Sensory Garden focusing on color (Iris is named for the Greek goddess of rainbow). The Iris collection is divided into three sections, each of them focuses on one of the primary colors: yellow, red and blue. The proposed circular planters should be used for annuals, replanted thought the season to display constant bloom of the particular color. The triangular part of the garden is designated for additional *Iris* requiring wet conditions. The trickling stream from the Alpinarium could feed into the wet *Iris* display. The trellis system, installed as a continuation of the paths through the Iris garden will create an opportunity to grow vines, separate the display from the Rhododendron collection, and create visual funnels towards the Linden terrace.

A recently established dwarf evergreen collection was situated in the south-west corner of the North property, near the administration building. This area in the Master Plan is considered to be non-accessible for visitors and reserved for staff needs. Thus, the dwarf evergreen collection is proposed to be relocated by the Amphitheater, where it would be planted on a berm, meeting the higher grade of the terraced amphitheater benches. Evergreens would provide screening for the space, should there be any events, while the garden remains open. The Amphitheater is deliberately proposed in a more remote location: by closing a couple paths the space could be used for private functions (possibly even rented out). Newly proposed access for trucks on the West side of the property is needed to deliver wood (for heating purposes) stockpiled behind the greenhouses. It could be utilized for deliveries to the Amphitheater, as there may be a need to bring tables, props, music system or catered food into the space.

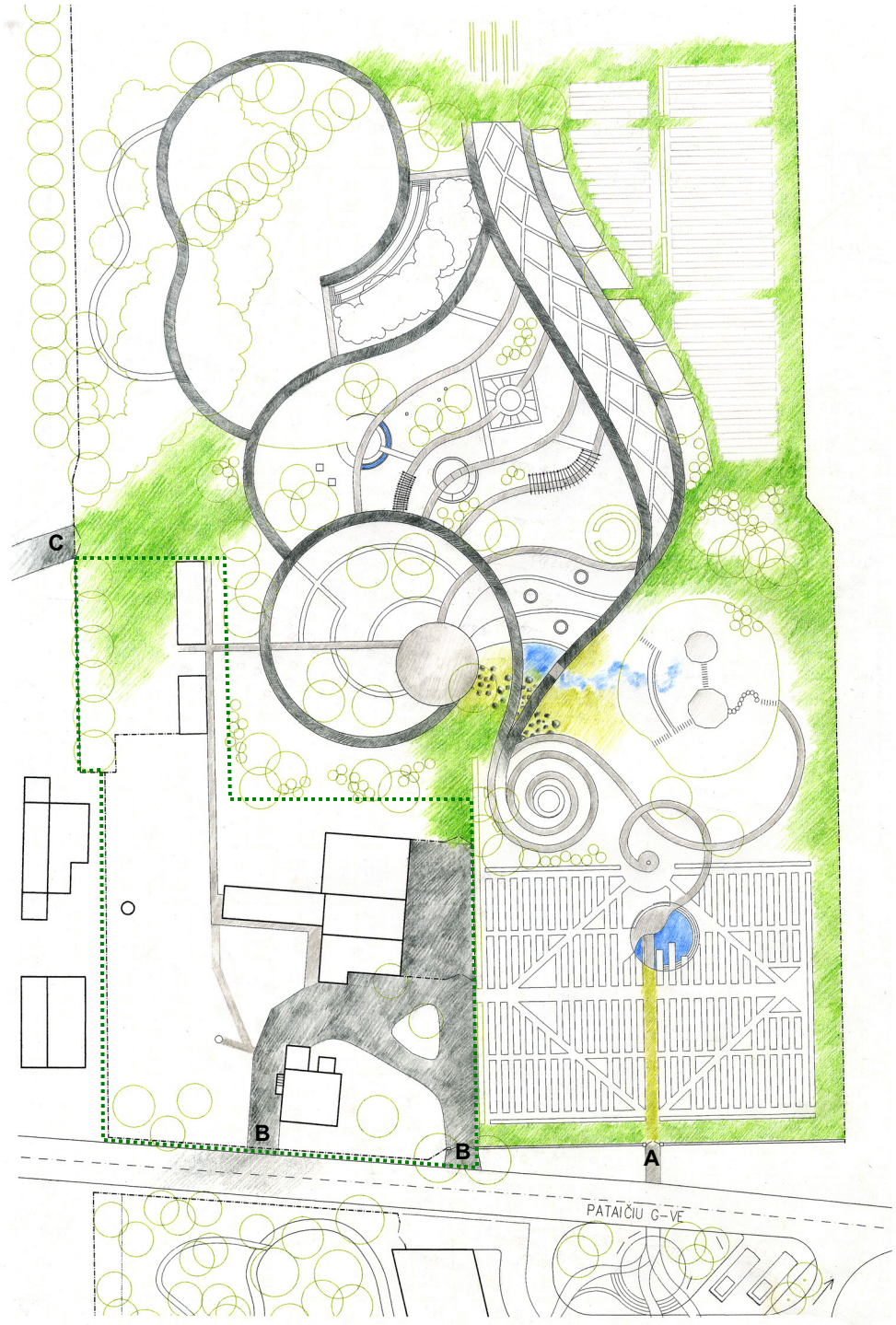
Circulation

Currently all paths in the garden are covered by turf, except a paved vehicular area by the administration building. As the garden will invite more and more visitors in the future, lawn paths will not only be difficult to maintain for increased traffic volumes, but will prevent convenient access to display areas for certain group of people (in wheelchairs and with strollers). The proposed new circulation system (Figure 38) features a hierarchy of paths, classified by surface finish and width.

The circulation has to be considered not only for visitors, but for maintenance vehicles as well. Šiauliai Botanic Garden owns a small tractor for maintenance – a width of the wheel base is 0.85 m. Therefore each and every collection has to have some kind of access path equal or greater than 1.5 m in width for maintenance purposes. Most of these paths would be used by visitors as well. In the areas where visitors' access is not necessary, lawn strips of sufficient width may serve as maintenance paths. Most of them are located around the perimeter of the property. The area in front of the maintenance building should be fenced for security and aesthetic purposes. One gate would allow access into the maintenance yard where the equipment is repaired, and the other gate would provide convenient connection with planting zones.

Most of the secondary visitor's paths are proposed to be paved and 1 m in width. All isles in the Systematic Garden are maintained in turf, as it was typical in the XVI-XVII centuries. The newly proposed visitor's entrance aligned with the main axis of Systematic Garden is identified as a turf path, but it may need to be paved later as the visitors' volumes increase.

The new layout of Šiauliai Botanic Garden would pose difficulty to deliver wood and soil by trucks. To resolve this problem an alternative gravel road should connect the maintenance road along the railroad with the new gate, proposed on the West side of the property. The gate would be used only for occasional deliveries, especially wood, which gets stacked behind the greenhouses. The entrance to the private "staff only" zone should clearly indicate no access to the visitors.



Key

Pedestrian and vehicular paved path

Pedestrian paved path

Pedestrian and vehicular lawn path

Pedestrian lawn path

A – Main visitors' entrance **B** – Staff entrances
C – Truck access (deliveries only)

"Staff onlv" zone

Figure 38. Circulation system for the North property.

Views

The Master Plan is a long-term document and it is important to foresee how it may be useful to the institution after a few decades. During that time period staff may change and different collections may gain higher priority. However, in order to maintain the integrity of the design, the framework – open views and nodes of tension and release – should be preserved.

Figure 39. Structural views.

The proposed open vistas are important in guiding a visitor – they provide unobstructed views to way-finding landmarks that help to get oriented in space. Most open vistas are like windows behind the curtain, which allow a glimpse into another space and create eagerness to explore. The goal is to create mystery by revealing only parts of the garden and to stimulate interest to move through the space by alternating the visitor's attention to the close-by exposition and far-away points of interest.

The “view-map” (Figure 39) should help the staff to determine the location of structural features, especially trees in the field. The two shade trees which obstruct the Alpinarium at the entrance frame it from a different viewpoint , as when a visitor is ready to exit the Systematic Garden. The two existing magnificent trees of highest cultural importance in Lithuania – linden (by the Linden Terrace) and oak (on the left in Figure 40) – should be unobstructed from main paths and treated as focal points and way-finding features.

The most important vista is from the top of the Alpinarium. Only the lower observation area has alternative path to exit the space, but once the visitor reaches the top of the knoll, he/ she has to turn around and return via the same set of steps. Therefore the view from the top observation area is the sole reason of climbing there. The Heritage collection, which took the form of the traditional belt, is strategically located to be fully appreciated only from the top of the Alpinarium. Thus, it is critically important to maintain that opening between the oaks, which acts as a frame for the flower-belt. The metaphoric message, which came from my personal experience, is hidden in that arrangement – only viewed from a foreign environment (expressed as an alpine garden) the “familiar and common” flowers of Lithuania (exhibited in a belt of Heritage collection) reveal their beauty not noticeable from close-by.

Figure 40. Proposed Heritage collection as viewed from the top of Alpinarium.

Figure 42. Nodes of tension and release.

Nodes

Just as views are important for long-term management, nodes are important for the visitor's experience. Nodes of tension and release, orchestrated for the entire garden, help create a cohesive experience. The intention is to make the entire property, including paths, open spaces and natural areas, a memorable place, and to avoid the situation, when the particular collection itself is a sole reason to get to a certain point in the garden, but the transition from one area to another is "a void" – just a path connecting point A to point B.

The marked nodes have two different purposes – they are points of tension (beige in Figure 41) or areas of release (blue in Figure 41). Nodes of tension are spaces where a visitor encounters decision-making: a few paths to follow or options how to continue explore the garden. Theses areas are ideal for way-finding signs or interpretive material - a visitor will very likely stop to make a decision and may appreciate some help to get oriented. Nodes of tension will

very likely be meeting points, where family members or groups will congregate to continue to visit or exit the garden. Thus, seating elements are proposed in these areas (except the entrance): a circular built-in bench at the pool deck, large stones to lean-on near the Children's Garden, benches at the lower observation area of the Alpinarium (existing) and under the shade trees West of Butterfly Garden. In addition, nodes of tension are the best places for "people watching". It is known that older people in Lithuania like to sit in public spaces to observe others and increase their likelihood to meet somebody to chat with. While some areas might be more appropriate for short-time stops, the benches under the shade trees would be the most favorable place for "people watching" and should be designed to be comfortable to sit for longer periods.

"Nodes of release" are open spaces for rest and contemplation. If the garden could be recorded as music, nodes of release are pauses, critical to reveal the flow of melody. The seating elements in these nodes are placed without immediate stimulation – the visitor would look not to a plant exposition, but rather into open lawn or meadow areas. Some areas may be used as gathering places, like the Amphitheater or Oak Grove. All "nodes of release" should provide places to sit. The new seating with southwest exposure, replacing woven willow by the path of the Alpinarium hill would be appreciated certainly on cooler days. The benches at the end of the Heritage collection would become a true refuge from the urban environment, as the visitor's view should focus to the naturalized meadow with no signs of urban development.

Each "node of release" has a different characteristic and provides choices for the most favorable environment to relax. Seating under the rose arbor at the eastern side of the Sensory Garden would provide shade on hot summer days and the benches on the western side of the Sensory Garden would have views toward the tree canopy of the woodland garden and sounds of falling water from the half-circle wall-fountain (Figure 52).

Focus area: connection

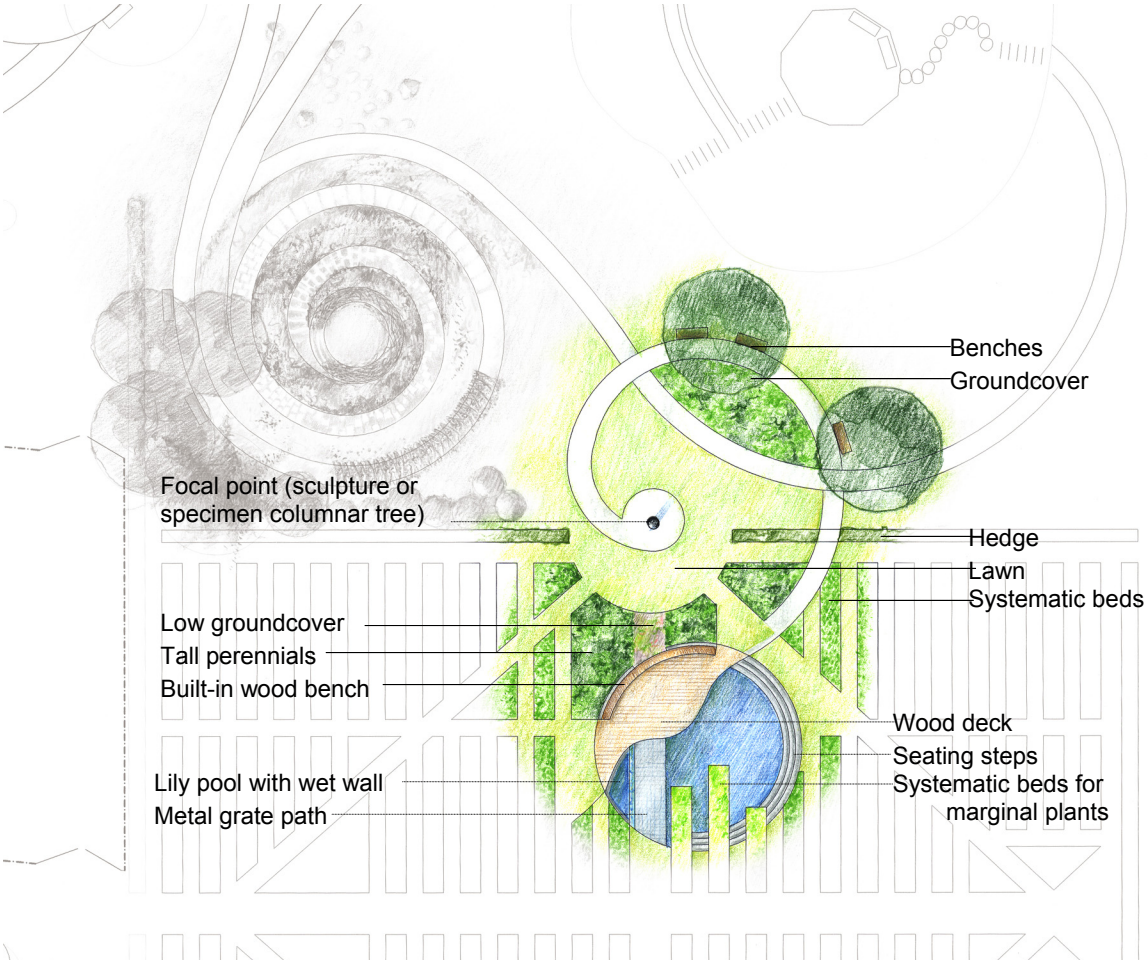


Figure 43. Connection between Systematic Garden and new collections.

One of the most difficult areas to resolve was a connection between the currently existing Systematic Garden, featuring a very strict geometric beds and the new exposition with more naturalistic curvilinear paths. Conceptually, the Systematic Garden has not much in common with new collections, as it imitates European botanic gardens of the XVI-XVII centuries while the new collections focus on cultural heritage of Lithuania. Thus, establishment of the link was not an easy design task.

The main feature of this area is the circular pond, partially covered by a wooden deck. The intention was to create a node of tension, where a visitor would have to stop and re-orient himself instead of marching across the Systematic Garden, without any further investigations. As a visitor reaches the

deck, a semi-circular bench's curve leads her/ him back to the diagonal path, inviting her/ himto continue to explore the Systematic Garden.

A focal point – a sculptural element or columnar specimen plant – aligned on the same axis as the entrance gate and the main path through the Systematic Garden, is " a teaser" – something visible, but not accessible immediately. The main path towards the focal point "continues" as a low ground cover (e.g. *Thymus* sp.) framed by taller perennials. The circular bench is visible only as a thin line across "the path", while the other edges of the circle deck have a low retaining wall as the support for the seat.

The circular pool is a shallow water feature, allowing children safely to interact with water as their parents may enjoy informal seating on the steps. The planting beds extending into the pond allow display of marginal vegetation as part of the Systematic Garden. The deck and metal grate, may be used as a small stage area, while the audience is seated on the steps by the pond. The elevated basin with a wet wall not only serves as a lily pool for up-close viewing, but is an interactive feature: every passer-by (including ones in wheelchairs) may touch the water and watch it splash under her/his feet.

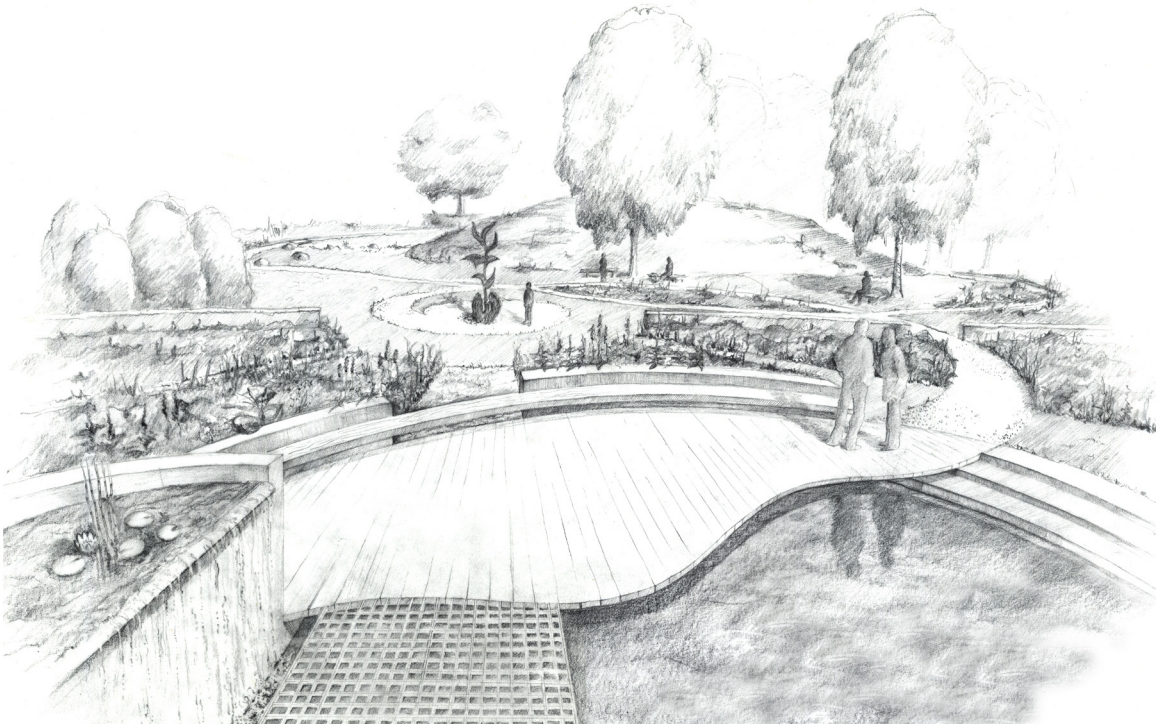


Figure 44. View from the circular pool.

Focus area: Children's Garden

Figure 45. A rolled-up traditional belt.

The design concept for the Children's Garden was inspired by a Lithuanian traditional belt as well. The image of the rolled belt and how the pattern gets revealed only in its uncoiled ends metaphorically reminds us that it takes many years from the childbirth until a person understands her/ his identity end exposes one's unique "pattern" of life. There is also something magical about the center of the coil – instinctively one always wants to touch it and trace the edge of the belt untill it ends. In a similar fashion I believe the children would want to get inside the spiral pattern and reach the center of it – the point of no continuation if entered from outside, but in essence – the point of beginning. The Children's Garden is strategically placed near entrance and the main path, but in such a location that it is not necessary to cross though it. Many people may be intimidated to enter the Children's Garden and revisit their past, but may instead enjoy observing activities in it. However, people who do not want to visit Children's Garden will have to abandon the paved path and walk on stepping stones - a short-cut through the lawn among scattered large stones. This circulation pattern symbolizes that the childhood is an unavoidable period of life and understanding of cultural heritage - uncoiling experience of ethnicity - starts in childhood.

This design of the Children's Garden features multiple allegorical symbols and to explain each of them would take a separate document. Most of the allegories are based on Lithuanian folk-tales, as again the goal here is to connect cultural heritage with plants through the eyes of a child.

The central feature of the garden is an elevated nest symbolizing both the point of beginning and the intimacy of home atmosphere. The nest, constructed

Figure 46. Conceptual ideas for Children's Garden.

out of tree branches could be used as an intimate space for storytelling. The path from the nest starts as a strip of turf and gradually becomes paved. The pavers of the path are arranged in a pattern observed in weaving. Pavers could have imprints of leaves or could be treated as word-tiles to display a meaningful message. A visitor, entering the Children's Garden, would notice the decomposing path only after he/ she passes a willow tunnel – a symbolic gate to childhood. The fact that the cut willow stems may root and get established symbolizes that each of us have a chance to reconnect with childhood experiences and the "roots" of ethnicity.

The sand play area will feature boxes with natural objects – branches, cones, stones – as building materials to encourage play with natural objects rather than plastic manufactured toys. The area is supposed to provide opportunities to create compositions on the smoothened sand - one of the favored activities of children observed at the seashore. The benches under the trees are placed for the convenience of parents supervising children.

The tree group at the corner of the Children's Garden features personified trees from a well-known Lithuanian folk-tale "Spruce, Queen of Serpents" (H in Figure 46). The main characters of the story – spruce (a mother), oak, birch, ash (sons) and trembling aspen (a daughter) – are known for every child in Lithuania, but often disconnected from real trees. Another favorite folk-tale - "Twelve ravens" – features nettles as the key element of the story, which could be incorporated into the exhibit. Anna Sakse has also published a wonderful children's fairy-tale book, which tells stories how certain flowers – dandelions, gladioli, lilies, peonies, poppies, snowdrops and many others - appeared on the Earth. After watching the plant in bloom and hearing the story the child will retain the connection for a long time.

Many Lithuanian fairy-tales feature three brothers, who, upon reaching adulthood, have to travel into the world to seek their destiny. They travel together until reaching a point where the road forks into three different directions. This allegory is depicted at the point where three paths uncoil from the Children's Garden.

Focus area: Sensory Garden

The Sensory Garden focuses on perception of smell, texture, taste and sound in Lithuanian culture and features plants common and typical to Lithuania: many people would have fond memories associated with the smell of lilacs; by contrast, lavender, is not known or grown in Lithuanian homesteads. The Sensory Garden features four paths which flare-off from the “woven belt” of the Heritage Collection. Each path is devoted to one sense. However, many plants can be viewed from two different paths and if possible are so situated that they would be displayed for their multible characteristics, e.g. junipers may be displayed for their texture and scent (traditionally used in rituals of the Catholic church), or seeds of poppies are used for baking, yet are also known for the sound of their dried seedpods, rattling in the wind. As the final decisions on plant selection would be made by staff, it is important to note that the plant must relate to Lithuanian culture, no matter how expressive its sensual characteristics might be.

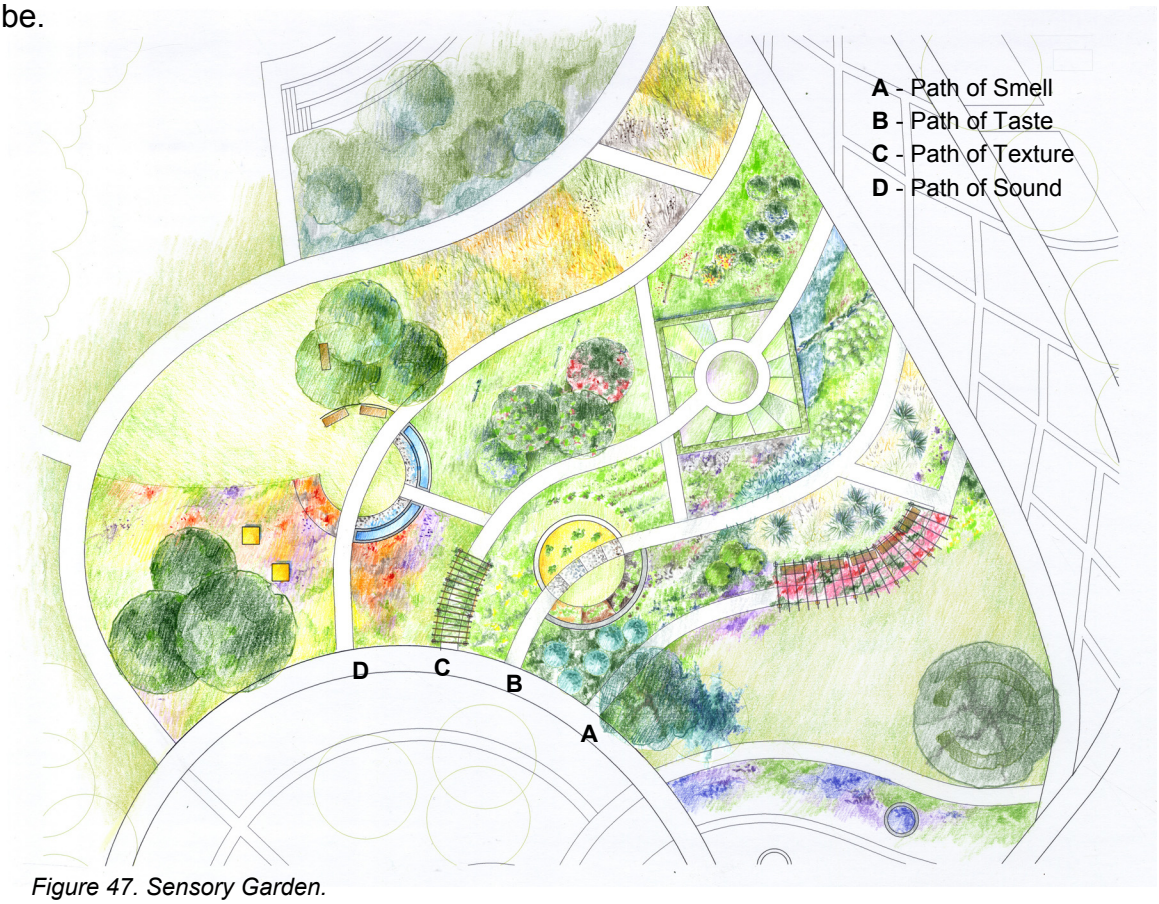


Figure 47. Sensory Garden.

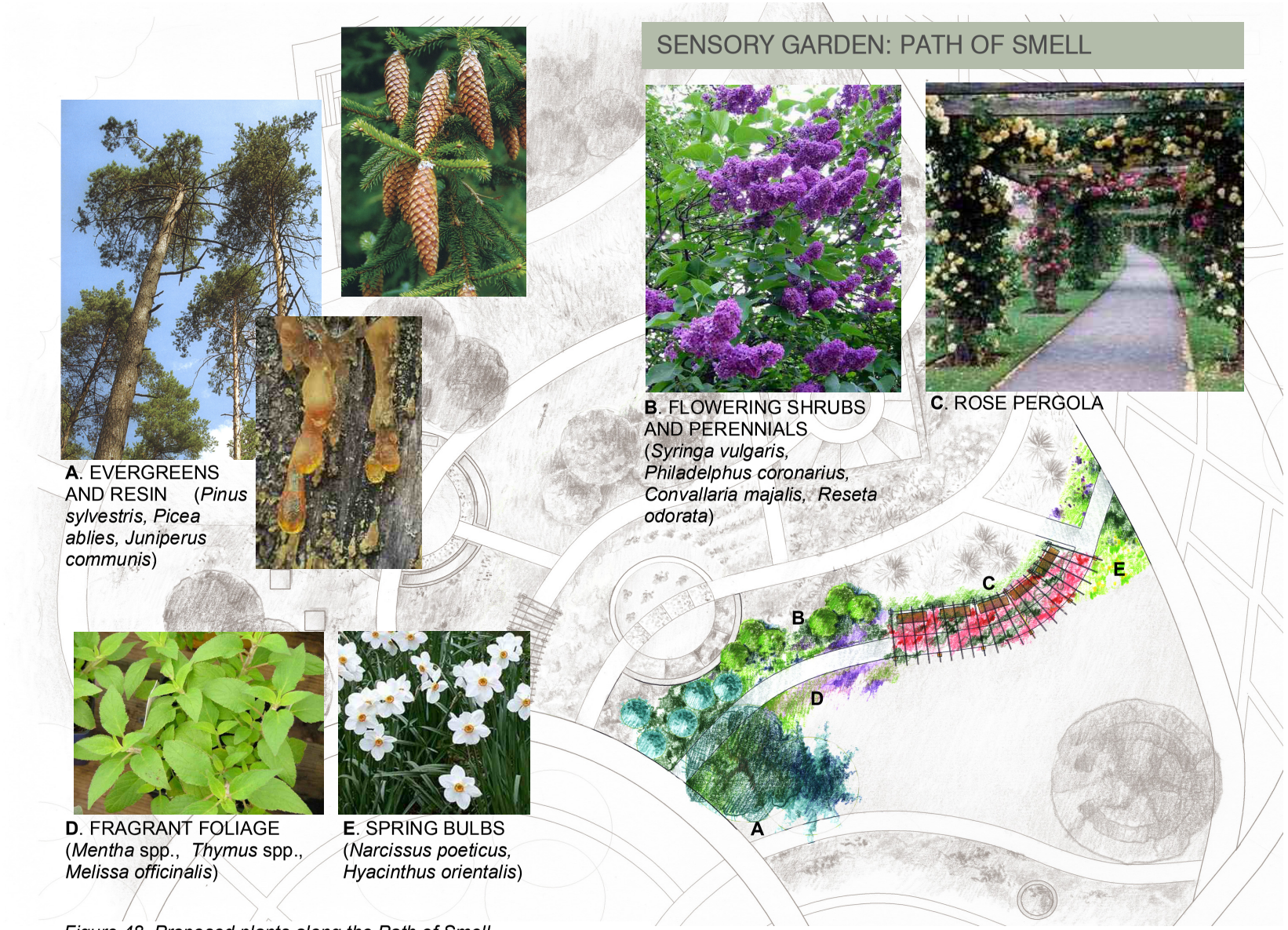


Figure 48. Proposed plants along the Path of Smell.

Figure 49. Proposed plants along the Path of Texture.

Figure 50. Proposed plants along the Path of Taste.

Figure 51. Proposed plantings along the Path of Sound.

While paths focusing on senses of touch, smell and taste can be successfully illustrated (Figure 47-49), a few words about selected elements of the Path of Sound may help convey the main ideas.

One of the most memorable sounds is rustling of grain fields at the time seeds are ripened. The dried ears touch each other and create the soothing sound, not reproducible by other means. The best way to listen to it is to lay down in the middle of the grain field on your back and just see the blue sky and grain ears above your head – thus the strip of lawn is left on the edge of the grain "field" (G in Figure 51) to allow at least an introduction to this experience. The grain plants are strategically placed where the cross-path from the Path of Taste ends, in order to incorporate the topic about grains into guided tours about food producing plants. Šiauliai Botanic Garden conducts research on imported grains on a yearly basis – thus the exposition would have a research component tied to it.

Bird "scarers" (F in Figure 51) are wooden handcrafted objects with moving parts to scare birds away from fruit trees or berry bushes. Once very common throught Lithuania, now they are virtually non-existent and the collection of these objects would have significant historical and cultural value by itself.

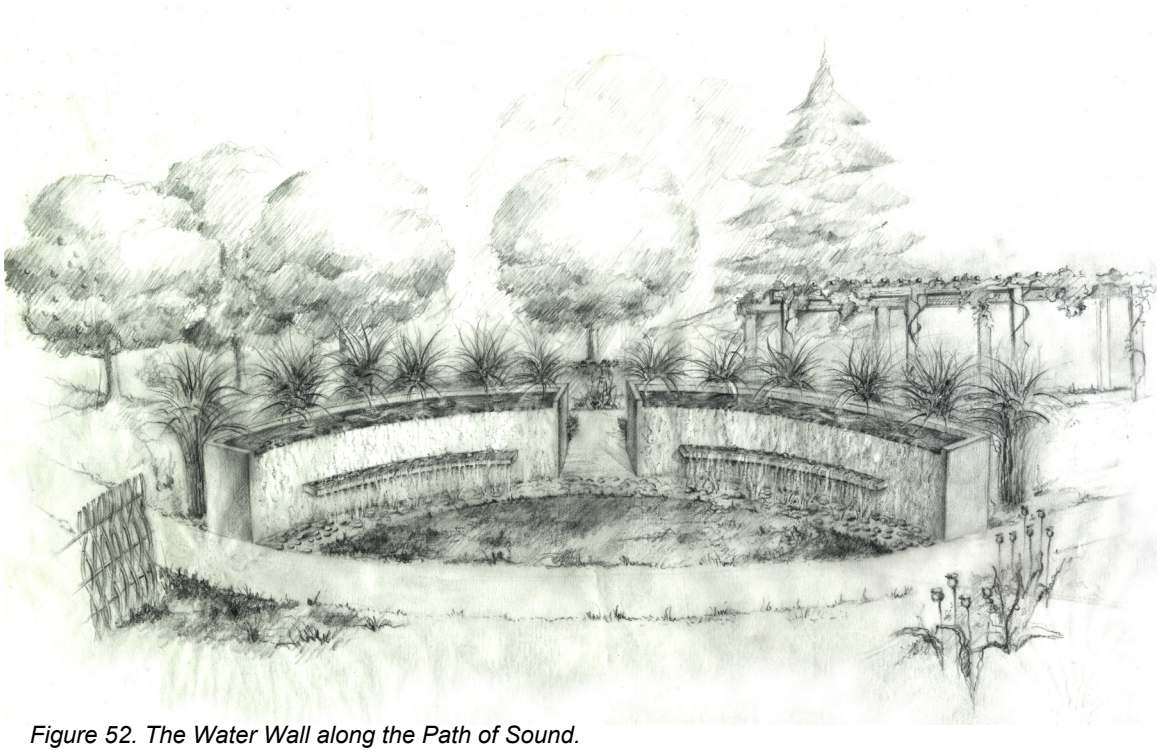


Figure 52. The Water Wall along the Path of Sound.

MASTERPLAN: SOUTH PROPERTY

Design intent

Figure 53. Portrait of a young -old lady.

The goal for the South property is to establish an exposition, which would focus on the native vegetation of Lithuania. The difficulty of such a task was most accurately described by Ian Robertson: “A prophet is not without honor, save in his own country” says Matthew, and native landscapes and floras frequently share this fate“ (Robertson 2004, 10). With this difficulty in mind, I decided to follow the footsteps of F.L. Olmstead, and in a similar way to how he designed the Arnold Arboretum, strive to create an exposition which would have a justification for professionals, yet would be enjoyable for every visitor. Just as the same drawing of a woman can be seen as a portrait of a young or an old lady (Figure 53), the display should create “a different picture” for two different audiences: a park-like setting in an urban context for any resident and informative exhibit about ecosystems of the country for specialist and plant-lover.The Display of Lithuanian Regional Communities is a snapshot of the vegetation in different regions of Lithuania. The different displays seamlessly blend into each other as is found in nature.

A new parking lot and new visitor center should be located on the South property as well, since no vacant land adjacent to the road is available on the North parcel. Though Šiauliai Botanic Garden does not plan to commercially propagate plants for sale, given the situation, that no native herbaceous plant nurseries exist in the area, the Sales area is proposed in the South Property.

The Display of Lithuanian Regional Plant Communities

In theory the differences among regions of Lithuania would be most accurately displayed by exhibiting representative *ecosystems*. However, even though the botanic garden will attempt to import the most suitable soils and mimic the hydrological conditions of the represented sites, given the limited space, with no topographic and climatic differences, it is more accurate to state that the exposition focuses on *plant communities*, as found in representative ecosystems of certain regions.

The Display of Lithuanian Regional Plant Communities is based on the phyto-geographic division of Lithuania made in 1969-1970 by M. Natkevičaitė-Ivanauskienė (Figure 54) (Natkevičaitė-Ivanauskienė 1983, 254). Out of 12 separate regions exhibited on the map of Lithuania, only 10 were selected to be illustrated at Šiauliai Botanic Garden by representative plant communities (Figure 55*)*. The exposition of regions carefully maintains the schematic relationship among geographic locations and creates a sequential experience as if one would be traveling through Lithuania.

Because each separate region has a number of different ecosystems and due to the limited area available for the exposition, only one or two ecosystems were selected to represent each bio-geographic unit. Two criteria were used to determine which ecosystem would best represent the particular region: 1) importance of the representative ecosystem in the European Union or listing in Lithuanian Habitat Red Book; 2) possibility to create an iconic image for the visitor.

Importance of the habitat in the European Union. The European Commission Habitats Directive Annex I (Office of Official Publication for the European Communities, 1992.) listed 218 European natural habitat types of community interest whose conservation requires designation of special areas of conservation. Seventy one (71) habitats were listed as priority ones: these are endangered habitats whose natural range mainly falls within the EU. Fifty two (52) habitats included in the Habitats Directive Annex I are found in Lithuania. They are considered as special areas of conservation and are listed in the

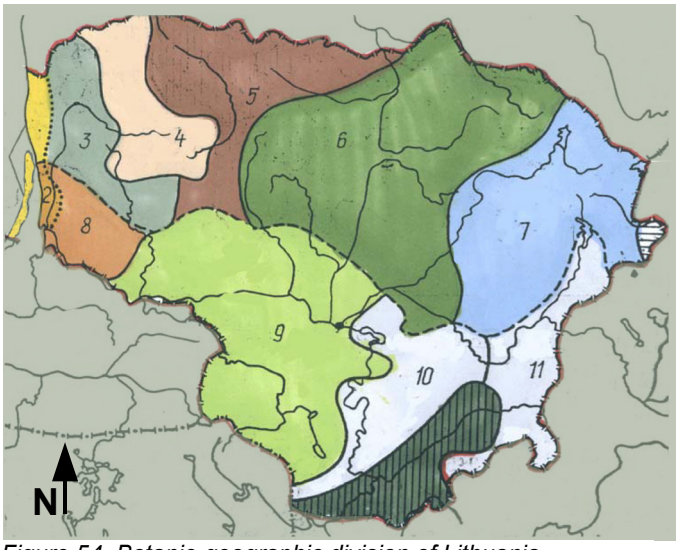


Figure 54. Botanic-geographic division of Lithuania.

Representative bio-geographic regions of Lithuania:

1. Lithuanian Baltic seashore
2. Curonian lagoon region
3. Northern “Zemaiciu” region
4. Northern “ Zemaiciu” plateau
5. Northeastern plain
6. Northern Lithuania lowland
7. “Aukstaiciu” plateau
8. Southwestern “Zemaiciu” region
9. Southern Lithuanian plain
10. Southern Lithuania plateau
11. Northestern Lithuanian plateau
12. Dainava plain

Figure 55. Schematic layout of representative plant communities.

NATURA 2000 network of protected sites. Sixteen (16) of them have a priority status. The definitions of the habitat, characteristic animal and plant species, and corresponding categories for the other classification systems were published in the *Interpretation Manual of European Union Habitats* (2003). Each habitat is given a four-digit Natura 2000 code. A similar illustrated publication - *Europines svarbos buveines Lietuvoje* (Rašomavičius 2004) – describes only habitats found in Lithuania. Šiauliai Botanic Garden would like to exhibit selected plant communities of these habitats in order to educate local visitors about the importance of Lithuanian flora in the European Union and emphasize the message that loss of habitat leads to extinction of certain species.

Possibility to create an iconic image. Only certain ecosystems present a character of land and vegetation, identifiable by an average visitor, rather than to a particular science-oriented professional, such as botanist, ecologist or entomologist. In addition, some ecosystems have the abiotic or biotic conditions which are impossible to mimic in an artificial environment, especially one severely limited to a small area. The goal of Šiauliai Botanic Garden is to display plant communities that are relatively easily recognizable and could be identifed if later encountered in natural setting.

The following list briefly describes proposed exhibitions according to the regions to be represented (the with region number corresponds to those as outlined in M. Natkevičaitė-Ivanauskienė's map and does not follow linear order) (Figure 55*).* One or two plant communities, dominant or significant in that region, if included into Habitats Directive, are listed by the same habitat name with a coded four-digit number given in parenthesis:

1. Lithuanian Baltic seashore vegetation region will be illustrated by *Grey Dunes* (2130) display. The exposition will primarily focus on herbaceous vegetation of fixed costal dunes with some areas covered by *Empetrum nigrum* as seen in *Decalcified fixed dunes* (2140). Some woody species (*Salix* sp*., Pinus sylvestris* etc*.)*, as seen in natural dune complexes will provide structure to the exposition.

2. Curonian lagoon (Kuršių marios) shore region will be represented by *Alkaline fen* (7230) vegetation. Bog myrtle *(Myrica gale)*, a species included in Red Data Book of Lithuania because of its limited habitat is a primary focus of the expositions.

3. Northwestern Žemačių region will be represented by *Dry Heaths* (4030)*,* typically found in dry peat lands. This community is common adjacent to dunes and raised bogs – thus, the location of the collection next to the *Grey Dune* display will be an appropriate transition as encountered in natural setting.

4. Northwestern Žemačių plateau will be represented by woody and herbatious plants from *Western Taiga* (9010) forest. The exposition will also include the Spring Hillside display exhibiting spring ephemerals.

A. GRAY DUNES

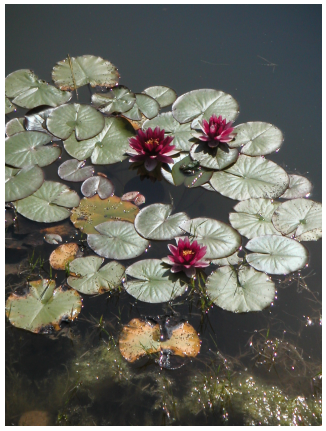
B. ALKALINE FEN

C. DRY HEATHS

E. SPRING HILLSIDE

D. BOREAL EVERGREEN FOREST
F. RAISED BOG
G. WET MEADOW
H. ALLUVIAL FOREST

I. TALL MEADOW



J. WATER VEGETATION

K. WETLAND
L. OAK DISPLAY
M. WEED DISPLAY
P. SANDY PINE RIDGE

N. ALPINE RELICS

O. HORNBEAM GROVE

Figure 56. Layout of representative plant communities.

5. Northeastern Plain will be represented by *Raised Bog* (7110) and *Molinia Meadow* (6410). The bog and wet meadow will be fed by overflow water from the pond by utilizing an existing culvert, as explained in a following section "Focus area: hydrological solutions".

6. Northern Lithuanian Lowland will be represented by a *Alluvial Forest* (91E0) display on one side of the existing pond and a *Northern Boreal Alluvial Meadow* (6450) on the opposite side of the pond.

7. Aukštaičiu plateau is the region of many lakes and rivers. Thus, it will be represented by a *Wetland* display and an *Emergent Vegetation* display along the shores of the existing pond. Installation of this display requires modification of the pond shoreline: a shallow water shelf is needed to establish marginal vegetation.

9. Southern Lithuanian Plain will be represented by *Oak Woods* (9190), which will include the endangered species *Quercus petrea*. This particular region has soils with high nutrient levels and supports a high variety of species, including weeds. Thus, a *Weed* display will be created to educate visitors about native weeds in agricultural crops and the difference between them and exotic invasive species.

10. Southern Lithuanian Plateau will be represented by *Hornbeam Forest* (9160) *and Alpine Relics Grassland* on a calcareous substrate (6210). *Alpine Relics Grassland* would be formed on a hill and display higher-altitude relics found in Lithuania at sites with slightly warmer temperatures. Native orchids would take an important part of this display. Hornbeam Forests are becoming very rare in Lithuania and *Carpinus betulus* can not be found in Northern Lithuania as its line of hardiness crosses Lithuania significantly south of Šiauliai. Local visitors may considere hornbeam as unusual woody plant, though native in southern part of Lithuania.

12. Dainava is a southeastern sandy plain and would be represented by a *Sandy Pine Ridge*. This region has many species not found anywhere else in Lithuania - they reached their current habitats along river corridors from southern Dnepr-Pripet sandplains in Belarus and Ukraine.

Medicinal Plant Garden. Lithuanians, as with many other cultures, used plants as remedies for all kind of diseases. Even now many people in Lithuania still collect medicinal plants in the fields and forest or grow them in their own gardens. Unfortunately, with prescription medication readily available, there is less need to pass such knowledge from generation to generation and indigenous plants loose their “healing power” in society. However, the number of visitors who attended the Medicinal Plants Day at the Šiauliai Botanic Garden in August 2004 verifies that there is still a great interest in healing properties of herbs and a great interest to get more information about the subject.

The Medicinal Plant Garden, proposed in the center of the Display of Lithuanian Regional Plant Communities, is a tribute to prof. Šimkunaitė, who lived in Aukštaičių plateau and extensively researched the medicinal properties of plants. The Medicinal Plant Garden would solely display medicinal plants native to Lithuania. It would provide an opportunity to include additional species of native plants, which do not fit into any other plant community according to their native habitat. The Red Book Path, which intersects the Medicinal Plant Garden, creates an opportunity to separate endangered species with medicinal properties and build an educational display explaining why certain plants should not be collected in the wild.

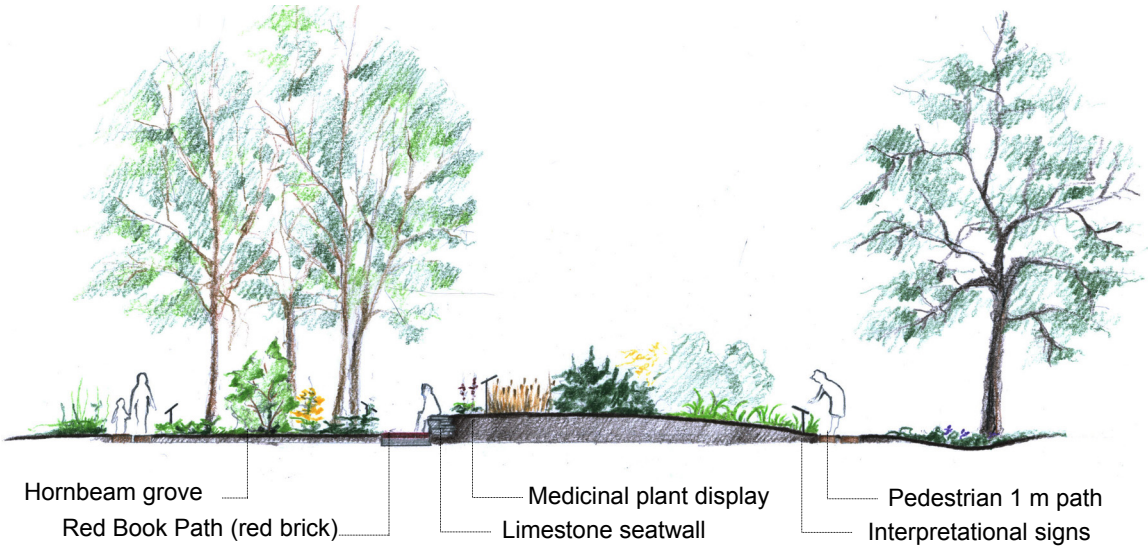


Figure 57. Section through Medicinal Plant Garden.

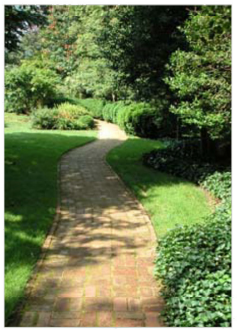
Circulation and thematic paths

The circulation system of South Property has the same path hierarchy as the North Property: unpaved and paved paths of two different widths. The boardwalk across the northwestern section of the pond has sufficient width for the maintenance vehicles, but would not meet the load requirements. Thus, it is necessary to leave a clear strip of lawn on the West side of the pond for the utilitarian access. The vehicular gate next to the road would provide maintenance access, while visitors could enter the fenced area through the gate next to parking lot. Should the admission fee systems be initiated, the entrance through the proposed Visitor Center would allow easy control. The circular patio by the Visitor Center would be the main place for orientation and interpretational signage. While the shortcuts from patio to the pond through the lawn are available, the paved path would take visitors through the sequential exposition.

As different bio-geographic regions seamlessly blend into each other through the display, the changing materials of the path could subtly demarcate the different plant communities (Figure 58). The “boundaries” may be easily expressed by different edging of the path: e.g. woven branches would immediately remind the visitor of typical treatment of the paths in the dunes, and irregular stones would be an appropriate choice for woodland communities.

Water Path. The Master Plan for Display of Lithuanian Regional Plant Communities has a number of hydrologically distinct habitats, currently unavailable in the botanic garden, such as shallow water for emergent vegetation, wetland, raised bog, wet meadow and alkaline peatland. All these plant communities would be connected by the Water Path meandering between the expositions. Water Path would change its materials according to the habitat – a boardwalk would intersect the bog garden, stepping stones would lead through the emergent vegetation display and a log bridge would intersect the wetland. The thematic path would enable Šiauliai Botanic Garden to establish a self-guided tour and educate visitors about water regimes, soils and plant communities in these habitats.

A. ACCESSIBLE PATH WITH COBBLE EDGING

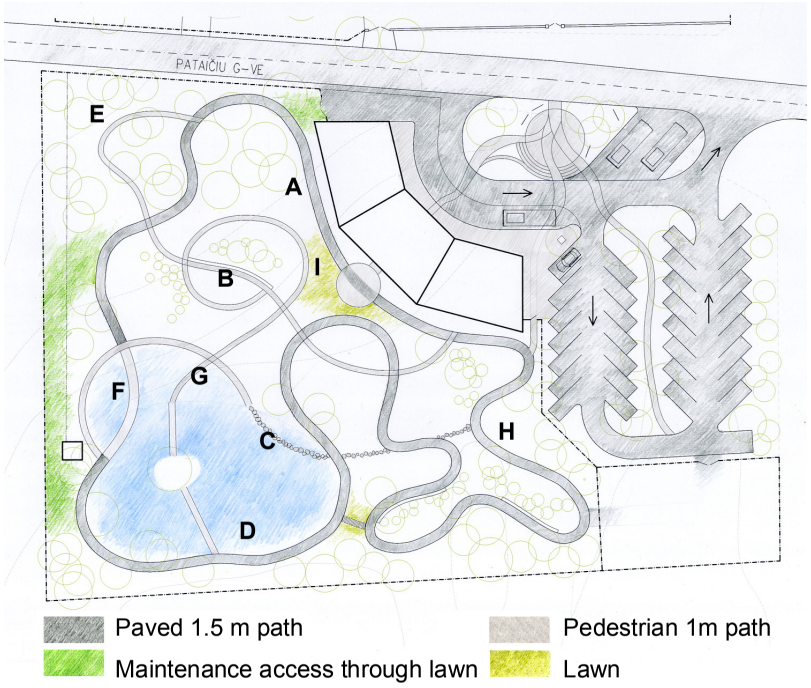


B. RED BRICK PATH

C. STEPPING STONES IN THE POND

D. SHORELINE TREATMENT

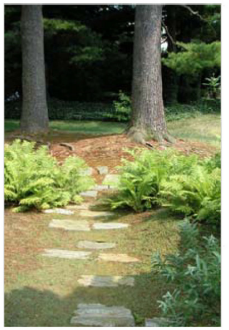
E. PATH TRHOUGH WOODLAND



F. BOARDWALK

G. PATH SEPARATING WETLAND AND POND

H. PATH THROUGH DUNE DISPLAY



I. STEPPING STONES IN LAWN

Figure 58. Inspirational images for the path system of the South property.

Red Book Path. Šiauliai Botanic Garden has a unique Red Data Book collection of endangered species. The collection currently is displayed in a very tight space and only one or two plants of each species are grown. Aesthetic qualities of the plant often can be displayed only in masses or in association with companion plants. Thus, an expansion of the Red Book collection is a priority need. The Display of Lithuanian Regional Communities presents an excellent opportunity to display endangered species across their native habitats. The opportunity to display disappearing species across different habitats would allow having a few different genotypes of the same species for research purposes, as they could be incorporated into different plant communities. By creating a separate Red Book Path (actually constructed out of red brick) to display endangered species, the collection could stand as a separate entity, incorporated into larger exhibit.

Figure 59. Water path (blue) and Red Book path (red).

Hydrological solutions

Figure 60. Overflow pipe from pond.

Pond overflow. In summer 2004 Šiauliai Botanic Garden installed an artesian well and the pond is no longer used for irrigation purposes, which caused great water-level fluctuation. During high-level seasons water is drained through overflow pipe into the ditch behind the fence (Figure 60). The area where overflow water flows is purposefully planned for a Bog Garden. The perforated draintile would distribute excess water into the subsurface of the Bog Garden to keep the soil saturated. Bogs rely on a high water table, rather than on periodical flooding, therefore they need subsurface irrigation in artificially created gardens to mimic the same water regime as in nature. An alternative irrigation system is provided by burying a hose with holes, which can be connected to well-water in case the water level of pond falls too low.

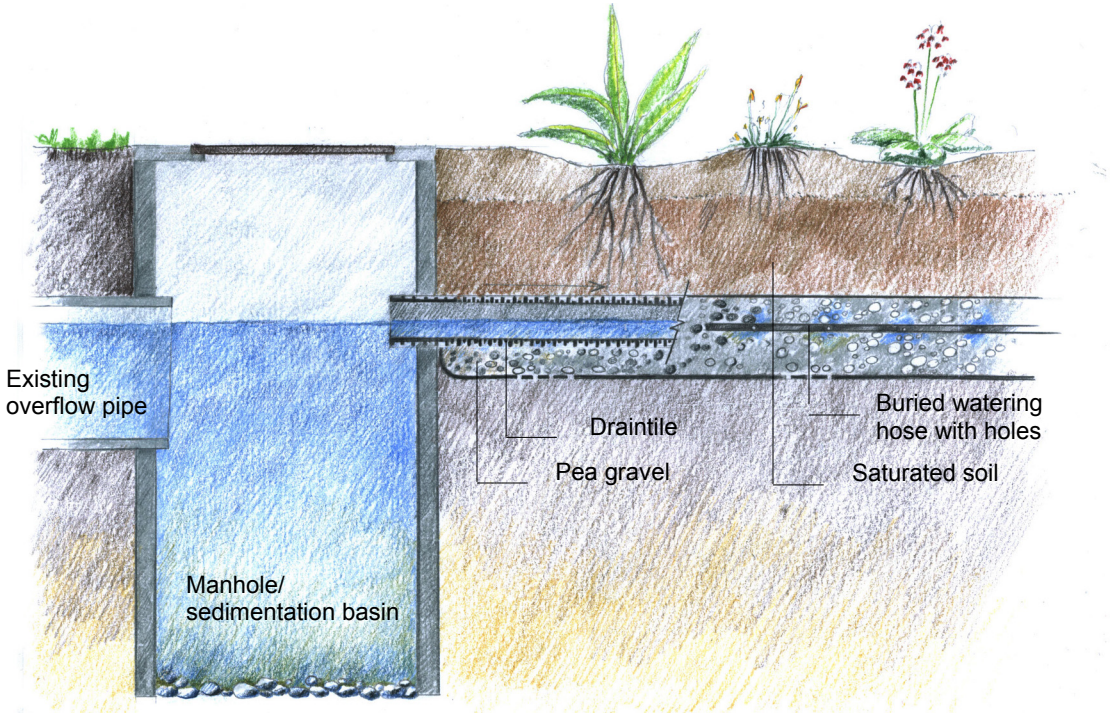


Figure 61. Irrigation system for the Bog Garden.

Parking lot with vegetated swale. The botanic garden currently does not have a parking lot and the inconvenient street parking may become a major issue as the flow of visitors increases. Thus, the parking lot for 30 cars has been planned on the South property. The parking lot meets not only utilitarian need, but is also an opportunity to educate the public about environmentally conscious design and construction practices. The new parking lot would be constructed as a permeable surface to reduce run-off from the site. In addition, to prevent parking-related pollution of the swale, draining adjacent lands into Vijole creek, a vegetated swale between the parking isles would be constructed to clean the surface run-off water. The vegetation, tolerating temporary flooding, would be a good educational opportunity for people having similar situation at their properties. An overflow pipe will carry excess water from the vegetated swale into the alkaline peatland as this plant community is prone to periodical floodings in native habitats. In case of large storms, the additional overflow pipe will drain water into the city swale, but the sedimentation and initial cleaning would have occurred on site.

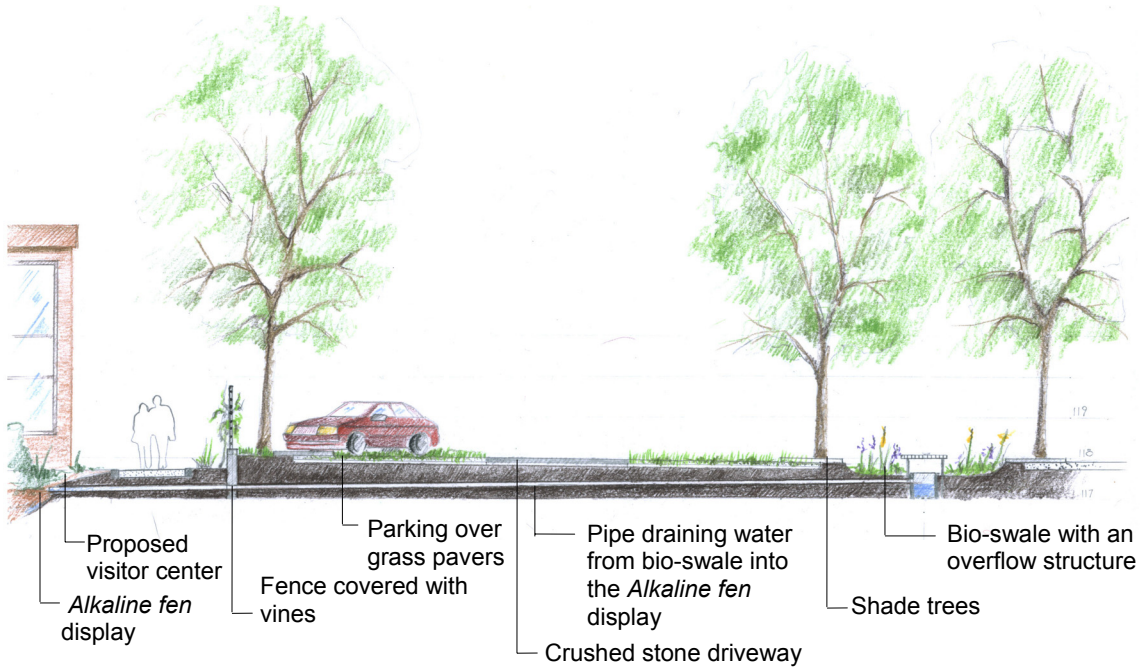


Figure 62. Vegetated swale of the parking lot with overflow pipe.

Focus area: Entrance Garden

It is quite unusual that the Entrance Garden is discussed the last in the explanatory notes. In Šiauliai Botanic Garden, the Entrance Garden is not only the place of arrival and exit, but is also an important circulation link between the North and South properties, which may have been difficult to explain prior to understanding design intent for both parcels.

The Entrance Gardent has to provide a sense of arrival to the institution, anchor the expositions and meet functional needs. The new entrance will allow convenient drop-off and turn around for busses, which currently cannot be parked on site. Different paving materials – gravel, pavers, asphalt and stamped concrete - will mark different functional zones and create interest in the ground plane.

Figure 63. Entrance Garden.

In the plan view, paths leading from the Entrance Garden to the South property represent roots of the plant, while the main path leading to the entrance of the North Property across the road represents the stem, which branches out into paths of the Systematic Garden. Conceptually, the allegory of underground and visible parts of the plant conveys the message that even if we are rooted into our native environment, often we do not consciously understand it and notice only the cultural expression of the relationship with the plant world. Thus, the Entrance Garden circle is a point of arrival, which symbolizes the place, where we purposefully come to explore the relationship between nature and culture.

Functionally, the hardscape circle is a space large enough to accommodate groups and especially convenient for tours arriving by bus. The plan indicates designated places for signs displaying maps of the property and any other appropriate information about the institution. Benches under the trees provide seating opportunities for people waiting to meet their party or simply resting during their transition between North and South properties. A few picnic tables under the trees may be an appropriate addition. Modular pavers along the southern edge of the circle could provide an opportunity to acknowledge donors. In addition, the pavers with gaps would occupy children for a waiting period, as youngsters are entertained by jumping from one square to another. The paver-path, which branches out from the semi-circular pattern, is designed with children in mind. It is also useful for the maintenance of annuals, which are supposed to create a flashy display, constantly in bloom, to signify the arrival into the Botanic Garden.

In order to ensure adequate facilities for increased number of visitors, the proposed new Visitor Center is to be situated next to the Entrance Garden. While the outlined Visitor Center would be designed by an architect, three main parts of the building programmatically are designated as the visitors' facilities (in the central part), conservatory and library/ multi-purpose meeting room (at the end sections of the building).

CONCLUSIONS

Being removed from my own culture, I was presented with a unique opportunity to distill what makes the “grass greener” in Šiauliai Botanic Garden. The goal was not to make the institution “the same as every other garden, but to express one’s unique mission” (Robertson 2004, 9).

This Master Plan for Šiauliai Botanic Garden in not the perfect solution to the complex issues contemporary botanic gardens have to consider. It is a solution which sifts common program elements through the sieve of the cultural and natural heritage of Lithuania. The same grain can be baked into different bread: it is a design question of how to develop spatial structure whose parts are visited in a logical order to provide a meaningful sequence of experiences, not “more of the same”.

The intent of the Master Plan - to return interpretational power to the *form* – was achieved by integrating culturally “recognizable” design elements into the layout of collections. The developed circulation patterns and thematic compositions borrow spatial arrangements from Lithuanian folk art, symbolism - from customs, traditions and folklore - and logical connections from the relationship of bio-geographic regions of Lithuania. It is my belief that the form can be instrumental to shift emphasis from a plant as an object, to its role in this particular context – Lithuanian culture.

It is known in Lithuania that in order to make good bread one has to have a good leaven, which was saved from the last batch of dough. I could not borrow leaven for my design, as I did not have a good precedent of the cultural expression in the design of the botanic garden. Thus, it is a brand new batch of dough. I will consider it good bread if there is a taste of Lithuania in it.

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APPENDICES

Appendix I: Objectives from *Action Plan for Botanic Gardens in EU*

The following objectives for botanic Gardens in European Union were defined by *Action Plan* (Cheney et al. 2000, 3-4):

A Science and Horticulture

- A1 Promote botanic gardens as resource centres for scientific research
- A2 Facilitate access to scientific and horticultural information in botanic gardens
- A3 Consolidate botanic gardens as major centres of taxonomy
- A4 Consolidate botanic gardens as centres for research on identification, biodiversity conservation and sustainable use
- A5 Promote and consolidate botanic gardens as major centres of specialised horticulture

B Heritage, Culture and Tourism

- B1 Seek recognition of the heritage value of botanic gardens
- B2 Raise awareness of the roles of botanic gardens in European history, development of botany, history of science and plant introduction
- B3 Promote the importance of the architectural heritage in European botanic gardens
- B4 Promote an appreciation of landscape and garden styles in botanic gardens
- B5 Recognise and promote botanic garden libraries, herbaria, museums, art and other collections as an important part of European culture and heritage
- B6 Safeguard and document important artefacts, structures and collections of historical and cultural importance
- B7 Promote botanic gardens as tourist attractions

C Conservation of Biodiversity

- C1 Ensure *in situ* conservation and assessment
- C2 Develop management of *ex situ* collections
- C3 Develop management and analysis of data and information
- C4 Ensure garden management that promotes biodiversity conservation and sustainable use of plant resources
- C5 Implement and influence national and international biodiversity policies

D Education, Training and Awareness

- D1 Develop botanic gardens as centres for environmental education
- D2 Promote botanic gardens to schools as centres for environmental education
- D3 Promote botanic gardens as resources for higher education and training
- D4 Present information to the public in a variety of ways
- D5 Promote botanic gardens to the public as centres for information on plants
- D6 Encourage public debate about issues relating to plants
- D7 Ensure that the garden's message is clear and consistent
- D8 Raise the status of education

E Networking and Co-operation

- E1 Develop a network for scientific research and horticultural activities
- E2 Develop and strengthen networks to improve conservation of biodiversity
- E3 Develop and strengthen national networks to improve education by botanic gardens
- E4 Develop closer networking to promote staff training in botanic gardens
- E5 Participate in and form local networks
- E6 Work together internationally
- E7 Develop an efficient network

F Capacity Building

- F1 Build effective management of resources
- F2 Improve and develop staff skills and training
- F3 Build and implement a policy on collaboration to assist capacity building for botanic gardens and other partner organisations and institutions throughout the world

Appendix II: List of Threatened and Endangered Species Grown in Šiauliai Botanic Garden

The list is classified according to the categories of *Lithuanian Red Data Book* (2003):

Category 0 – extinct (recorded after 1800);
Category 1 – endangered;
Category 2 – vulnerable (population in decline);
Category 3 – rear;
Category 4 – rear (limited information available);
Category 5 – protected (population stabilized).

0(Ex) kategorija

1. Rubus arcticus L.
2. Veratrum lobelianum Bernh.
3. Hypericum humifusum L.
4. Aphanes arvensis L.
5. Hydrocotyle vulgaris L.

1(E) kategorija

1. Betula nana L.
2. Isopyrum thalictroides L.
3. Bromopsis erecta (Huds.) Fourr.
4. Hedera helix L.
5. Dianthus armeria L.
6. Dianthus superbus L.
7. Melittis melissophyllum L.
8. Glaux maritima L.
9. Tofieldia calyculata (L.) Wahlenb.
10. Gnaphalium luteoalbum L.
11. Gratiola officinalis L.
12. Dracocephalum ruyschiana L.

2(V) kategorija

1. Arnica montana L.
2. Seseli annuum L.
3. Centhaurea phrygia L.
4. Allium vineale L.
5. Dactylorhiza maculata (L.) Soó
6. Gentiana cruciata L.
7. Prunella grandiflora (L.) Scholler
8. Scutellaria hastifolia L.
9. Gladiolus imbricatus L.
10. Campanula bononiensis L.
11. Cypripedium calceolus L.
12. Thesium ebracteatum Hayne

13. Sesleria caerulea (L.) Ard.
14. Pulicaria vulgaris Gaertn.
15. Polemonium caeruleum L.
16. Agrostemma githago L.
17. Corydalis cava (L.) Schweigg. et Körte
18. Ajuga pyramidalis L.
19. Iris sibirica L.

3(R) kategorija

1. Astrantia major L.
2. Quercus petrea L. ex Liebl.
3. Allium angulosum L.
4. Allium scorodoprasum L.
5. Bromopsis ramosa (Huds.) Holub
6. Agrimonia procera Wallr.
7. Trifolium rubens L.
8. Festuca altissima All.
9. Dianthus borbasii Vandas
10. Salix myrtilloides L.
11. Lithospermum officinale L.
12. Cruciata laevipes Opiz
13. Stachys recta L.
14. Lathyrus pisiformis L.
15. Corydalis intermedia (L.) Mérat
16. Geranium lucidum L.
17. Myrica gale L.
18. Salvia pratensis L.
19. Sherardia arvensis L.
20. Colchicum autumnale L.
21. Gagea pratensis (Pers.) Dumort.
22. Scabiosa columbaria L.

4(I) kategorija

1. Festuca psammophila (Hack. ex Čelak.)n Fritsch
2. Cerastium sylvaticum Waldst. et Kit.
3. Astragalus cicer L. Sesleria
4. Silene lithuanica Zapal·
5. Ornithopus perpusillus L.
6. Dactylis polygama Horv.
7. Androsace filiformis Retz.

5(Rs) kategorija

1. Laserpitium latifolium L.
2. Lunaria rediviva L.
3. Allium ursinum L.
4. Pulsatilla patens (L.) Mill.

Appendix III: Task Schedule and Area Take-offs for Cost Estimate

(South property only)

Site Work	Quantity	Unit
Remove existing fence	1	lump sum
Relocate current plantings	1	lump sum
Relocate pipe from a pump house	60	m
Grading	1	lump sum
Main irrigation lines	170	m
Visitor Parking and Entry Court		
Hardscape		
Main driveway crushed stone paving (loop)	340	m²
Drop-off area concrete pavers	180	m²
Curb (cobbles)	370	m
Crushed stone paving (parking isles)	320	m²
Grass pavers	465	m²
Water overflow drainage system	1	lump sum
Gravel path through entry court	18	m²
Entry court benches	4	each
Entry court informational signage	1	lump sum
Planting		
Soil preparation	500	m²
Trees	33	each
Perennials and grasses (swale)	230	m²
Grass	270	m²

Collections

Hardscape

Gravel paths
Path edging
Brick path
Limestone retaining wall (0.5m height)
Terrace paving
Boardwalk
Stepping stones in the pond
Wetland and bog liner
Pond overflow pipe (culvert into bog)
Fence (chain link, 1.5 m height)
Ornamental gate
Stone outcrops (decorative edging)
Pond edging/ stabilization
Seating benches
Irrigation

Planting

Imported soil (dune sand, peat, topsoil)
Soil preparation
Trees
Shrubs
Perennials and grasses
Grass

Additional Costs

Area lights	
Uplights	
Plant name tags	
Interpretational signage	
Miscellaneous expenses	10%
Construction contingency	10%
Bidding contingency	10%
Design and engineering	10%