



**Barbara Widera\***

## *Idea above Style. Sustainable Architecture*

### *Trends in modern architecture development*

The development of modern architecture is a complex process, the roots of which lie in the attitude towards tradition and cultural heritage, current state of knowledge in the field of constructing and technologies associated with the building industry, the author's philosophical and aesthetic viewpoints, the character of location, climatic requirements, functional circumstances, end-user needs, investor's expectations and law regulations. On this complicated background, however, certain values become predominant over the others, creating designing attitudes and, consequently, shaping architectural trends. Due to constantly increasing pace of life in the 20<sup>th</sup> century, architectural currents were changing faster and faster to finally reach a blurry state at the beginning of the new millennium.

In 1990s solutions for these multiple correlations were sought within three main designing methods. The first one, continuing the idea of so called white modernism, would propose forms based on simple and clear geometry. By the end of the century, their abstract and sublime character was emphasized. Modernist thought was often combined with Zen philosophy, with an expectation that the architecture would calm down emotions and create favourable background for spiritual and intellectual development. Puristic solutions, based on overriding principles and harmonizing contradictions of the surrounding world were preferred.

According to the second concept, architecture should provide the user with maximum comfort, showing clearly and distinctively both the functioning of the building and the human inside it. In the high-tech trend, addressed hereby, the utilisation of technologies which guarantee optimum conditions for people inside the building was of the highest priority. At the same time the superiority of system solutions, built on the basis of given parameters

and controlled on each stage by programmes written by teams of experts was regarded as indisputable. Objectivity of the computer, used as a controlling tool, was considered infallible as opposed to the erroneous subjectivity of human perception.

The third concept – the most rebellious one - was based on showing the complex and complicated world. Deconstructivism, instead of simplifying only underlined the difficulties and dilemmas of modern man, yet, it also offered freedom of making a variety of choices and a pleasure of intellectual contact with architecture. Architects connected with this concept were most frequently faced with the barriers of architectural and technological possibilities. It was only at the turn of the 21<sup>st</sup> century that the development of technologies and computer-aided design programmes helped to shift the boundaries of architectural limitations, which are currently determined mostly by the designer's imagination.

At the beginning of the 21<sup>st</sup> century a new phenomenon has been observed. Some of the differences among architectural trends started to fade away. It often refers to issues which only a couple of years earlier seemed to be impossible to combine. At first it was attributed to the globalization and the influence it has on architecture due to popularization of technological achievements on a large scale. However, this is not the only point. Designers recognize the changeable and more complex needs of a mass audience. Architecture consumers want to feel the presence of other people, but in such a way that their privacy is not disturbed. They would like to be mobile but also to have the feeling of stability. They want to benefit from the comfort of city life and to keep close contact with nature. Today the architecture raises from such contradictions. Regardless of represented philosophical standpoints, architects more often use solutions which reflect concern for economical use of natural resources, construction materials and energy.

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## *Increasing environmental protection consciousness*

The turn of the 21<sup>st</sup> century is a time of general interest in the problems of natural environment protection. Large-scale education programmes addressing the issue of responsibility for the natural environment start to bring about first results. It can be especially attributed to the laws and regulations which enforce certain actions (especially on big investors) on the one hand, and to the development of methods and technologies which, in the end, provide the end-user not only with comfort and satisfaction, but also with financial savings on the other hand. James Wines from the SITE group also points out to another aspect of the problem, i.e. the attitude of architects themselves who, accentuating advanced technologies present them as a complicated challenge and at the same time seem to ignore artistic values of pro-ecological

solutions [6, p. 64]. It even happens that a peremptory tone of comments made by defenders of nature - even though they might be acting in good faith - discourages the public. *While people are usually fascinated by apocalyptic visions and fantastic projects of salvation, they do not find anything particularly interesting in photoelectric cells, solar panels or thermal window panes [6].* Thus, in order to achieve the victory of the idea, nature-friendly architecture, apart from objective factors, should also meet the public expectations concerning aesthetic and cultural criteria, as well as the question of its integration with the surrounding. It does not mean an immediate necessity to comply with imposed forms. Variety of solutions and freedom of choice in architectural design should be recognized as up-to-date and creative.

## *Green architecture*

The requirements that should be met by sustainable architecture have been formulated by legal regulations, systems of assessment and certificates applicable for a given country, as well as other organizing documents<sup>1</sup>. However, in the present state of development there are no clearly outlined formal specifications that would characterize most of the objects. They depend both on the scale of investments and the designer's philosophy. Similar goals are being achieved by the application of various methods. Nonetheless, a certain repetitiveness can be observed. Its occurrence is not the effect of copying, but the authors' similar way of thinking. On the basis of observation of the projects realized at the beginning of the 21<sup>st</sup> century - built in accordance with the postulates of modern eco-friendly architecture - four main groups can be distinguished.

### **Objects set in natural landscape – emphasizing advantages of the surroundings, referring to traditional local solutions**

Speaking about objects taking advantage from the surroundings and inspired by traditional housing, it would be difficult to indicate the moment when they started to spring up. However, the idea of such perceived eco-friendly architecture usually functioned as a niche movement. At present they are small- and medium-scale projects which authors employ seemingly low technologically advanced solutions, based on cheap and locally available building materials. Despite the low-tech image well matching the landscape, today's realizations very often utilize highly advanced concepts and systems. However, advanced technology is not of the prime importance nor is it exaggaratingly exposed since

the authors are more inclined to concentrate on aesthetic and practical qualities. The members of SITE group are among the supporters of the idea of architecture created on the basis of landscape transformation and current local conditions (climatic and geological). Their constructions are built into the ground usually with green roofing. The architecture intertwines with local greenery, water and geological structures often placed as 'ecorealistic' exhibits with glass walls [9].

An interesting example of unconventional realization is the project of 24H Architecture studio from 2004. Dragspelhuset is an extension to an original cabin from 1800. It is located on the shore of the lake Övre Gla in the nature reserve Glaskogen in Sweden. The structure is

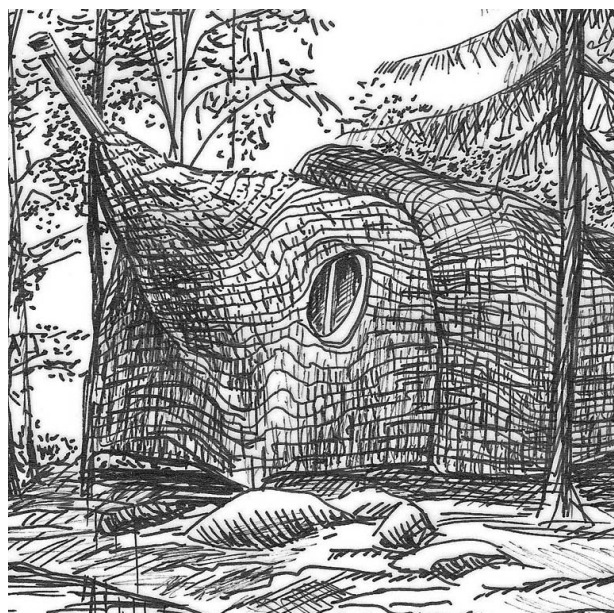


Fig. 1. Dragspelhuset, Glaskogen, Sweden, design 24H Architecture, 2004 (draw by Barbara Widera.)

Il. 1. Dragspelhuset, Glaskogen, Szwecja, proj. 24H Architecture, 2004 r (rys. Barbara Widera)

<sup>1</sup> Commonly used assessment systems are e.g. the American LEED® <http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>, the Japanese CASBEE [http://www.acronymfinder.com/Comprehensive-Assessment-System-for-Building-Environmental-Efficiency-\(Japan\)-\(CASBEE\).html](http://www.acronymfinder.com/Comprehensive-Assessment-System-for-Building-Environmental-Efficiency-(Japan)-(CASBEE).html), or the British BREEAM, <http://www.breem.org>, 23.10.1010.

almost completely covered with cedar wood. The planks were cut into small pieces which allowed smooth covering of the rounded shape which that causes the object to literally blend in with the surrounding forest background. Double wooden walls create a good thermal insulation. The status of zero-energy building has been achieved by a combination of solar energy and conventional techniques such as three wood stoves, which also fuel the water heating system. Reindeer hides covering the living area provide an extra insulation. A compost tank is located outside the house. Carbon dioxide emission is at a minimum level. A nearby stream is used as a source of fresh water while harvested rain water is used for sanitation purposes [5, p. 23].

### **Objects based solely on eco-friendly technologies, blended in with the landscape with the emphasis on modern pro-ecological solutions**

Currently the majority of realizations in this category are prestigious and very individually treated objects. They are designed with the thought of incorporating highly advanced technologies in order to minimize the negative impact on natural environment: from obtaining materials until the final stage of the building use (including dismantling and utilization).

At the competition project of Bird Island in Sentul Park, Kuala Lumpur, Malaysia (in 2009) GRAFT Lab architects took care of a creative design, based on idea of blending indoor and outdoor using natural ventilation, solar and wind energy<sup>2</sup>. A group of dwellings were set on stilts due to the immediate proximity of a lake and in order to minimize the footprint of the building on the ground. Great care to preserve the existing flora was taken, mostly to protect birds' nests in the reserve area. Most building materials were obtained from recycling or renewable resources. Stone and bamboo provided the interior with the natural look. The use of bamboo wood for openwork tent-like constructions does not exclude contemporary appearance. Obtained dynamic structures create an expressive and unique image (Fig. 2).

FXFowle Architects are famous for their environmentally friendly projects. The SAP Americas Headquarters project, Newton Square, Pennsylvania, (2008–09) achieved LEED Platinum certification in 2010. Similarly to the previous example, it uses wind and sunlight as the sources of energy. During the night, when energy demands are the lowest, a hybrid air-conditioning system produces ice utilised to cool the building during the day. A green roof makes a good thermal insulation. Harvesting and storing of rainwater helps to save fresh water. Further water usage reduction in the building is possible thanks to simple solutions such as e.g. waterless urinals or two-level toilet flush systems. The building is equipped with geothermal heat pump. Efficient heating or cooling is provided by the radiating floor with individualized radiant tubes. In order to optimize the temperature and the

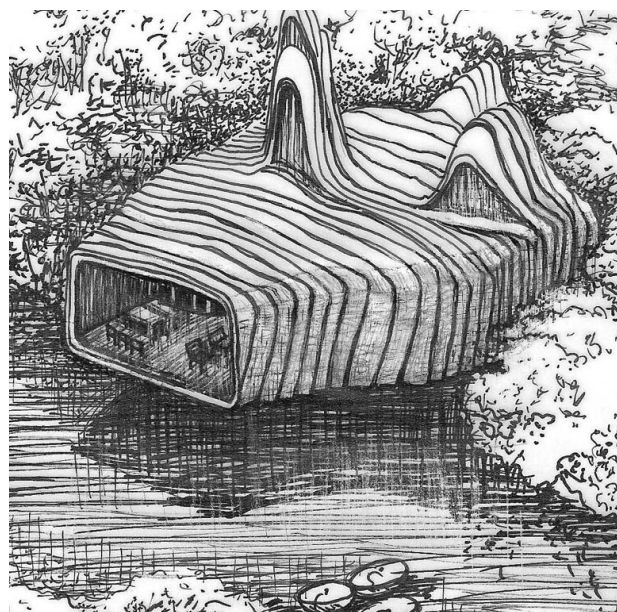


Fig. 2. Bird Island, Sentul Park, Kuala Lumpur, Malaysia, design GRAFT, 2009 (draw by Barbara Widera)

Il. 2. Bird Island, Sentul Park, Kuala Lumpur, Malezji, proj. GRAFT, 2009 r (rys . Barbara Widera)

amount of incoming daylight, external blinds with automatically adjusted angle have been integrated with sensors inside the house, which send the information about current conditions. The building has highly efficient curtain walls with triple glazing. The green on the roof and a soft elevation line give the construction a friendly look seamlessly integrating it with the surroundings, in which the existing forest stand has been preserved. However, the authors point out the fact that the construction, built outside the existing communication infrastructure, is not completely friendly for the environment because it requires an additional transportation system to be created. Hence, the suggestion to choose locations in large city centres so as to enable people to use public transport.

### **Large-scale prestigious objects located in city centres, utilising the existing infrastructure, expressly showing modern construction and technological solutions**

The third group of objects is usually associated with stately headquarters of corporations having a budget at their disposal which enables location in the centres of big cities, where the existing transport network can be used. Most up-to-date construction and technological solutions seem quite appropriate in this case. Among the projects realized in the last few years, the following deserve special recognition: New York Times Building (completed in 2007, designed by Renzo Piano) and SIEEB (Sino-Italian Ecological and Energy Efficient Building) in Beijing (completed in 2007, designed by Mario Cucinella Architects). One of the most distinctive is Hearst Headquarters, erected in 2006 in New York according to the design by Norman Foster. The elevation of the six-storey base has been preserved as the remains of Hearst's first completed edifice, designed by Joseph Urban in 1928. The interior has been remodelled in order to create an open atrium. The diagonal

<sup>2</sup> The heat pumps provide 100% renewable energy; the building was nominated for LEED Platinum Certification. Uffelen C., op. cit., p. 27

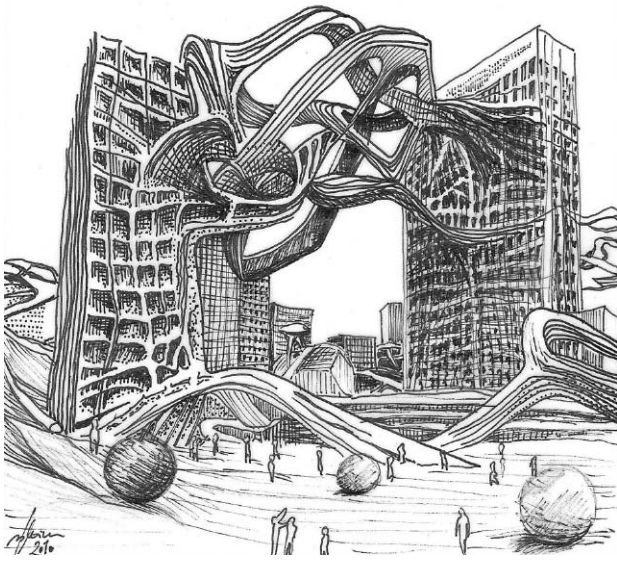


Fig. 5. MEtreePOLIS, design Matthias Hollwich i Mark Kushner (HWKN), 2007 (draw by B. Widera)

Il. 5. MEtreePOLIS, proj. Matthias Hollwich i Mark Kushner (HWKN), 2007 r (rys. B. Widera)

pattern of the office space, which starts at the 10<sup>th</sup> floor, allowed to save 20% of steel, 80% of which came from recycled sources. Below, the structure is supported by huge pylons seen from the outside. The floor here is paved with heat conducting limestone. Polyethylene tubing is embedded under the floor and filled with circulating water for cooling or heating. Air-flow inside the tower is utilised to provide energy. Rainwater collected on the roof is sent to a tank in the basement and then reused for cooling of the building, fuelling the Icefall in the atrium, irrigating the green roof and plants inside. The water, cascading down the glass plates of monumental sculpture designed by James Carpenter cools and humidifies the lobby. The air-conditioning installed on the office floors does not emit any substances harmful to ozone layer. Its operation is controlled by a system of sensors detecting human presence inside the rooms. During work breaks the same sensors turn off computers and lights. The glass facade has been coated with Low-E coating which lets the light in and provides good thermal insulation. The whole building has been equipped with fibre optic data transmission system, Wi-Fi and video distribution system. In order to utilise the existing transportation network, a special new connection with the underground has been organised. The building is accessible for persons with disabilities. No paints, furniture or finishing components containing chemical substances hazardous for health or environment have been used. The Hearst Headquarters has achieved LEED Golden Certificate.

### **Visionary designs incorporating greenery as an architectural component, denoting predominance of nature over technology**

Apart from an increasing number of constructions addressing environmental protection issues there are projects, which might be referred to as visionary and, in a

way, setting new trends in architectural design. From among the ones presented here, these are, in most cases, the most costly propositions. The opponents may accuse them of a slightly too unbridled fantasizing and disregard for economic aspects. The proponents emphasize that this is a very limited offer. The aesthetic qualities are convincing enough for an average viewer and the boldness of architectural form helps to propagate eco-consciousness and stimulate discussions not only in the professional circles.

Only Merely some of the projects belonging to this group come to life. Multifunctional skyscraper Solaris in Singapore, designed by T. R. Hamzah & Yeang and scheduled for completion in 2010, is one of them. By introducing the greenery (9000 m<sup>2</sup> altogether) interweaving with architecture set in a characteristic spiral landscape, the project very suggestively reflects the author's pro-ecological orientations. Apart from cascadingly arranged gardens stretching from the rooftop to as far as One - North Park, the building has a monumental atrium lit by daylight and used for natural ventilation. The system of water recycling supports plant irrigation. In order to minimize direct sunlight exposure, sun-shading louvers have been used as well as low-e double glazing facades.

A similar although more radical idea of architecture and greenery coexisting together has been put forward by Michael Sorkin in his project Penang Peaks (2004) [4]. Other architects tend to cover the whole structures with plants not only for aesthetic reasons and oxygen production but seeing it also as a source of energy. Luigi Centola is working in Vallo di Viano in Italy on Biovallo project [1]. The central building of the complex - the zero-energy Innovations Pavilion - will be covered with bioplastic transparent pulp containing an algae culture fed by harvested rainwater. The algae will transform sunlight and carbon dioxide into electric energy [3]. Besides, the construction will utilise solar, wind and water energy.

The most uncompromising architectural and urban visions include concepts of cities of the future in which traditional communication network will disappear replaced by e.g. the global GPS system capable of highly precise location of all vehicles in real time<sup>3</sup>. Matthias Hollwich and Mark Kushner (HWKN group) in their project MEtreePOLIS (2007) describe the city of the future, or rather a biostructural system in which buildings, grown from appropriately genetically modified plants, take the role of energy producers instead of consumers such as they are today (Fig. 3).

Regardless of how complex or advanced the designs, for modern architecture it is becoming a very important aspect to provide its users with contact with nature and healthy living conditions. Human needs, however, should not dominate over the needs of the environment. The ideas of sustainable development are considered as being of crucial importance for the survival of Earth and its inhabitants. Numerous examples of projects realized by various architects representing different styles show the advantage of ethics understood in this way over aesthetics seen individually.

<sup>3</sup> Cf. Hollwich M., Kushner M., MEtreePOLIS, www.hwkn.com, 23.08.2010.

### References

- [1] Centola L., <http://www.centolaassociati.it>, 23.08.2010
- [2] Hollwich M., Kushner M., METreePOLIS, [www.hwkn.com](http://www.hwkn.com), 23.08.2010
- [3] Melis A., Happe T., Hydrogen Production. Green Algae as a Source of Energy, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1540156/pdf/hw0740.pdf>, 23.08.2010
- [4] Sorkin M., <http://sorkinstudio.net/projects.htm>, 23.08.2010
- [5] Uffelen C., Ecological Architecture, Braun Publishing AG, Berlin 2009
- [6] Wines J., *Zielona Architektura* (English: *Green Architecture*), eds. Jodidio P., Taschen, Kolonia 2008, Polish edition Warsaw 2008
- [7] [http://www.acronymfinder.com/Comprehensive-Assessment-System-for-Building-Environmental-Efficiency-\(Japan\)-\(CASBEE\).html](http://www.acronymfinder.com/Comprehensive-Assessment-System-for-Building-Environmental-Efficiency-(Japan)-(CASBEE).html)
- [8] <http://www.breeam.org>, 23.10.1010
- [9] <http://sitewyork.com/projects/tac/tac01.htm>, 23.08.2010
- [10] <http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>

### *Idea ponad stylem. Architektura przetrwania*

Przełom XX i XXI wieku to okres powszechnego zainteresowania problemami ochrony środowiska naturalnego. Rozwój technologii oraz programów wspomagających projektowanie przyczyniły się do przesunięcia granic możliwości architektury. Obecnie wyznacza je głównie wyobraźnia projektanta. Jednocześnie daje się zauważyć zacieranie niektórych, dotąd wyraźnych różnic pomiędzy współczesnymi nurtami architektonicznymi. Niezależnie od reprezentowanych postaw filozoficznych twórcy coraz częściej sięgają po rozwiązania ujawniające tro-

skę o rozsądne gospodarowanie zasobami naturalnymi, materiałami konstrukcyjnymi i energią. Ogromnie ważne staje się zapewnienie użytkownikowi kontaktu z naturą i zdrowych warunków życia. Potrzeby człowieka nie mogą przy tym dominować nad potrzebami przyrody. Idee zrównoważonego rozwoju są uznawane za kluczowe dla przetrwania Ziemi i jej mieszkańców. Szereg obiektów realizowanych przez architektów związanych z różnymi stylami prezentuje przewagę tak rozumianej etyki nad estetyką, pojmowaną indywidualnie.

**Key words:** limits of architecture, sustainable development, ethics and aesthetics

**Słowa kluczowe:** granice możliwości architektury, zrównoważony rozwój, etyka a estetyka