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EDUCATIONAL SPACES IN BOTANICAL GARDENS

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ABSTRACT

The main purpose of this work is to show how to change the botanical gardens to improve their educational function. In the past botanical gardens played an important role in training of pharmacists and doctors by growing and studying the herbs. Since the 16th century there have been botanical gardens next to universities in Italy and, later, in northern Europe. Kings and wealthy merchants created wonderful gardens for example in Kew and Paris. Subtropical plants were grown in orangeries, and tropical plants were put up in greenhouses. Nowadays most of botanical gardens are arranged according to the geographical origin of the plants, so that visitors can experience the views and smells of rainforest, desert, or misty mountain forest, everything within a few hours. One can experience the Nature in images, smells, tastes, touches, sounds and words. All that builds a new system with many educational possibilities created by tens, often unnamed, spaces. It can be used in general education including all spheres of the man's development: knowledge, behavior, emotions and spirituality.

Key words
botanical garden, education, space, theatre

INTRODUCTION

The idea of space as the environment in which the human exists is not new. Since a long time people have been aware of the importance of the place's arrangement stressing its social position, importance of administration, the role of cult and nonverbal identification of mutual relations. This knowledge is also used in many spheres of human activity. Since half of the century many scientists have tried to define the mutual relationship between man and environment within the frames of one of the branches of psychology – environmental psychology. Nowadays the attention is paid to modify particular environment in order to increase maximally its efficiency and functionality in production space or generally understood service spaces: trade, art, recreation, exhibition or education. From the point of view of theory of systems the structure (including space) in particular environment (conditions, surroundings) defines the acceptable functions of system. The conditions in socio-political systems are defined by the dominant outlooks. In consumer democracy (not civil one) the main idea is mass production and utilitarianism. The reason is that the particular institution will survive only if everyone will be served in such a way that will make them go back and leave their money again (money voting). And the consumer will do that if the space of particular service will be nice, efficient and not too demanding. In this space for a moment we will feel special, important, powerful, admirable, irreplaceable.... It is an attitude different from the dominant in the beginning of 20th century when the space stressed the exceptionality of few people building their position, stressing their dignity and confirming their power.

This purpose had monumental buildings, first castles and palaces of lords, temples of different cults, buildings of government, financial institutions and courts. In the periods of prosperity of empires or countries the accompanying and increasing the power of monarch institutions were created such as palace gardens, botanical garden and zoos, parks, universities

and museums. Of course some stressed the power of the founder (palace gardens, private museum collections). The others kept some civil order and prepared people responsible for functioning of state and church institutions (universities). Others despite being "the gifts of the lord to his subjects" in indirect way suggested that the lord (powerful, virtuous, compassionate, generous, etc.) thinks about his subjects (i.e. public parks). The other category includes such institutions as museums, botanical gardens and zoos which main function was presenting of loots, trophies or gifts stressing the power of empires, their influences and possibilities of expansion. Their educational function was understood in a typical way from 19th and the beginning of 20th century. The education was the attribute of western civilization. It allowed for conquering and winning. It was a source of superiority over the technologically weaker civilizations understood then as "underdeveloped". Very often they were created next to other institutions which shaped the policy of expansion – for example universities where in natural way the professional teaching stuff explained the significance of the discoveries and victories and prepared the new generations of conquerors/discoverers. The most triumphant was encyclopedism- resulting from the hunger for scientific information and search for empirical truths.

The celebration of the power of reason first by Europeans and then by northern Americans spread over the whole planet in 20th century and became a global phenomenon. As a result it brought many unexpected changes in the structure of societies which took this model. They were unexpected because they changed in an extremely fast for societies way the significance and role of many institutions. The way of thinking changed and within a few decades the elitist societies changed into egalitarian, democratic and having utilitarian and populist tendencies. The last ones where strongly supported by the development of media, advertising and consumerism which were perceived as the ideological and economical base for our civilization. This emancipation of societies was rooted in educational institutions first and foremost in universities (progressing, modern, innovative) which as the first ceased to keep the old system.

The innovation as an intellectual form freely switched from empirical and technical science to humanism and broke the scholastic schemes and especially in philosophy, psychology, sociology and pedagogy allowed for creating many alternative versions of social and educational systems. The change of institution's function means usually the change in its financial support and the way it is done. The institutions loosing their previous importance and failing in finding their place in new reality died in a natural way. The others that became more significant grew sometimes uncontrollably and absorbed more funds than it would seem necessary for functioning of system. This change motivated many educational institutions to change their structure and take up new tasks but it put many others in a very difficult situation.

The reason was that the changes in structure were limited by the previous space (i.e. majestic buildings, halls, exhibition places, etc.) These problems had mostly the cultural institutions representing the high culture which had never had utilitarian tendencies. We mean the museums, galleries and even theatres. They are usually located in the spaces stressing the importance of time and place and they block the dialog between the audience and the space or objects in this space. The crisis of botanical garden and zoos was caused by some other elements but still within the same change. When the encyclopedic trend, which organized "macroscopic world", diminished it was difficult to support the systematic or collecting institutions (BChang, 2003). The survival of these institutions until the changes allowing for their normal functioning was possible thanks to their inertia (and scientific institutions are very good at it). Secondly, they fall under the utilitarian tendencies quite easily (it can be said that they can exist and financially support themselves but then usually they loose their basic functions). However, in the second half of 20th century the paradigm of functioning botanical gardens and zoos changed.

It was connected with the idea of threats caused by technological or industrial civilization. It was changing in that time into consumer civilization and consuming the resources of the whole planet. This civilization resolved a few problems such as the problems

of hunger, plagues, children mortality, but only for a short time. The ecologists pointed to two destructive processes: the high energy consuming and the demographic explosion. The problem was that the both processes were sustained at the cost of natural resources, habitations and the increasing number of population of even the whole species at the cost of biological diversity. It provided the botanical gardens and zoos with new role – the conservation of biological diversity. The crucial events which opened the possibilities for botanical gardens were the World Conferences. The most important was the World Conference in Rio de Janeiro in 1992 which in Agenda XXI pointed to the necessity of biological diversity conservation and to importance of education in environment, ecology and biology first to understand the changes happening on the Earth then to find the alternative ways of development of our civilization.

The modern botanical gardens are not homogenous. They can be divided into many different types concerning their function: scholar (ordination, the conservation of biological diversity), educational, economical (both production and services) or collecting. The differences can also concern the importance of particular functions for directors and sponsors. These institutions are also different in the size of their territory, location in regard to the cities and the climate which influences in a significant way the character of botanical garden. Some activities can be analyzed for all of them: the modification and exploitation of educational space. It supports the development which according to many teachers and psychologists is the most important goal of education.

EDUCATION AND BOTANICAL GARDENS

It is believed that the aim of present education is the education for development, understood as the series of changes through individual experience, which lead to the proper control of self in the external world (Jakowicka, 1994). Such education is stimulated by child's needs which, during the period of the most intensive development, are turned into the process of self – formation because of the natural need for better and deeper development (Gloton, Clero, 1985). Maslow points out to two mechanisms limiting development: on one hand, the defensive tendencies which manifest themselves in fear of risk and unknown, and on another hand, the desire to undertake the risk and to experience new things (Maslow, 1986). Jakowicka understands the "education for development" as the liberation of internal values of the individual, improvement of her/his personality in a sense of "transgression", extension of the ability of choosing the values, stimulation of the activity in different spheres of the child's life, the formation of the responsibility for the "quality" of the Self (Jakowicka, 1994). Very important in the education are the processes of self-analysis, self-evaluation, and self-investigation – not only investigation of surroundings, environment and external phenomena.

Such educational goals are the reason that the educational aims of botanical gardens should first and foremost take into account the children's developmental needs.

Gloton and Clero point out to the significance of the knowledge about natural and creative activity of a child. Donaldson points to the strong need of being effective, competent, independent, to understand world and to act efficiently (Donaldson, 1986). The natural aspiration of the child since early childhood is to understand the world, attempt to limit the ignorance, achieve the mastery of language, ability to anticipate the future situations on the basis of past experiences and to understand the other people points of view. From the very beginning child shows his own aims and intentions through his activities. It proves the possibility of child's transformation and transgression through the education.

Learning is an active endeavor providing the learner with the chance to ask relevant questions and to make meaningful choices. Different learners will have different goals for their experiences, so it requires the existence of many alternative settings. Good learning environments are naturally "messy," providing a wide set of choices and options that give learners the opportunities to create their own order out of a variety of elements. For botanical gardens, this means the necessity to be aware of the diversity of interests and expectations of the visitors and to provide a variety of ways to satisfy these interests. For botanical garden

spaces, this can mean providing easy visual access to the entire environment so that individuals can organize their own ways through the botanical collections (BChang, 2004).

Are these aims and intentions known and respected by designers of botanical gardens as well as by teachers responsible for natural education in botanical gardens? Does botanical garden make possible pupils' holistic and balanced development? Does educational space of botanical garden encourage children's development?

SPACE AND EDUCATION

It is often said that the learning is a process of the mind. A lot of what actually occurs during the learning process is showed by characteristics of the learner's environment. The variety of stimuli, the social aspect of the setting, the spatial context, and even the amount of light and sound all affect the learning experience. Even the external architecture of the building sends a strong message about visitor's expectations.

Even now the botanical gardens' exhibition spaces are designed (if they are designed at all) by architects who concentrate on the great and monumental or by interior designers who concentrate on the small, minimalist and detailed. Botanical garden buildings like orangeries or green houses often contain magnificent halls with little educational functionality. What is missing in these projects is an importance of the atmosphere of the public space in the process of learning.

The necessity of a better understanding of the relationship between space and learning process became apparent to us when we started to discus a new project of the Silesian Botanical Garden. Over the years people have had critical comments, both positive and negative, about the educational potential of botanical garden(s). We could also observe other botanical gardens and discuses how the infrastructure (existing roads, paths, buildings) has shaped the botanical garden's general development. As we considered new plans and projects, we began to ask ourselves which of the current characteristics of existing botanical gardens were vital to preserve and which were incidental and unimportant or even destructive to the educational experience.

Our interest in the effects of space on learning process is caused not only by our experiences in theatre, art (painting, sculpture and artistic installations) but also by our experiences in botany, developmental plant anatomy (structure and function), botanical garden building (structure and function), and education in different educational spaces (educational games theory). From these experiences emerged several discussions about concept of botanical garden as a living theatre or even as a theatre of life, and also botanical garden as a living space, adaptation to the space, adaptation as a process of learning, learning – education, education – dialogue (between us and space), dialogue – drama (as a very effective method) drama – theatre.

Theater can be understood as a storytelling in a formal space. Theater directors make meaningful and conscious use of elements of environment at their disposal to tell a story or set a mood.

The educational meetings in gardens, in spaces created and creating themselves, are based on the dialog between teachers, children and biological environment. It is a dialog that was interrupted long time ago.

The possibilities of different activities in the appropriate environment are the answers to the deep needs of children: like safety, acceptation and spontaneous play, creativity in dance, music, art, learning, self-cognition and dialog with nature. But most of all these activities are organized in a form of friendly meetings, poetical adventures, and magical journeys into unknown which create the appropriate condition for a dialog. The meeting is a special kind of activity (mobile, verbal, artistic, technical, and musical) so the dialog can have many forms depending on the possibilities and fancies of children. In the following article we are trying to present some of the possibilities of such meetings which give the opportunity for the partner meeting of the worlds of an adult and child in the best possible space – the garden.

THEATRICALITY OF GARDEN SPACES

The important element of meetings is the space – the special, chosen, limited and isolated place, the place created and creating itself. The isolation is a source of its unique characteristics

and unusual force. Because of that the educational space of the botanical garden can be compared with theatrical space, the place separated and for Artaund the most important one. For him the theatrical space is the place which should be filled. It is a place for actors and the audience, a place that is indeed different from the surroundings, the sacred place. Artaund defining the theatre within the space isolates it from the secular surrounding. The space in Kantor's theatre is a living space which can produce forms and objects. It is a dynamic, changing and flexible space. The actors must fight against it, manipulate and shape it. He combines the idea of place where theatre is negated with its box scene. His performances took place on the railway stations, on the post, in ruined apartment, in laundry, in changing rooms and basements. Wherever he organized his performances he arranged and isolated the space. The reformers of modern theatre bring back the conventional character of theatrical space. It involves giving up the illusion and coming back to the authentic value of physical space.

According to Schechner to articulate the space means to allow it for speaking, in other words to see the space, to explore it, but not like the element enabling us to do something but to do what the space encourages us to do (see Trzynadlowski, 1982). Being in space properly arranged and with a specific atmosphere stimulates us to create the poetic associations, to fantasize, explore and experiment. Such places can be found in gardens.

The space of children's theatre is a secret place guarding its mysteries. It is a secret garden which creates the desire to discover, create and perform the stories enchanted in the objects and place itself. The garden transforms itself during the play and brings to life the places from children's world of fantasies. However, the children's theatre is based mainly on children's imagination which changes a piece of junk into whatever he/she wants. "Let's imagine the suburbs of the city. Among rubbish and weeds the boys are playing. The planks, pieces of bricks, metal sheets and boxes transform during the play into forms. They are not longer a plank, brick or piece of wall. Their new quality they owe to a child that noticed this or that among the rubbish. Moved into a different, chosen place they become a wall of a house, a building, a table or a car. In this moment they change the chaos into the order" (Bogdanowicz, 1988). In this way the world of fiction is created, the particular scenes are arranged and the dialogues are formed. The children's theatre is created where all participants of play generate an autonomous reality. For some time the fictitious world replaces the real world. The independence of the reality created by children is based on autonomy of space and time and specific creation of existence. Space, time and existence created by children are ruled by different laws, cause and effect relations, and conditions different from these that exist in reality. Everything that exists beyond imagination disappears and is replaced by the world created by the child. During the theatrical plays the technical obstacles are resolved in imagination. It means that the play takes place in two spheres: reality and fantasy. The objects without the name, usually pieces of junk, become a source of creative process; they are the basis for imagination which creates them once more and gives them a new meaning. The similar process takes place in modern experimental theatres in which the objects and mechanisms get new meanings and take part in amazing game of imagination.

The child in his play is guided by the general concept of created situation. During the play this concept develops and forms a text. It has following functions:

– it is a dialog between people or things performing,
– expresses what is happening, happened or will happen – idea of narration (Szuman, 1962).

It is the result of situation and appears only where it is necessary.

The meetings should be connected with children's games in which the important role plays the space and object, the games that are result of child's natural needs. The meeting should convert the obligatory activities that end in the school into individual studying, quest, experiments and getting new experiences. It should provide situations when the child stops watching and starts to participate and share his feelings. It should provide the moments of self-conscience and afterthought.

It was the potential of educational storytelling that brought us to botanical gardens. The

experiences led us to ask the following question: What is integral for the learning experience in the arrangement of a botanical garden's exhibit space? The Silesian Botanical Garden organization stimulated us to think more deeply about how space design affects behavior. We have always been charmed by the beauty of botanical gardens; much of that charm, we believe, is due to their spatial architecture. The style of designing the space can strongly affect the experience by providing rich and flexible surroundings, enabling the interpretation and naturally creating the opportunity for visitors to ask their own questions produced by their own ways of cognition.

On the other hand, the botanical collections presented in a chronological way show how the designer is taught science in school. It minimizes free association and maximizes logical sequencing. It is a teacher (designer) centered not learner (visitor) centered. And it is a space that produces isolation rather than group activity. The next questions appear: how the creators of botanical garden want to affect the participants of educational meetings? What kind of influences in fact we have to deal with? And whether we have to deal with visitor's dialogue with designer through his work or with his/her own questions in educational space helping him/her to find possible answers (in space discovered by him/her in a different, individual way). We may also ask another question: how botanical garden should be designed, to take into consideration the educational values of exhibition space?

The experiences supported our idea that the design of the spatial environment plays a significant role in making easier the process of learning in botanical gardens. But what is actually known about how space and learning are related? How does the physical and social design of environments such as a classroom, home, workplace, museum, botanical garden, or zoo affect the learning process?

HOW DOES THE SPATIAL ENVIRONMENT INFLUENCE THE LEARNING PROCESS?

The research on the effect of the space's design on the process of learning is less developed than other investigations in learning theory. Some research results can be found in the recently developed field of environmental psychology, which studies people's interactions with their sociophysical surroundings. A few specific researches have been done on the effects of space on learning in more formal settings such as classrooms and playgrounds. Additional clues come from the collected knowledge of behavioral anthropologists, environmental architects, and urban designers who study as the part of their design process the way people use the real spaces. In many cases the relation between the space and learning is somehow indirect. The effect of space on behavior is known and since the connection between behavior and learning is proved the relationship between space and learning can be potentially assumed.

SOME OBSERVATIONS ON THE ENVIRONMENTAL PSYCHOLOGY

The first point of environmental psychology is the necessity of treating the individuals as active participants in their world. Instead of considering the individuals as objects in a fixed setting, environmental psychology studies the dynamic interaction between individuals and their environment, each having an effect on the other. The individual tries to organize his physical environment and raise his freedom of choice. No matter what is the primary purpose that brings the individual to a given physical setting it must not only satisfy the primary need and other relevant needs, but also it must allow for satisfaction of goals that are partly related to the major purpose. Any physical setting that provides many alternatives for the satisfaction of a primary purpose and the satisfaction of related and unrelated purposes obviously increases considerably freedom of choice.

Our experience of space is determined by both personal and cultural expectations (Hall 1966). In botanical gardens, complex relationships among people as well as between people and plants determine the efficiency of the learning experience. Robert Sommer, early pioneer in the field of environmental psychology, strongly declares that instead of following the rule that "form follows function," space design-

ers and architects of our public spaces show an interest in a form alone. To break this cycle, he argues that the designers must understand the complex human needs that affect the use of space. In *Personal Space*, Sommer (1969) discusses such issues as human dominant/submissive behavior, social distance, personal space, and ecosystem of a small group as well as experiments with the manipulation of space made to study changes in behavior.

HOW THE SPACE WORKS?

Our experiences with space taught us a lot about how the space works. The design of space can have hidden as well as the visible impact on our lives and on our experiences. Even small aspects of design can change our experiences dramatically. Our experience of space is dynamic because of our own individual movement as well as the influence of others. The design of a space can easily affect the way that we experience the elements within it. Elements do not function on their own, but rather are part of a spatial tapestry that includes their neighbors, distant elements, and the physical space itself (BChang, 2004).

For example, the changes in the intensity of visual stimuli can be used to interrupt a visit and provide opportunities for a shift in thinking. For example the possibility of walking through a tunnel in a park without being disturbed provides the time for thinking, consolidating ideas, and relaxing the peripheral vision. After leaving the tunnel, one's vision is then stimulated anew. The effect is to refresh the visual system and to overcome the natural course of visual training.

PEOPLE GO WHERE PEOPLE ARE...

In City, Whyte (1988) points out to the characteristics that make us enjoy certain settings and dislike others, for example movable chairs, food, entertainment, and even a "mayor" of the space, a person who provides help and information. His motto that "people go where people are" provides the key to a good public space design. Whyte observed that people are interested in peripheral participation in activities. He provided a clue that design of educational spaces should allow for lurking, or looking over the shoulders of other visitors. This brings to mind the familiar museum practice of copying the way the previous visitor used an exhibit, natural behavior that should be connected with the exhibit in a form of apprenticeship. Perhaps, that is a key aspect of educational design.

CONCLUSION

All children are born with the creative powers. Later on, it depends only on us if we can create the atmosphere that will support the child's work. Man must feel mentally safe and free to act creatively. The psychological freedom is necessary not to limit the child's expression.

The entire architecture of a botanical garden, from the infrastructural design to the interior color scheme, plays an important role in visitors' intellectual approach to the botanical collections. Since the unique characteristic of a botanical garden is its public exhibit space, it is vital for the botanical garden developers to realize the potential links between space and learning process before they create exciting and provocative educational spaces in their facilities (BChang, 2004).

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