

**DAYLIGHT &
ARCHITECTURE**
MAGAZINE BY
VELUX

AUTUMN 2007 ISSUE 06 **FRAMING DAYLIGHT** 10 EURO

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**FRAMING
DAYLIGHT**

VELUX®

DISCOURSE BY KIM DIRCKINCK- HOLMFELD

Kim Dirckinck-Holmfeld is an architect and one of the most renowned architecture critics in Denmark. He was editor of the Danish specialist magazines *Arkitekten* and *Arkitektur DK* for many years, and is the author of numerous books about architecture.

FORM AND IMPRESSION

At the VELUX Daylight Symposium in Bilbao in the spring of 2007, the insight into how America treats its children gave particular cause for reflection. In California, pupils are forced into derelict, shabby, unattractive rooms with no daylight. You don't need to be a professor of psychology to realise that depressing environments of this kind, with a complete absence of experience, lead to problems with unhappy and maladjusted children. The atmosphere is evidence of a lack of welfare provision that appears to be contagious. It is not surprising that the performance and happiness of the children improves by up to 25% when daylight is let into the rooms (as architect and researcher Lisa Heschong discovered) – and, importantly, through windows that the children are able to see out of. Lisa Heschong's research has produced clear evidence that daylight and a view are imperative for physical and mental health.

But what about all the other factors that contribute to a complete spatial experience?

How does our environment affect us? The town, the building, the room, the landscape – even the last is designed by humans. When it comes down to it, our entire environment is the work of humans. But is it also humane?

Space plus form equals impressions. But how are they created? We know very little about this, and science can help us little in understanding more about it. There are too many factors that work together here. We need to develop different methods to ensure that architects and builders build for people instead of jumping on the next mega-trend in the international flying circus of architecture.

There is not enough research that is able to qualitatively analyse building environments and consequently provide support for planners and constructors. There are various approaches to this, but there is no real research carried out about the mental and emotional effects of architecture. At least we do know something about human behaviour in different types of urban space and under different climatic and cultural conditions. Among others, architect Jan Gehl and a network of urban researchers addressed this subject, and for a generation, it has been one of the basic principles for avoiding social planning errors. Even if, in building projects, many other objectives often elbow this information out, there are also already certain guidelines for humane urban development based on a behaviouristic approach. But we still know little about what exactly goes on inside people.

In many ways, architecture has become removed from its origins, in other words, the intention of creating a stimulating framework for human life. Moving in time with technological development (and assisted by helpful computers) we are faced increasingly with newer, more fantastic and seductive designs, that sprinkle a builder's glittering magic dust over projects. But what is it really like living and being in these phantasms that express more what we can do than what we actually want?

The architect's responsibility is still to create a humane, healthy, sustainable and life-affirming space for the lives that flow through the channels of architecture.

**VELUX EDITORIAL
FRAMING DAYLIGHT**

"Light is a drug that stimulates the production of serotonin, dopamine and gamma-aminobutyric acids in the human body, enhancing impulse control, motivation, muscle coordination, calmness and focus," says Lisa Hescong, who led a project team that analysed the impacts of daylighting on human performance, and gave a lecture on this issue at the second VELUX Daylight Symposium in Bilbao.

Studies show that daylight considerably affects motivation and the ability to concentrate. And daylight and an outdoor view stimulate the learning ability of school pupils in the classroom. Sunlight is vital for human health and well-being. Sunlight can help cure diseases like tuberculosis and rickets, speed up the healing of wounds and even relieve pain. Significantly more people contract diseases due to lack of light in their lives than people who

get skin cancer due to too much sun. From ancient times it has been known that sunlight has a disinfectant effect on surfaces and clothes, and the healing effect of sunlight, fresh air and hygiene has been known in sanatoria for almost 100 years.

The history of sunlight and health is told by Richard Hobday, who, in his article, discusses the contributions of the ancient Egyptian priest and master builder Imhotep, the British nurse Florence Nightingale, the Danish physicist and Nobel Prize winner Niels Finsen and Le Corbusier, who all knew about the relationship between sunlight and health.

In our days, not only sanatoria, hospitals and thermal baths take care of people's well-being. 'Wellness' has become a mass phenomenon of providing well-being and relaxation by means of light, heat and water in countless variations. A good example of this is the new spa designed by Behnisch Architekten, Bad Aibling in Upper Bavaria. They created a spacious spa landscape focusing on views of the surrounding area.

Daylight and an outdoor view stimulate the children's learning abilities at the special school in Schwechat near Vienna, designed by architects fasch&fuchs. The new primary school in Kingsmead in the north of England, designed by Craig White, is not only an ideal learning environment

for schoolchildren, offering a great deal of daylight and fresh air, but also an opportunity to provide the pupils with hands-on experience and knowledge about sustainable building and sustainable choices of lifestyle. This is a vital aspect for White Design, a company committed to designing buildings for human beings rather than, as they put it, places for machines to live in.

The importance of daylight to architecture and people's quality of life is a keystone in the founding of our company. "Bringing light to life" is our philosophy in everything we do linking natural resources with human needs. Therefore we find it essential to explore and illustrate how daylight can contribute to and enhance human health, learning and productivity. With this issue of Daylight and Architecture we focus on how outdoor and indoor climates, views and most notably daylight can substantially effect our lives. Through the frames of daylight.

Enjoy your read.

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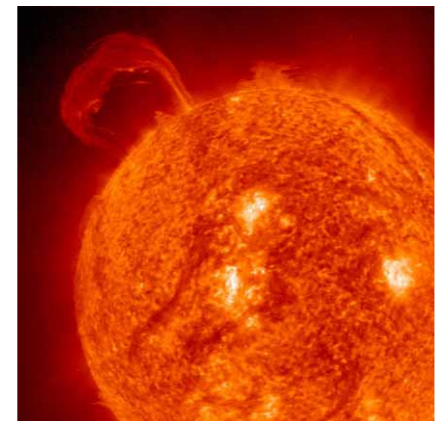
NOW

Jean Nouvel's planned new Louvre building in Abu Dhabi stands out due to its filigree cupola – as well as his masterful renderings. Video stills adorn the colourful facade of the Netherlands Institute for Sound and Vision in Hilversum, greetings to the bereaved, the plastic-film cupola in the Atocha memorial in Madrid. Also: The retrospective of a master photographer in Düsseldorf.



**4 MANKIND AND ARCHITECTURE
LIGHT AND LIFE FROM THE SUN**

Many people do everything they can to avoid exposure to the sun; the fear of sunstroke and the unhealthy effects of UV light are simply too deeply engrained. Any yet, even in times of global warming, sunlight is one of the best things that nature has to offer to the human body. Richard Hobday explains why, and what consequences this could have for architecture.



**REFLECTIONS
34 ZONNESTRAAL
SANATORIUM**

The Zonnestraal sanatorium in Hilversum is the perfect embodiment of the ideals associated with architectural modernism in respect of light, hygiene and health. The building designed by Jan Duiker, Bernard Bijvoet and Gerko Wiebenga was the expression of a medical and architectural attitude which still took the sun seriously as a lasting source of life.



**DAYLIGHTING
40 HOME AWAY
FROM HOME**

Approximately 80 disabled children, many of them with multiple disabilities, attend the special school in Schwechat near Vienna. The building created by architects fasch&fuchs establishes a balance between the imperatives of protecting the children and allowing them to make contact – not only with other pupils but with nature outside the building. Entering the building through the numerous windows, natural daylight illuminates the interior and penetrates right down into the basement.



**VELUX DIALOGUE
56 MORE LIGHT**

Architects and light planners have rediscovered their appreciation of daylight. But the complexity of the matter still makes many of them wary of dealing with the issue intensively and in depth. During the second VELUX Daylight Symposium in Bilbao, projects were presented as examples and new solutions aimed at facilitating daylight planning were discussed.



**VELUX INSIGHT
48 LEARNING THROUGH
LIGHTNESS**

With their primary school in Kingsmead, a town in the north of England, White Design created an outstanding example of how to build a sustainable construction as a learning environment. With its very dynamic roof construction, the wooden building is not only based on modern technologies which save energy and raw materials but also allows the schoolchildren to experience these features. Daylight plays an important role in this, ensuring a pleasant learning climate and enabling the school to make substantial energy savings.

The things that make architecture tick: events, competitions and selected new developments from the world of daylighting.



PHOTO: DARIA SCAGLIOLA & STUMBRACKEE

A FLICKERING FACADE OF FILM

Henri Matisse meets Nam June Paik – these or similar associations are those evoked by a first look at the Netherlands Institute for Sound and Vision in Hilversum. And the thought of Korean video artist Paik, at least, sums things up pretty accurately: the Dutch artist Jaap Drupsteen used 748 stills from the films stored in the four underground levels of the building for his facade concept. The Institute for Sound and Vision houses an archive of all the audio and visual materials it receives from Dutch radio and television history. In its seven upper floors the building, which was designed by Neutelings Riedijk Architects, offers room for offices, a museum and a multimedia library. The above-ground and underground sections of the building are connected via a cruciform plenum: looking north-south, the eyes drift upwards the atrium; looking east-west, a chasm-like light well falls away right down to the fourth underground level. The facade and front entrance of the building faces south, allowing the afternoon light to penetrate and illuminate the foyer in an almost magical way.

The Institute's facades are a joint project of Neutelings Riedijk, Jaap Drupsteen and glass-maker Saint-Gobain, who commissioned a new production line especially for the manufacture of the required panes of glass – more than 2,100 in all. The film stills were transferred onto the panes using a recently developed digital printing process with ceramic inks. In a second step, the blank side of the glass panes was engraved with a relief of the same image, so that all 748 images can be seen on both sides of the glass – sometimes in two dimensions, sometimes in three. The reliefs were first milled as negative moulds made of MDF, then given a ceramic coating before finally serving as moulds for the viscous glass at temperatures of 820 degrees.

LOUVRE WITH A LACE CAP

If one is to believe Sheikh Khalifa bin Zayed Al Nahyan, ruler of Abu Dhabi, the largest of the seven United Arab Emirates is set to become one of the world's foremost cultural metropolises over the next ten years. In early 2007, the desert state presented plans for four prestigious cultural projects to the public: an offshoot of the Guggenheim Museum, the Saadiyat Performing Arts Centre, a maritime museum and a museum of classical art. All four establishments are to be based on the 27 square kilometre Saadiyat Island, in English: the Island of Happiness. The list of the architects leading the projects reads like a Who's Who of world architecture: the Guggenheim Abu Dhabi is

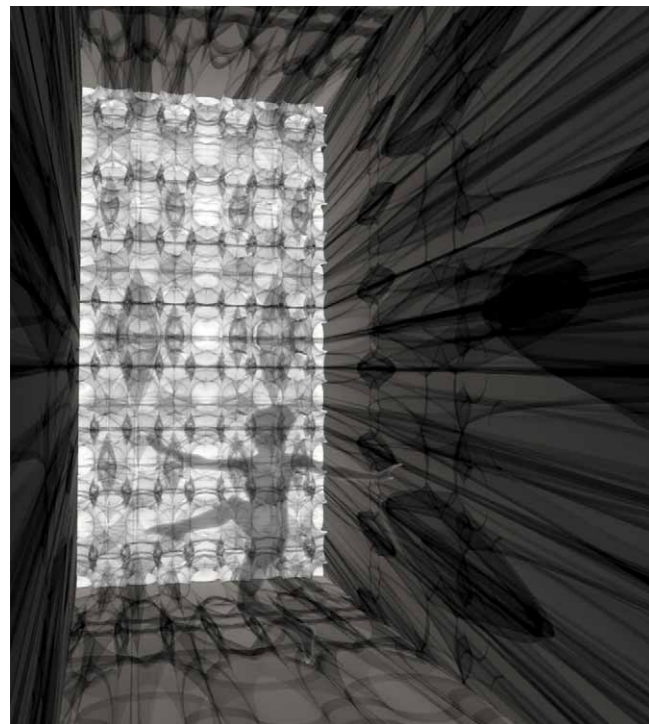
the responsibility of Frank Gehry; the Performing Arts Centre is being planned by Zaha Hadid, and the Maritime Museum bears the hallmarks of Tadao Ando's work. For the Museum of Classical Art, the Emirate has engaged Paris-based architect Jean Nouvel – and one other high-profile partner from France: Abu Dhabi has paid around EUR 700 million for the privilege of giving the completed building the name Louvre Abu Dhabi. Moreover, France has pledged to supply this desert outpost with works of art from the Louvre Paris for its first ten years of existence.

Jean Nouvel's design is a study of the museum's location, between desert and sea: just beyond the pre-

vious coastline, a complex of small buildings – museum pavilions, open terraces and water basins – is starting to emerge. This complex will be crowned by a broad, flat dome with a diameter of some 180 metres which, according to Jean Nouvel, represents a link between the world cultures. The dome "is made up of a web of different patterns interlaced into a translucent ceiling which lets a diffuse, magical light come through in the best tradition of great Arabian architecture". The presence of water and the constant sea breeze should make for a pleasant climate underneath the dome.



RENDERINGS: ATELIER JEAN NOUVEL



GRAPHICS: SANGWON PARK, HONORABLE MENTION IN INTERNATIONAL VELUX AWARD 2006, PROJECT NO. 369.

THIRD LIGHT OF TOMORROW

On 1 October, the third International VELUX Award for students of architecture, Light of Tomorrow, opens. The Award event runs every second year, with the first being held in 2004. It is targeted at students and teachers at schools of architecture all over the world. The Award is intended to encourage and challenge students of architecture to explore the theme of sunlight and daylight in its widest sense in order to create a deeper understanding of this source of light and energy. The IVA seeks to explore the boundaries of daylight in architecture, including aesthetics, functionality, sustainability, and the interaction between buildings and environment. The Award is not restricted to the use of VELUX products.

The concept of the Award is that teachers nominate student projects completed during the academic years 2006/07 and 2007/08. An internationally acclaimed jury will evaluate all the submitted projects on the criteria of conceptual idea, experimental thinking and critical discussion and will award a total sum of €30,000 to the winning students and teachers. The jury consists of acclaimed professionals including

practicing architects and representatives from UIA and EAAC and the students must submit their projects before 8 May 2008. All submitted projects will be exhibited at the XXIII UIA World Congress of Architecture in Turin in summer 2008.

The jury members in 2004 were Glenn Murcutt, Craig Dykers, John Pawson, Ole Bouman, Ahmet Gülgönen, James Horan and Michael Pack; in 2006, Kengo Kuma, Róisín Heneghan, Omar Rabie, Douglas Steidl, Per Olaf Fjeld and Massimo Buccilli. The jury members for the 2008 Award are currently being appointed. Jury evaluation will take place in June 2008, and VELUX will announce and celebrate the winners at an award event in November 2008 to which the winning students will, of course, be invited. Previous Award events were held in Paris and Bilbao where the winning students and their teachers had the opportunity to meet the jury members and other representatives from the international community of architects and building professionals. Read more at www.velux.com/IVA.



PHOTO: ENRICO CANO

TURIN FIRMAMENT

In Italy's automobile capital Turin, there is much at the start of the new millennium that heralds the end of one era and the beginning of a new one. One of the epicentres of renovation in the city is located in its north-west quarter. Once dominated by the furnaces and mills of heavy industry, in the years to come the area is earmarked for the development of housing for 15,000 people. For Turin Cardinal Severino Poletto, this was reason enough to give the new quarter a religious hub as well. With Mario Botta, he commissioned one of the most prominent church architects of our time to design a new church building, conference hall and community centre with a 700-person capacity for the quarter.

Santo Volto church stands on the site of what was once a steelworks belonging to the Fiat Group. Its 60-metre high chimney is now a church tower and provides a distinctive landmark for the new church which can be seen for miles around. Around the outside of the tower winds a helix made of high-grade steel with horizontal 'thorns' designed to be reminiscent of Christ's crown. A metal cross at the top provides the finishing touch.

The church building itself is also highly symbolic, with the sacred number seven playing the central role. The church is constructed in seven elements, each 35 metres in height, arranged like slices of a cake and that come together around a central hollow cylinder, like the keystone of a church vault. The seven 'towers' are open to the interior of the church below and glazed to reveal the sky above; their skylights, set at a 45 degree inward angle, allow abundant daylight into the church interior. Outside, the towers are flanked by a corona of side chapels, which for their part are supplied with daylight through lower-level roof openings reminiscent of light shafts. The inclined roof areas between the towers are faced with maplewood; the side walls and floor of the church, on the other hand, are surfaced with red Veronese marble. From the doorway, the eye is immediately drawn to the church's altarpiece: a rasterised image of the Shroud of Turin. In order to achieve the desired effect, the architects used stones with two different types of surface that converge in the sidelights to form the face of Jesus.



PHOTO: ROLAND HALBE

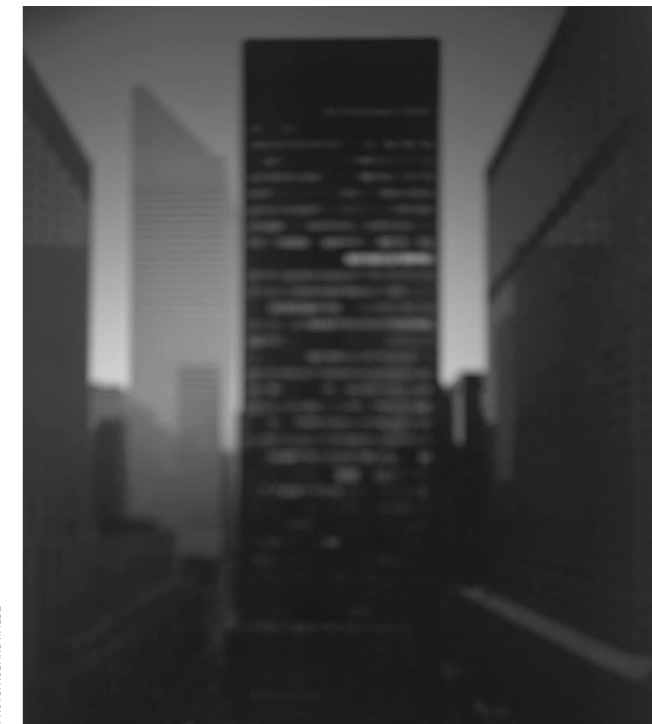
THE BLUE VOID

On 11 March 2004, exactly two and a half years after the attacks on the World Trade Center in New York, ten bombs went off during morning rush hour at Madrid's Atocha station. 191 people were killed and 1,800 injured; in the days that followed, thousands of Madrid's residents and tourists left messages of condolence at the site of the bombings and on the Internet. A selection of these now adorns the interior dome of the monument erected for the victims, which was unveiled on the third anniversary of the attacks: one example reads "Hace falta mucha fantasia para soportar la realidad (A great deal of imagination is needed in order to bear reality)". And the five young architects from the Estudio FAM 2003 practice certainly proved their capacity for imagination when they won the competition to build the memorial. Their renderings showed an irregularly curved glass dome in whose interior the inscriptions seemed, in some mysterious way, to be floating.

In its execution, the dome may have lost its extravagant shape, but it has in no way lost its apparent weightlessness – and this despite weighing a good 160 tonnes. Its outer shell, an 11-metre high glass cylinder,

was constructed from 15,000 imbricate bricks, each measuring 30x20x7 centimetres and made of solid, colourless glass. The bricks are self-supporting and were joined together using acrylic adhesive. Inside the glass cylinder hangs a bell-shaped interior dome made of ETFE foil, upon which the messages received from all over the world in the wake of the bombings have been imprinted. The tautness of the foil dome is maintained by a series of fans which create a constant vacuum between the two shells and thus "suck" the foil upwards.

The memorial can be visited via the Atocha underground station: from here, the visitor can gain access to an austere blue space extending over almost 500 square metres, the "vacío azul" (blue void), as it is called by the architects. Estudio FAM associates a certain claim to eternity with its structure: the intention is for future generations to be able to read the messages of the mourners too. Whether the unusual structure, which has never yet been tested on such a scale, will be able to deliver on this score remains to be seen.



HIROSHI SUGIMOTO: REPROGRAM BILLOWING; 1997; SILVER GELATINE PRINT, 149.2 X 119.4 CM. PRIVATE COLLECTION (ARCHITECT: LUDWIG MIES VAN DER ROHE)

HIROSHI SUGIMOTO: RETROSPECTIVE IN DÜSSELDORF

Continuing until 6 January 2008, the Kunstsammlung Nordrhein-Westfalen art museum in Düsseldorf is currently showing a retrospective of the work of Japanese photographer Hiroshi Sugimoto. Born in 1948, the artist, who has been living in the USA since 1970, is one of the most important photographic artists alive today. In his great, incredibly detailed large-format photos – mostly rendered in black and white – Sugimoto deals with subjects such as time and memory, reality and representation. Using extremely long exposure times, masterful use of light and selective soft focus, he is able to portray reality in a way never before perceptible to the human eye. Sugimoto's rise to fame started in the mid-1970s with his Theaters series; long-exposure images of movie theatres and drive-ins. The exposure of the film in the camera lasted as long as the film on the screen, thus allowing a single photograph to show the sum of all the details of the film, which – how could it be otherwise – blend together to form a dazzling white square.

In the Architecture series (1997 onwards) Sugimoto creates alienated images of much-photographed icons of modern architecture by a

targeted use of soft focus. Although the images are stripped of all detail, the buildings remain recognisable, but other aspects come to the fore: reflections of the sunlight, the texture of a cloudy sky, or dramatic contrasts of light and shade on the buildings' surfaces.

In his latest series, Sugimoto remains a devotee of representational photography; however, his subjects are becoming even more reductive. In Colors of Shadow, a series of colour photographs of an unfurnished Tokyo apartment, Sugimoto explores the interplay of light and dark, surface and space created by the daylight falling on the abstract white walls. The Conceptual Forms series shows plaster representations of mathematical models from the Tokyo University collection, which Sugimoto elevates to the status of abstract sculptures through effective use of lighting.

The Düsseldorf exhibition is the first stop on a tour which will take in three further stages. It comprises nine series of works as well as, at the centre of the exhibition, Sugimoto's aluminium sculpture, Onduloid.

LIGHT AND LIFE FROM THE SUN



PHOTO: JOE MCNALLY / GETTY IMAGES

By Richard Hobday

Kept to within reasonable limits, direct sunlight is the best thing that nature can do for our health. Some of its effects have been known for thousands of years. This makes it all the more astonishing that physicians and architects have long reacted to this knowledge with ignorance or rejection. And, all too often, this reaction remains unchanged.

MEDICAL PRACTICE has often had a direct and very profound influence on the development of architecture; and nowhere is this more evident than in the guiding principles of the Modern Movement. The ideas which first informed Modernism were formulated at a time when the building professions were in the vanguard of a battle against tuberculosis. Throughout Europe, hundreds of thousands of people were dying each year from the 'white plague', which, although in retreat, was still taking more lives than smallpox, typhoid, scarlet fever and all the other infectious diseases of the era combined. Many of the pioneers of modern architecture were involved in the construction of tuberculosis sanatoria. They were familiar with the medicine of their day and sometimes worked alongside doctors who used sunlight to cure their patients.

In 1903, the Nobel Prize for medicine was awarded to Dr. Niels Finsen, the Danish physician and scientist who discovered that ultraviolet radiation could heal Lupus Vulgaris, a form of tuberculosis thought to be incurable. Finsen's Nobel Prize followed the discovery by two British scientists in 1877 that the sun's rays could kill bacteria, and could do so having passed through glass. Their work prompted other scientists to investigate the effects of exposing bacteria to the sun's rays, and it was not long before sunlight was being hailed as 'nature's universal disinfectant' and an important weapon in the fight against infectious diseases. Sunlit rooms were held to be hygienic, while those that did not admit the sun's rays were not. Architects began designing hospitals with large south-facing windows to admit direct sunlight and prevent the spread of tuberculosis and other pathogens. They built terraces and balconies where patients with tuberculosis could be exposed to the sun under medical supervision, a practice which became known as heliotherapy.

During the First World War, military surgeons used the sun's rays to disinfect and heal the wounds of casualties on both sides of the conflict. Then in 1921, medical researchers proved that sunlight could cure rickets, a crippling bone disease that had been endemic in England, and elsewhere, for nearly 300 years. The discovery of the sanitary and then the therapeutic properties of sunlight brought about by Finsen and others had a marked effect on building design from the

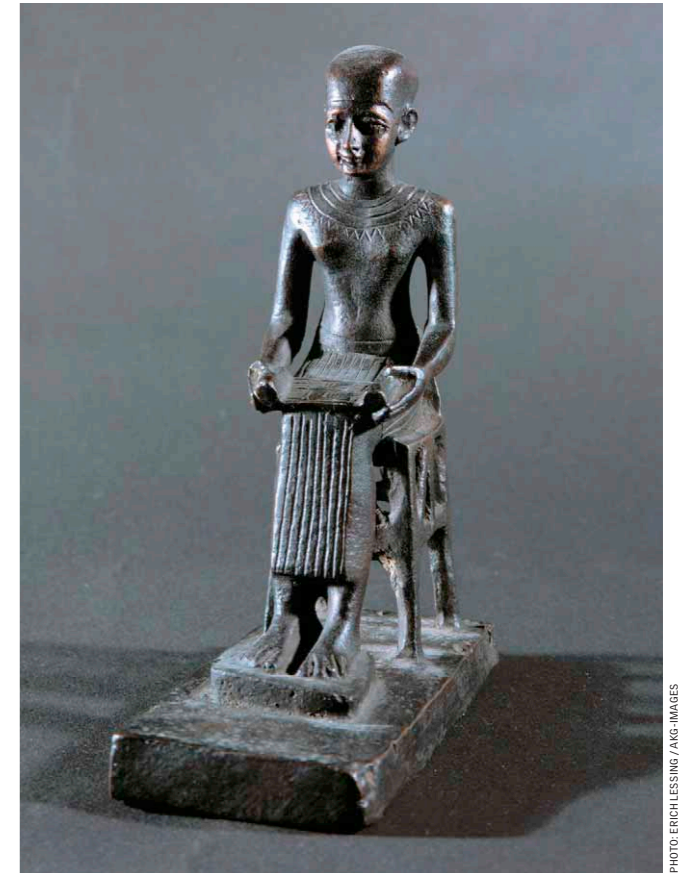


PHOTO: ERIC LLESSING / ANG-IMAGES

Opposite: Iris of a human eye. The fact that bright light has a positive effect on the human psyche has been known for a long time. The receptors in the eye which responsible for this, however, were not discovered until 2002.

Above: Imhotep is regarded as the first master builder to be known by name in human history. But Imhotep was also an early all-round scholar. He was an astronomer, doctor and priest of the ancient Egyptian cult of the sun and thus personifies the link between the sun, architecture and medicine.



Left: Florence Nightingale (1820-1910) is regarded as the pioneer of modern nursing. Her example inspired her admirers, who included Henri Dunant, to found the Red Cross. In her books 'Notes on Nursing' and 'Notes on Hospitals' in the middle of the 19th century, she pointed out the antibacterial and healing effects of sunlight.

Below: Our genes also determine how we react to sunlight; this varies from person to person. Scientists even assume that the tendency to suffer from skin cancer depends more on the genes than exposure to sunlight.

turn of the century onwards. In his influential manifesto The Athens Charter, Le Corbusier proclaimed that:

“To bring in the sun, that is the new and the most imperative duty of the architect.”

In fact, there was nothing new about it. Throughout the ancient world, architects and engineers built for the sun. They undertook much of this work to facilitate sun worship and mark the sun's path through the heavens. They also appreciated that sunlit buildings could prevent disease. Nearly five thousand years ago, work began on Egypt's first pyramid; the Step Pyramid at Saqqara, near Memphis. The architect in charge was also a doctor, and the high priest of an Egyptian solar cult.

Today, Imhotep is remembered as the master-builder of one of the world's great monuments; but he also personifies the historic link between the sun, architecture and medicine. The ancient Egyptians worshipped the sun for its healing powers and used sunlight as a medicine. The Ebers Papyrus, one of the oldest surviving Egyptian medical texts, recommends it. Some of the most distinguished doctors in Greece, Rome and the Arabic world practised sunlight therapy. The Romans built solaria where they could sunbathe for health, and their best villas, baths and health temples were carefully oriented for the sun. Indeed, the citizens of Imperial Rome considered sun exposure so important they had right-to-sunlight legislation.

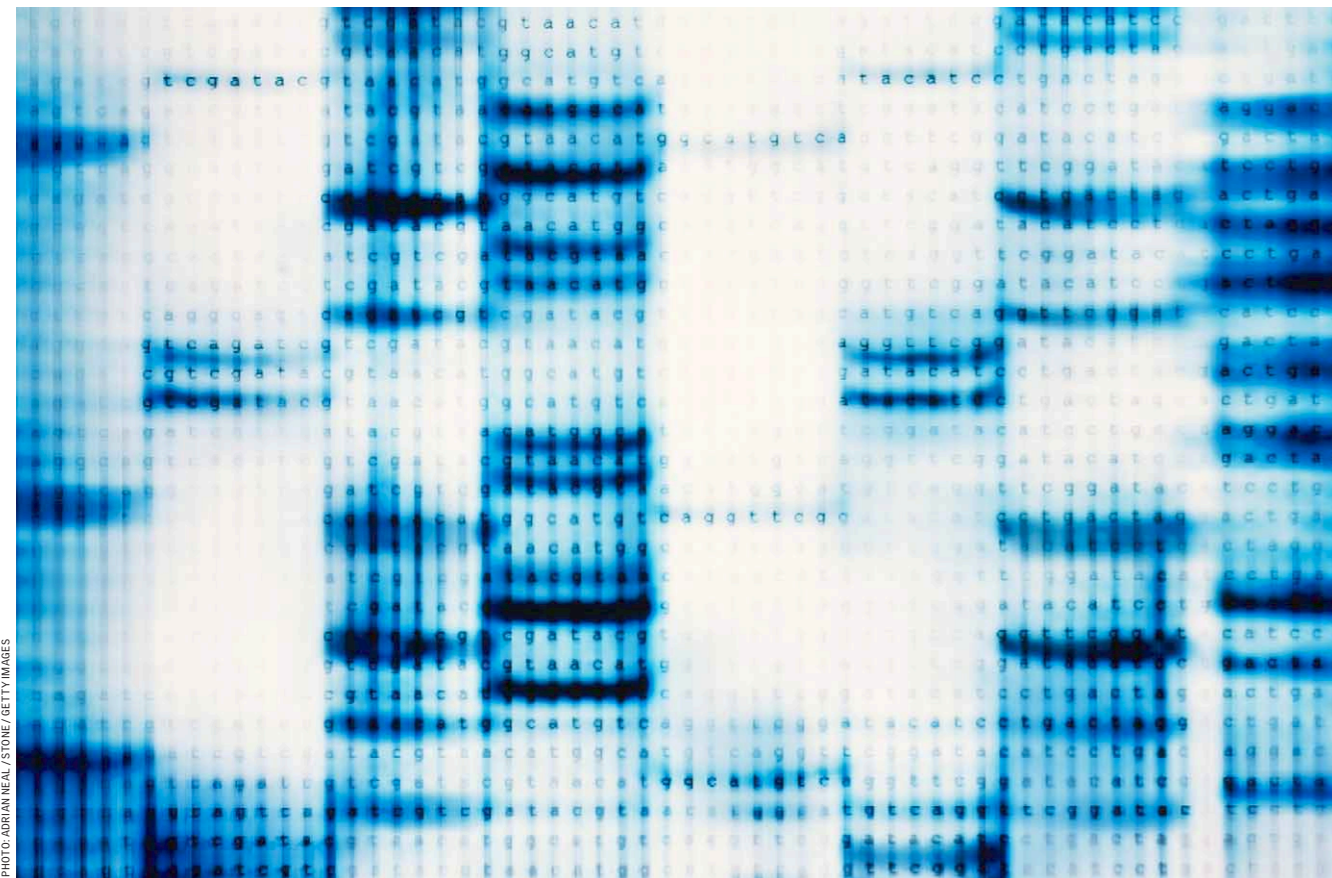
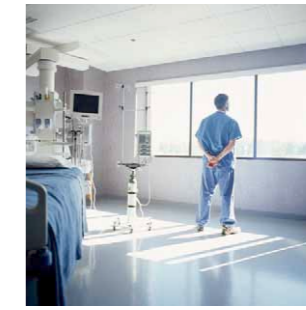


PHOTO: ADRIAN NEAL / STONE / GETTY IMAGES



PHOTOS: DIANA HEELY / TONY / GETTY IMAGES

ECLIPSE AND REDISCOVERY

However, in the years that followed the Fall of Rome, doctors attached rather less importance to sunlight, hygiene and sanitation. There is barely a reference to the sun in western medical literature until the end of the 17th century. And it was not to be until the latter part of the 19th century, following the rediscovery of the sun's health benefits, that buildings were arranged to admit its rays again. In England, the government had introduced a Window Tax 1695, and while this tax was in force, windows were bricked up and houses were often designed with the minimum of fenestration to avoid payment. Unfortunately the tradition of inadequate windows extended well beyond the abolition of the tax in 1851. In addition, the air pollution and dismal housing that accompanied the Industrial Revolution meant that sunlight was in very short supply outside buildings as well as in them.

While legislators may have been ignorant of the relationship between sunlight and occupant well-being during this period, high levels of natural light were encouraged in hospitals by a few enlightened individuals, including Florence Nightingale, the pioneer of modern nursing. Miss Nightingale considered sunlight vital in providing a healthy environment for the sick. This was emphasised in her Notes on Hospitals of 1859 as follows:

“Direct sunlight, not only daylight, is necessary for speedy recovery, except, perhaps, in certain ophthalmic and a small number of other cases. Instances could be given, almost endless, where, in dark wards or in wards with a northern aspect, even when thoroughly warmed, or in wards with borrowed light, even when thoroughly ventilated, the sick could not by any means be made speedily to recover... All hospital buildings in this climate should be erected so that as great a surface as possible should receive direct sunlight – a rule which has been observed in several of our best hospitals, but, I am sorry to say, passed over in some of those most recently constructed. Window-blinds can always moderate the light of a light ward; but the gloom of a dark ward is irremediable... The escape of heat may be diminished by plate or double glass. But while we can generate warmth, we cannot generate daylight, or the purifying and curative effect of the sun's rays.”

When Florence Nightingale made these observations, architects and doctors were still largely unaware of the health benefits of getting sunlight indoors. Her thinking on the subject was in advance of scientific opinion and ran counter to the prevailing orthodoxy, which was to keep patients out of direct sunlight. She believed that a view of the sky and especially sun was of the utmost importance to the sick. Something else she insisted on was fresh air, and lots of it. The air within a hospital ward had to be as pure as the air outside, without chilling the patients. Air was not fresh if it was not warmed by the sun, nor was it safe if it came from anywhere other than an open window. In the 1850s, the effect of poor ventilation on the sick and the well were not generally recognised. It was not unusual for medical staff to keep ward windows hermetically closed for fear of lowering the air temperature.

Florence Nightingale was an advocate of the pavilion system, originally a French arrangement of separate ward units. The Nightingale ward, as it became known, was extensively glazed by the standards of the day. A minimum of one large window for every two beds provided patients with copious amounts of fresh air and natural light. However, it was to be many years before her ideas gained acceptance. In 1933, the Royal Institute of British Architects published a report on sunlight penetration in buildings, in which they referred to the principles described in Notes on Hospitals, as follows:

“It is gratifying to note that some architects are at last, although half a century too late, beginning to take advantage of Florence Nightingale's common sense...”

With the discovery that sunlight could cure rickets and tuberculosis, and that it could kill bacteria, there were good grounds for getting sunlight in and around buildings. The architectural language that Le Corbusier developed from the 1920s onwards reflects this; drawing its inspiration from the sunlit ward of the sanatorium, and the terraces of the heliotherapy clinic. His iconic Villa Savoye, built near Paris in 1929, is designed for sunbathing. The living quarters on the first floor of face into a sun terrace. This incorporates a ramp that goes up to a sunbathing enclosure on the roof, which is sheltered by a screen of straight and curved walls. Le Corbusier believed the sun conferred physical and moral regeneration on those who exposed themselves to its rays. He was a keen sunbather, and



PHOTO: PETE TURNER / THE IMAGE BANK / GETTY IMAGES

was greatly concerned about the dangers of tuberculosis. This is clear from the book he wrote in the 1950s on one of his later buildings; L'Unité d'Habitation or Marseille Block:

"Doling out cosmic energy, the sun's effects are both physical and moral, and they have been too much neglected in recent times. The results of that neglect can be seen in cemetery and sanatorium."

L'Unité d'Habitation was the realisation of the mass housing schemes that had exercised Le Corbusier since the 1920s. He designed L'Unité to alleviate a severe post-war housing shortage in France. This milestone of modern architecture is arranged for sunlight and incorporates many of the features of a heliotherapy clinic. Balconies on both the east and west facades serve as sunscreens or 'brise-soleil' that shade the apartments in the summer months. They are also what Le Corbusier called an 'open-air extension' of each living room. In addition, L'Unité d'Habitation has a terraced roof that provides amenities for the residents, including a solarium.

THE DECLINE OF THE SUN – AGAIN

Until the middle years of the last century, natural lighting largely determined the plan of a building and the design of its external envelope. But with the advent of low-wattage fluorescent tubes in the 1930s, and air conditioning, reflective glass and cheap energy, the urban landscape began to change. Daylight was no longer a critical design element, as these technological advances made lighting deep-plan buildings a practical proposition. Medicine was changing too. Improvements in living standards led to a decrease in tuberculosis and rickets; and the arrival of antibiotics in the 1940s meant that infectious diseases were much more amenable to treatment. This is reflected in hospital design where sunlit, airy wards came to be replaced by structures that were more complex, and were closed to the elements. Gradually, the emphasis shifted from putting hospital patients in wards that supported healing and prevented infection, to ones that created a comfortable and more convenient environment for patients and staff. Sixty years ago, it was well recognised that sunlit wards have fewer bacteria in them. Today it is not. However, strains of tuberculosis have emerged that are resistant to antibiotics, and one of

P 11: Sunlight has often been completely 'blocked out' of hospitals since the middle of the 20th century. It is only in recent years that they have become aware of its benefits again. Studies have shown that sunlight can sometimes considerably speed up the healing process.

Previous and below: The person as the starting point and goal of architectural design: Le Corbusier's 'Modulor' symbolises this standpoint even today. In Le Corbusier's architecture, large roof terraces on which the residents could sunbathe were taken for granted. It was only later that scientists began to be sceptical and realised the damaging effects of UV radiation.

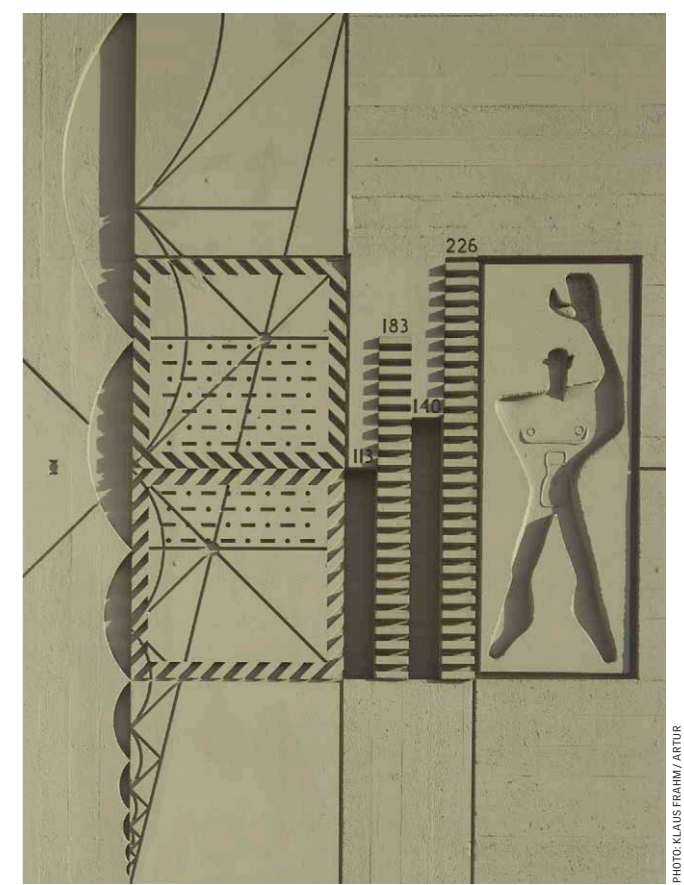
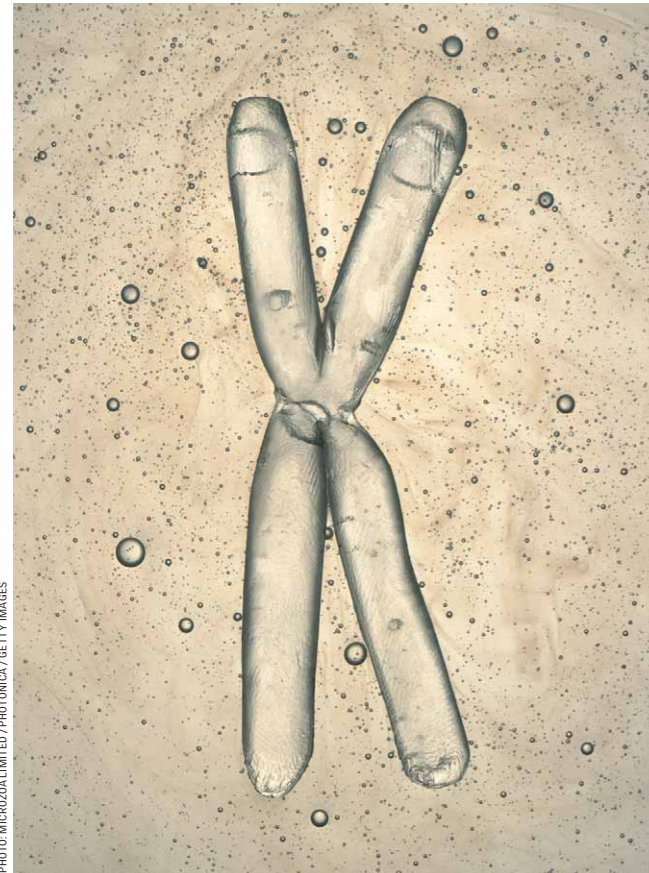


PHOTO: KLAUS FRANK / ARTUR



the so-called 'superbugs' that infect our hospitals is becoming established in the wider community. The MRSA bacterium, or methicillin-resistant *Staphylococcus aureus*, has long been a serious problem in wards and nursing homes where it infects patients weakened by disease or injury. But a strain has emerged that can infect healthy young people who have had no prior hospital exposure. With drug-resistant bacteria posing an ever-greater threat to public health, sunlight's germicidal properties merit rather more attention than they receive. So too do the therapeutic properties of sunlit spaces.

BRIGHT LIGHT

In Greece and Rome, physicians called the emotion associated with gloom and darkness 'melancholia'; and the idea that lethargy, sadness and despair can be triggered by low light levels is certainly a very ancient one. During the 1980s, scientific evidence emerged of a link between depressive illness and light deprivation. Based on this and other more recent findings, it has become clear that building occupants do not get enough bright light to have a positive impact on their health and emotional stability. The light levels required for this are much higher than those needed to perform visual tasks. Electric lighting developed under the assumption that the only significant purpose of light for humans is to see. Until recently, the impact of artificial light on physiological and psychological well-being was not generally considered.

A major breakthrough came in 2002, when scientists discovered a new sensory system in the human eye. This is not involved in vision: it is there to receive and respond to light, sending signals directly to the body's biological clock. This clock, in turn, regulates the secretion of hormones and neurotransmitters in the brain. These have a direct influence on our health and the amount of light and darkness we expose ourselves to dictates when, and how much of them, is secreted. Although bright light is known to have health benefits, and has been used to treat conditions such as seasonal affective disorder (SAD) and non-seasonal depression for some time, no one knows exactly how, or why, it works. The discovery of this new photosensitive system explains a great deal about the ways in which light affects our well-being.

Sensitivity to light and the susceptibility to certain skin diseases resulting from it is hereditary. Nevertheless, all people depend on vitamin D synthesis by the skin, for which sunlight is essential.

A hot bath relaxes body and mind – and all the more so if it is combined with a spot of sunbathing. Luminous intensities of around 2000 lux and more stimulate the circadian system and the human psyche.



Freckles are genetically determined deposits of pigmentation in the skin and often appear due to the influence of sunlight. Especially people who have a fair skin and are sensitive to light frequently have freckles.

PHOTO: RICKY JOHN MOLLOY / STONE / GETTY IMAGES



In April 2005, a study published in the American Journal of Psychiatry concluded that bright light therapy is as effective as medication in the treatment of major depressive illnesses and that it has fewer side effects. These and other findings support the age-old belief that we need to be able to see some bright light, or live in sunlit spaces, to stay healthy. Unfortunately, opportunities to benefit from light of sufficient intensity to have a favourable impact on our health can be limited in the modern world. This may explain why depression is becoming so common. According to the World Health Organisation, depressive disorders are the fourth leading cause of ill health among adults worldwide, and by the year 2020 severe depression will be second only to cardiovascular disease as the main cause of death and disability. Significantly, recent studies also suggest Florence Nightingale was right about the positive impact of sunlight on the recovery of hospital patients. Research shows that heart attack victims stand a better chance of recovery if they are in sunlit rooms. Depressed psychiatric patients fare better if they get some sun while in hospital, as do premature babies with jaundice. In addition, patients in hospital wards suffer less pain following surgery if they can see the sun.

SUNLIGHT DEPRIVATION

The sun's apparent motion through the sky each day regulates many of the body's hormonal and biochemical processes. Furthermore, as well as being our external timekeeper, the sun is also our natural source of vitamin D. Of course, solar radiation can trigger skin cancer in susceptible individuals but, paradoxically, the rays that cause tanning and burning are the same ones that synthesise vitamin D in the skin. There is little of this in the normal diet – so anyone who stays indoors when the sun is out may have very low levels of it. Vitamin D has long been known to be essential for strong bones and teeth, but recent research shows that it also plays a pivotal role in maintaining a healthy immune system. There is a growing body of evidence that low levels of vitamin D increase susceptibility to some very common and potentially fatal conditions such as heart disease, stroke, depression, obesity, cancer of the breast, colon, prostate and pancreas, multiple sclerosis, diabetes, and tuberculosis. And just at the time that scientists are

beginning to work out how vital adequate levels of vitamin D are to our health, others are starting to recognise just how common vitamin D deficiency really is. A number of recent studies have found disturbingly low levels of vitamin D across all age groups in Britain, the USA and elsewhere. The problem is so bad that rickets is making an unwelcome return.

The focus on the harmful effects of the sun's ultraviolet rays in recent years has rather overshadowed the benefits they can bring and the dangers of not getting enough of them. For much of its history, humanity has revered the sun as a source of light, life and well-being. The ancient Egyptians worshipped the sun's healing powers and made good use of them, as did the Greeks and Romans. Lack of sunlight has long been associated with weak bones, weak muscles, mood disorders and ill health. The pioneers of Modernism appreciated this, and so did the architects of Imperial Rome more than a thousand years before them. As the old Italian proverb points out:

“Where the sun does not go the doctor does.”

Dr. Richard Hobday is a recognised authority on sunlight and health in buildings. He is a Research Fellow at the School of the Built and Natural Environment, University of the West of England, Bristol, as well as the author of *The Light Revolution: Health, Architecture and the Sun* (Findhorn Press, 2006) and *The Healing Sun: Sunlight and Health in the 21st Century* (Findhorn Press, 1999).

INTERVIEW WITH PROF. ANGELA SCHUH

Professor Schuh, many positive effects of exposure to sunlight, for example its palliative effect on winter depression (seasonal affective disorder) are now well known. Others, such as the antimicrobial effect of the sun, seem to be almost completely disregarded in modern medical practice. Has the medical profession lost sight of the positive effects of sunlight?

Here we need to differentiate between two components of daylight that have different effects on the body: visible light and UV light. Visible light affects our melatonin levels via receptors in the eye and thus determines whether we feel awake or tired. Bright, visible light is also an effective remedy for winter depression. This has been known for a long time and is used accordingly in treating this condition.

UV light has also been used extensively by the medical profession in the last few decades, for example in treating skin diseases. This is true for both artificial UV light and sunlight. Therefore I would not use the word 'disregard' here. However, it is true that sunlight's good name has been significantly tarnished recently due to its carcinogenic effect, and it is thus often overlooked that this effect is heavily dependent on the dosage received. In sensible doses, the positive biological effects of sunlight by far outweigh the negative: vitamin D₃ synthesis, to name just the most important. Vitamin D₃ is formed on the skin exclusively via solar radiation. It boosts bone metabolism, prevents osteoporosis, generally strengthens the body and enhances performance. Moreover, Vitamin D₃ even protects against a number of forms of cancer.

What positive effects of sunlight are also effective indoors if a building is designed with the sun in mind and naturally lit?

The effects of visible light also penetrate buildings. Thus, if a building has been designed accordingly, light can also work against seasonal depression and general anxieties inside it. However, it is important to ensure that the light's intensity will exceed 2500 lux.

By contrast, human skin is protected from the effects of UV light by almost all types of window glass in use today. So in order to synthesise vitamin D₃, for example, people actually do need to go outdoors.

Modern human beings often spend 70–80% of their time indoors. How important is it in such cases to allow them to experience the same light changes that occur during the day outdoors?

I think the most important thing is to ensure sufficient and consistent light exposure both outdoors and indoors during the day. When evening comes, on the other hand, people need to start preparing for night with the aid of suitable lighting. In other words: soft light, nothing too bright. Without this change in light levels, the body doesn't produce any melatonin, and we don't feel tired so easily.

Around 50% of the population are sensitive to weather conditions in one way or another. Rapid reversals in conditions and sharp falls in temperature are among the most widespread meteorological phenomena to have negative effects on human well-being. To what extent should architecture try to shield people from these extremes of weather – and to what extent should people inside buildings be

exposed, in a controlled manner, to the same natural changes in temperature and air movements occurring outdoors?

Spending time in artificially air-conditioned buildings is generally seen as less than ideal from a medical perspective. Large, openable windows, on the other hand, are beneficial. The same applies to open inner courtyards, conservatories and balconies, in short: for all areas that allow us to expose ourselves to changing temperatures and sunlight, at least every once in a while. The body's thermoregulation function needs constant exercise, and it is therefore an ideal situation when fresh air can reach the skin at regular intervals. A constant, artificial uniform climate, on the other hand, allows our thermoregulation muscles to become flabby.

Incidentally, a similar effect is generated by laminar air flows, such as those created by tilted windows or ventilation slots. They form a constant draught to which the cold receptors of the skin adapt, preventing any further counter reaction from the body. That is why we so often catch cold when exposed to draughts. Turbulent air flows, such as those generated by forced ventilation systems, are better than uniform flows.

Comparative studies of mortality rates in different countries have shown that the "ideal" ambient temperature for good health seems to be lower for northern Europeans than it is for their southern neighbours. Is it not paradoxical, then, that it is often the hotter countries that have air-conditioned buildings that are even cooler than in temperate or high latitudes?

You're right. That is indeed paradoxical, as it means the body is working with temperature changes that are far too extreme. This overtaxes its thermoregulation mechanism and exposes it to excessive strain. A moderate level of air-conditioning with interior temperatures ranging between 20 and 25 degrees Celsius would be much more appropriate.

Professor (Prof. Dr. Dipl.-Met.) Angela Schuh is a Professor of Medical Climatology at the Institute for Health and Rehabilitation Sciences of the Ludwig Maximilian University, Munich. Her research focuses mainly on the effect of climatic therapy in different climate areas, climatic treatment and rehabilitation concepts and the healthful effects of heliotherapy.

DAYLIGHTING

The natural gift of daylight
put to practice in architecture

A THEME PARK DEDICATED TO WELL-BEING

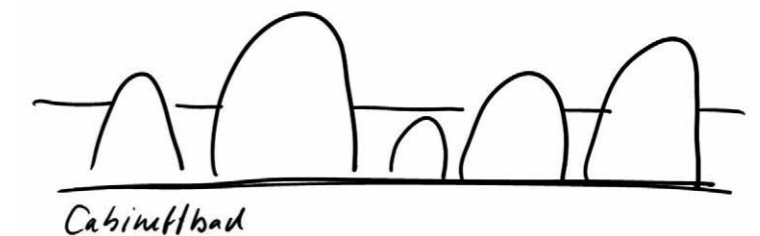
Thermal baths in Bad Aibling





By Ursula Baus.
Photos by Torben Eskerod & Adam Mørk.

For a long time now, sanatoriums, nursing homes and health spas have not been alone in dedicating themselves to human well-being. 'Wellness' has become a mass phenomenon and an integral part of the leisure industry. Take Bad Aibling, for example: where once invalids sought relief in therapeutic mud baths, a spa theme park, designed by Behnisch Architekten, has now been opened to provide a variety of health and relaxation services with the aid of lofty architecture, light, warmth and water.



Winter is on its way and with it the accompanying attacks of coughs, sniffles and sore throats. As we all know, hot baths work wonders for these symptoms – and for those whose bathtub at home is just too small, the option has been available since 13 September to visit the new spa complex in Bad Aibling near Rosenheim instead. The first mud baths facility in Bavaria was built here; in 1838, two country doctors and an apothecary had the idea of using the area's natural peat deposits for medicinal purposes. They then conducted seven years of research and thus laid the foundations for the Solen- und Schlamm-Bade-Anstalt (brine and mud baths complex). Since then, invalids have come here to seek relief from their sufferings in a range of more or less appetising peat and mud baths. Marshland equals peat: architects know it, heat makes it. During a peat bath, this slowly penetrates and benefits the body, strengthening the immune system, stimulating the metabolism, and doing wonders for the hormonal balance and nervous system. Whereas in the past, treatments like these often used to be paid for by the German health insurance providers,

these companies, with an eye to their premium accounts and the ageing population, are becoming more and more conservative in their approval. This strategy has naturally had an ongoing impact on traditional spas such as Bad Aibling, with retail ranges that had previously revolved around support hose, orthopaedic shoes, hearing aids, cafes and ladies' fashions for size 42 and above. It was thus a happy chance that drilling work, right at the spot where the existing standard open-air swimming pool lay next to a leisure and sauna centre, resulted in the discovery of a hot water spring. The idea of a thermal baths, which could go beyond the health spa business in attracting guests to Bad Aibling from near and far, could admit no delay in implementation.

Four years ago, the architectural firm Behnisch Architekten won the competition to design a new baths complex with a unique concept: next to the existing sauna facility, they created a spacious spa landscape focusing on views of the surrounding area and – something that no other competitor had proposed – they relocated the new, separately accessible open-air pool, which will

Previous: The Bad Aibling spa is located in a meadow with a stream running through it near the centre of the town and it features a free view of the outlines of the Bavarian Alps to the south. Behnisch Architekten exploited the location by opening the building up to the outside environment through the integration of large glass facades. The inside and outside areas form a unified bathing landscape.

Opposite: Anyone looking for extravagant materials and ornamental details in the spa will be disappointed. But the clever combinations and lighting design inside the building generate atmospheric density.





Previous: All-inclusive view from the south. Two of the seven domes interrupt the roof's edge on the south side of the building. Even from outside, the different window sizes provide an inkling of the lighting moods inside.

Above: Bathing as an experience in the outdoor area: massage showers, bubble baths and a fast-flow channel are features to promote the well-being of the bathers. The thermal water of the spa is extracted from a depth of 2000 metres below ground.

Opposite: Coloured tiles suggest what awaits the guests. The "hot and cold dome" invites them to participate in an intensive experience of temperature in water. In contrast to the other domes, it is not made of concrete but of a part transparent, part Plexiglass cupola.

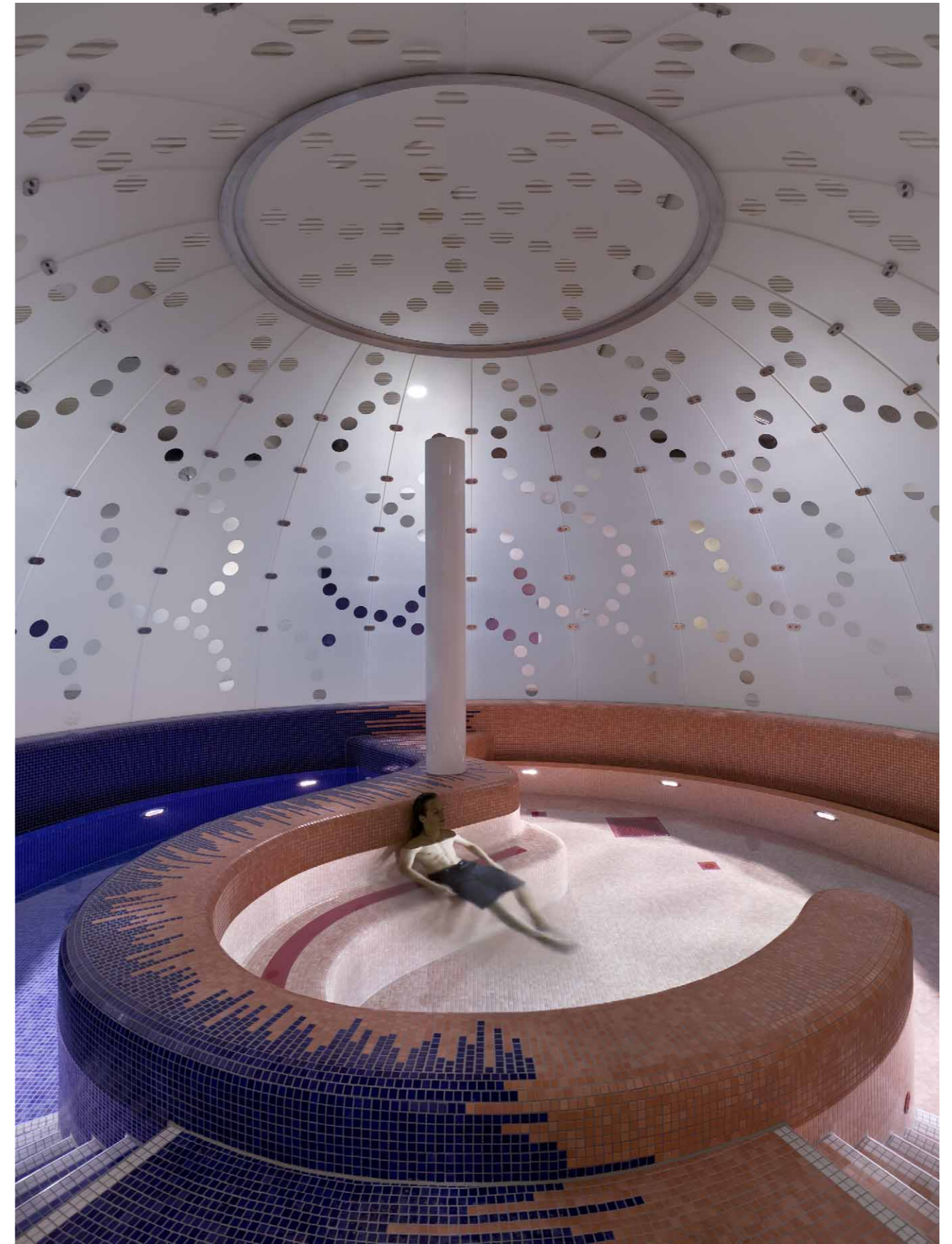
continue to delight the locals on hot summer days, to the roof of the thermal baths building. The thermal spa and beauty centre is primarily aimed at attracting guests from further afield. To be precise, three hundred thousand visitors a year will have to turn up to make the investment worthwhile - that's 822 guests every day.

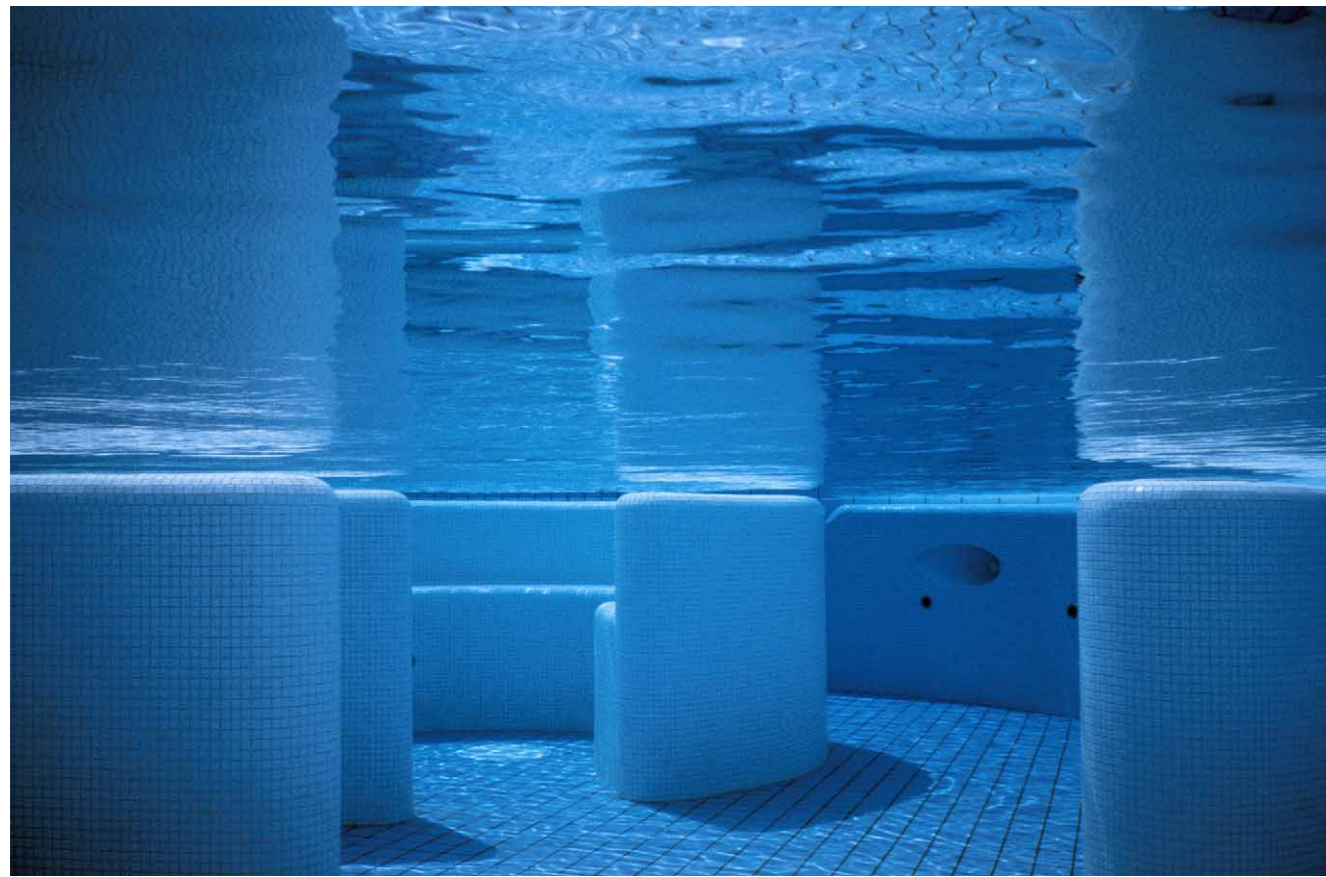
At this point, it must be said that human well-being is based on deeply subjective factors. Some people are more comfortable with wellies and welding than with the 'well' of wellness, in the pursuit of which they are willing to be kneaded, rubbed, scrubbed, peeled or given who knows what treatment at the hands of total strangers. For example, to me Ayurveda is snake venom and saunas make me claustrophobic. But although this may be a heavy burden on the path to becoming a wellness fan, at the end of the day it is irrelevant to one's appreciation of spa architecture.

Therapeutic jargon, of course, makes subtle distinctions: the ailing receive treatments, while in the beauty and wellness world we speak of applications - there is a reluctance to stigmatise the need for such

things. When Peter Zumthor built the thermal baths in Vals/Switzerland, he created a yardstick that all kinds of spa architecture - especially in and around the Alps - had to be compared with. However, Zumthor's cryptic style, ritually internalising the mountain backdrop, is hard to retreat from once entered; especially as in Vals there is no need to get into the water and tolerate every square metre as a spa experience. Neither is this a must in Bad Aibling. Here Behnisch Architekten chose a completely different path, one which had to be attractive to a very broad cross-section of the public - including families with small children, hairdressers, bakers wishing to be kneaded like bread dough - and had to give them their money's worth. Beauty for men? Yes, Bad Aibling offers that too, mindful of a society that counts the visual appearance of its members as a success factor.

Harmonising a complex room schedule, including a sauna, thermal spa, beauty area and separate open-air swimming pool with demanding, in some ways, 1980s-style structure demanded a powerful concept from the architects. The spa





Above: The outdoor pool from the diver's perspective. Powerful jets ensure a constant stream of water.

Opposite: Floating, letting oneself go, listening to music under water – things are comparatively peaceful in the thermal dome. Bathers who are lying down can look outside through the three arc-shaped windows.

landscape mentioned above was broken up by the installation of a number of enclosed domes in water-free areas, containing pools or "experience zones" with various themes. Under one dome, visitors can harden themselves to cold and hot temperatures with contrast baths, under another they can drift away to the music of the spheres floating up from under the water. One can 'experience water', bathe in bubbly water like a 21st century Marilyn Monroe in a 'champagne pool' – real champagne costs extra though – but also recuperate mentally with music and video projections. Then, of course, there is a Kneipp basin and a mud baths area, but also a toddlers' area, discreetly decorated with mythical creatures and supervised by qualified staff. The new family-friendly policy is becoming a key feature, and one greatly appreciated by stressed parents mothers and fathers; in Vals, under-fives are not allowed into the baths. In the spacious facilities of Bad Aibling, there is a niche for every taste in leisure or relaxation.

Importance was also attached to the reinvention of the sauna area into which the existing facility was to be integrated. Those

who say at this point that a sauna is just a sauna would be mistaken: with garden saunas, dry saunas, wet saunas, infusion saunas, log cabin saunas and mud saunas, there is much to be learned here.

There are thus three themes between which the architects performed a tricky, sure-footed balancing act during this project: the design from scratch of a thermal spa complex, the refurbishment of a 1980s architectural structure and the design of a classical outdoor pool. The thermal baths is unmistakably divided into zones within which the year's three hundred thousand bathing enthusiasts of all categories can feel they are in good hands. They can remain largely undisturbed in their favourite pools, although how the acoustic atmosphere will develop at peak times was not something we could predict on the basis of our visit. The achievements of the architects in the subtle conversion of the 1980s architecture – in the sauna area – are in a league of their own: pale wood next to the darkness of the open, old beamed roof, wine-red painted reminiscences between classical modern and post-modern iconography. All this deserves great

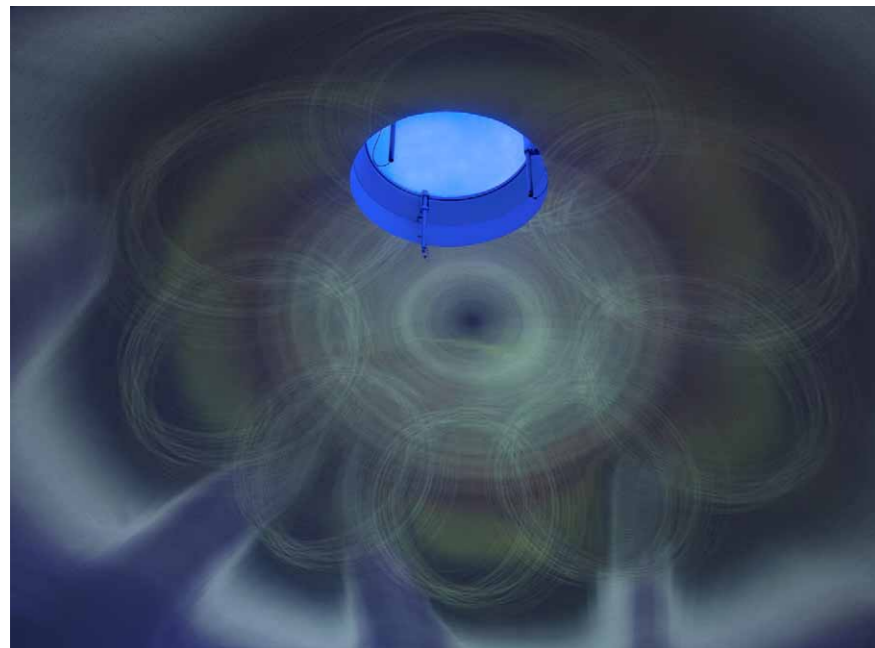


credit as a contribution to the field of building within existing structures. Here there was no single-minded quest for a contrast, any contrast, between the old and the new, no concealment of the old behind a new shell; what the architects achieved was more of a feeling of natural continuity.

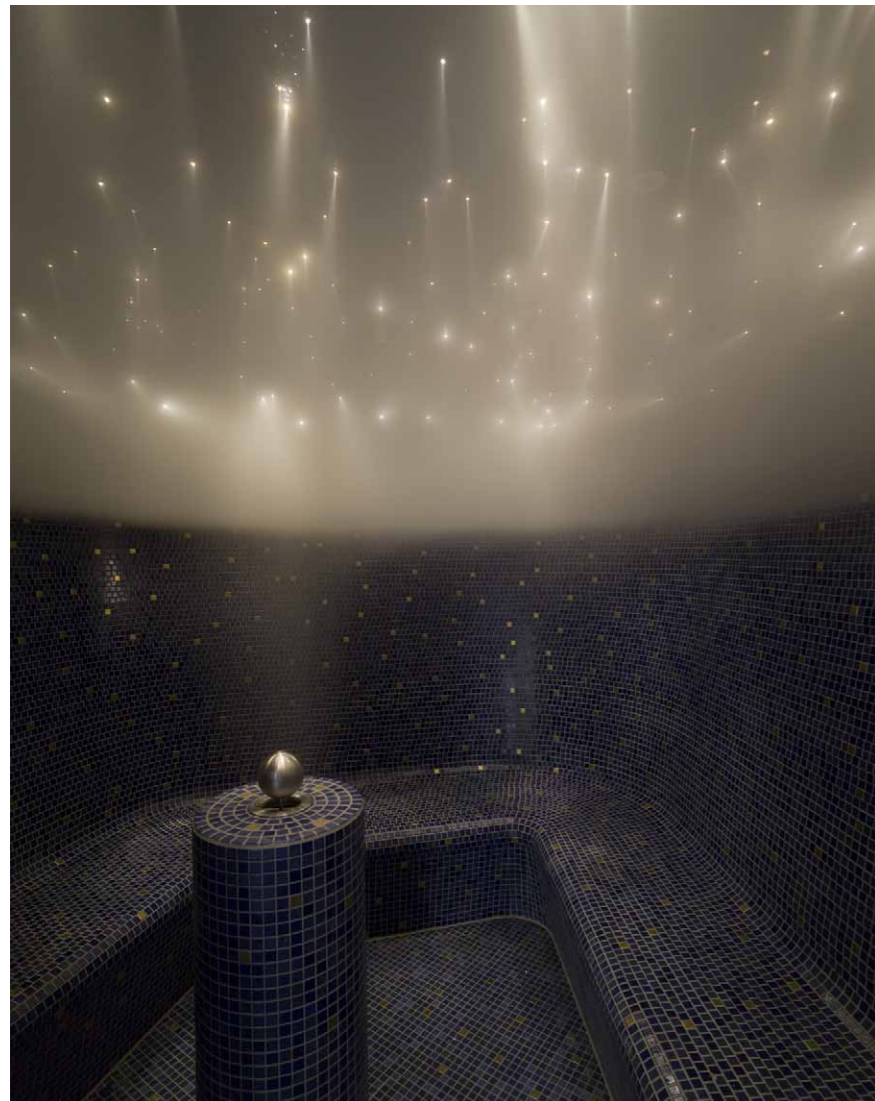
To ensure that the heterogeneous interior, designed to accommodate large numbers of spa enthusiasts, continued to constitute a uniform spa complex, the architects covered the floor in all areas – from the foyer to the poolside – with the same material: pale stoneware, the different formats of which prevent monotony, aid orientation and provide the non-slip surface the facility requires. Beside this, a range of tiles such as those found in every DIY store greet the visitor in all raised or sunken areas – plinths, basins and so on – which look exactly the same in public swimming pools as they do in one's bathroom at home. However, it is these tiles that make one think at times more of hygiene than of well-being – to suggest a synonym for the concept of 'wellness'. Apart from this uniform flooring, plants are used to provide a consistent feel throughout

the spa: the idea is that guests should feel as though they are in a conservatory within which the themed domes, although they have their place, are not intended to dominate. The vegetation, moreover, underpins the interleaving of interior and exterior that is a central feature of this light-drenched spa concept. Daylight spills into the entire large space from the sides, but the domes too are also skilfully designed to be generously provided with natural light: where they pierce the roof areas, a broad strip or ring within the roof surrounding each dome is glazed to allow ample daylight to penetrate all the way to the ground. The domes themselves, depending on their theme, incorporate small or large, many or few skylights – daylight accompanies the visitor through the entire complex and makes a significant contribution to its pleasant atmosphere.

And finally, the locals of Bad Aibling can also rejoice: a simple 25-metre pool on the complex roof, from which a view of the Wendelstein can still be enjoyed, a non-swimmer's area, a toddlers' pool and a slide that, depending on the angle of the hillside, can disappear into its surroundings, all



Left: The relaxation dome is in the west part of the thermal spa and is darker on the inside than the other domes. Gentle music and video projections on the ceiling transform it into a kind of multi-media cavern.



Left: The dome of the senses is the largest of the seven domes and has a steam bath on the inside. LEDs which are mounted in the ceiling and change their colour immerse the room in a constantly changing light, which almost becomes tangible due to its reflection in the highly moisturised air.

Opposite: View to the west from the dome of the senses. Several circular skylights illuminate the room, which is immersed in a deep blue colour.





Bad Aibling is a spa for the whole family. It not only has a special children's area but also contains features everywhere which encourage the play instinct such as these floating lights in the dome of the senses.

come together to form a top-notch open-air swimming experience. Here, the scenic themes explored in the spa complex experience have been completely avoided, and it is precisely this which gives the outdoor pool a quality that had to be sacrificed in the themed "islands" of the spa complex.

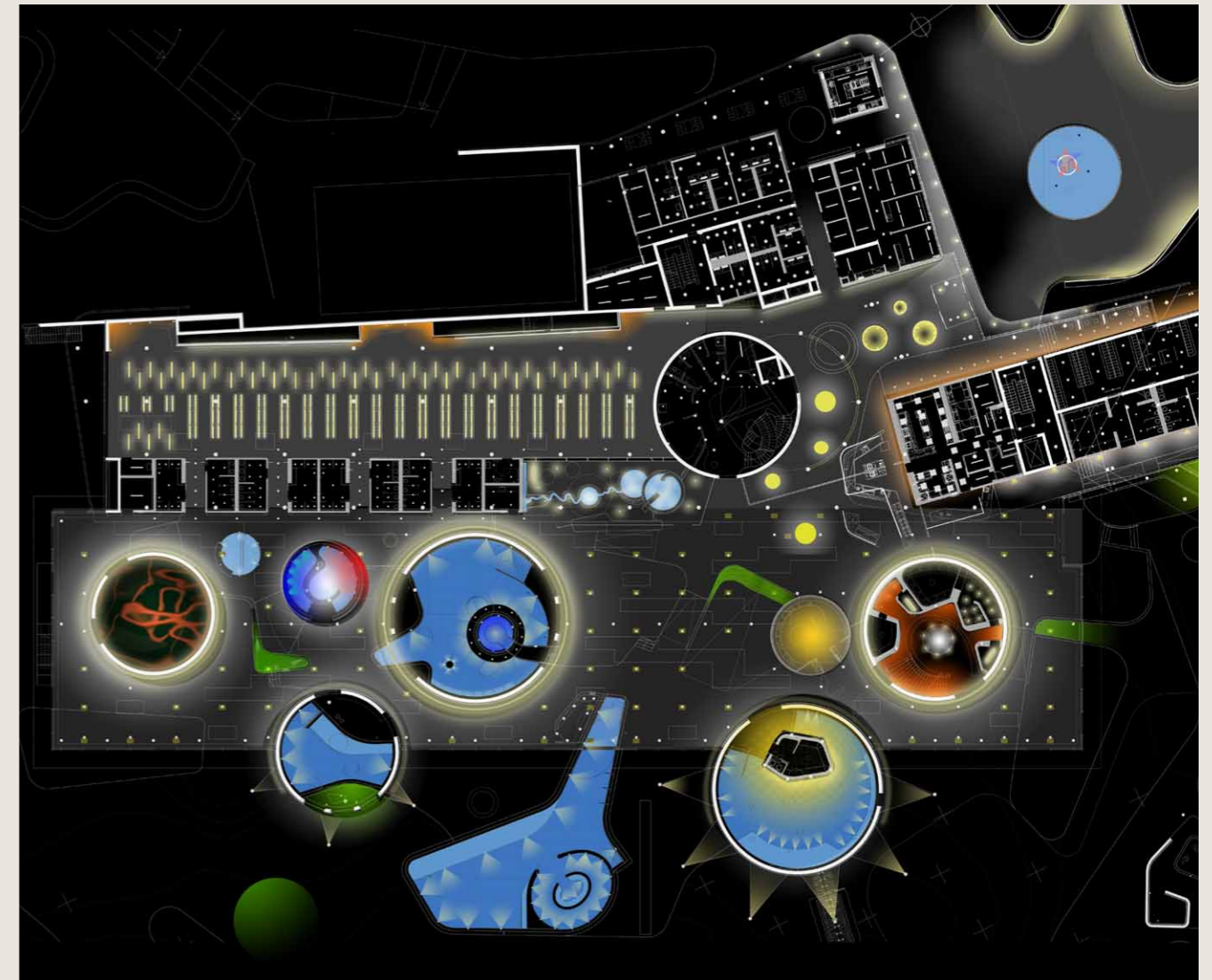
Here in Bad Aibling, the architects had to succeed in nothing less than a balancing act between a log cabin sauna and Turkish bath, a provincial open-air pool and a more or less sophisticated thermal baths complex. Behnisch Architekten has succeeded, at the very least, in performing an impressive 'spread eagle' with a quirky mixture of informal conservatory style architecture, cheerful references to pop culture and conscientious functionality. A multicultural spa landscape has been engineered and a theme park has been filled with aquatic pleasures within which a rubber duck would not excite the disapproval of piqued VIP guests. Bad Aibling is expected to attract a different clientele from that visiting Vals – and the architects have more than catered to this market. The concept of the thermal baths is aimed not just at providing beauty and wellness

services in an almost religious way for a well-heeled public accustomed to luxury, but to attract a broad cross-section of the public. Economic pressures have left certain traces in Bad Aibling, which could manifest themselves in an all too densely packed diversity of experiences in the spirit of the motto: something for everyone, so that everyone will come. The architecture of the facility does accommodate this complexity; however, it is kept in check with a wink in favour of a consistent concept.

Dr. Ursula Baus is a freelance architectural historian and critic. Her publications in magazines and books focus on contemporary architecture and architectural theory as well as on the history of engineering in architecture. She is the co-founder of frei04 publizistik and, since 2004, has been teaching architectural criticism and theory at Stuttgart University.

Facts	
Type of building	thermal spa
Client	Public Services Bad Aibling, Germany
Architects	Behnisch Architekten, Stuttgart, Germany
Location	Lindenstrasse 32, Bad Aibling, Germany

Ground plan with lighting concept. Underwater lights fill the pools with a magic, bluish glow at night.

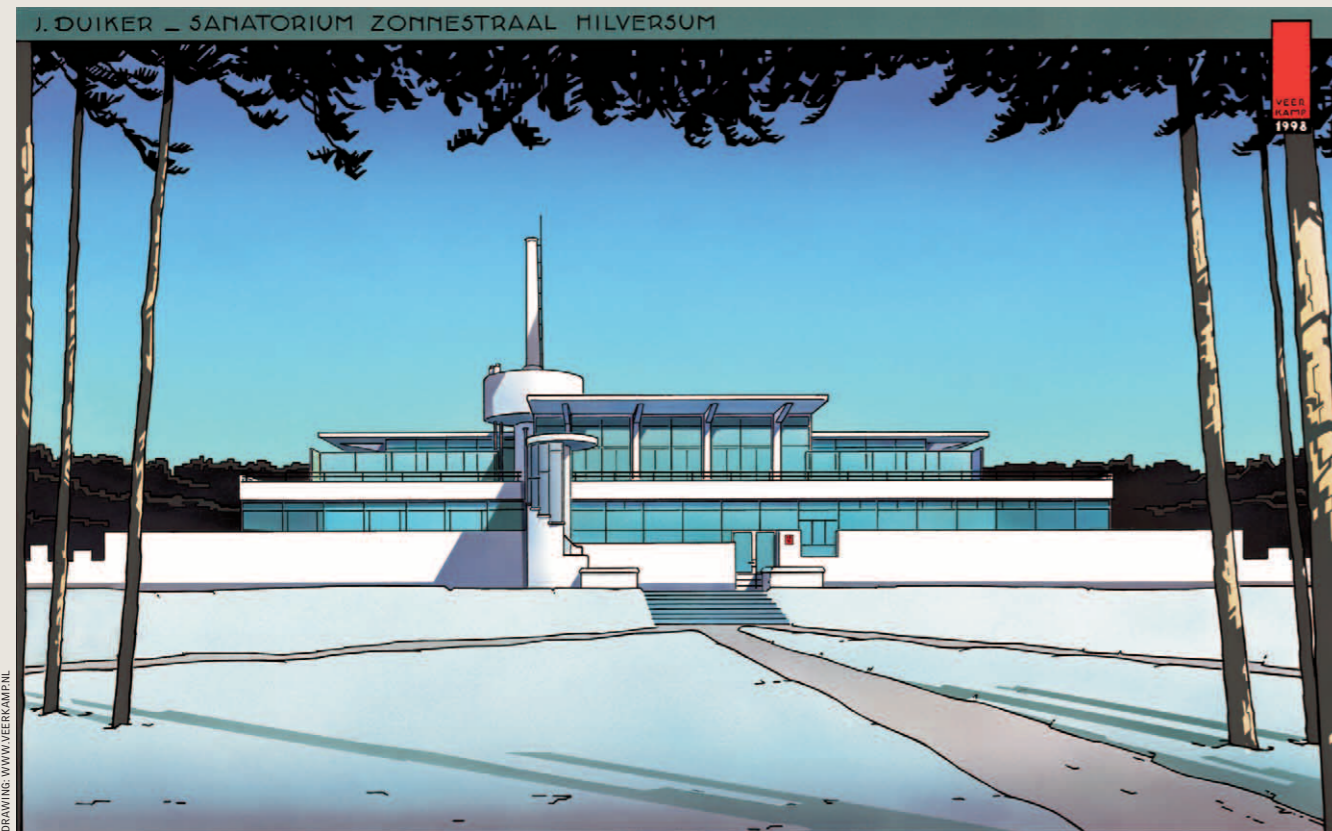




19°40'56.70"N
80°05'06.91"W
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ZONNESTRAAL SANATORIUM

The embodiment of light, air and space



Above: In 1998, the Netherlands artist Joost Veerkamp drew this view of Zonnestraal's main building. The southern facade is almost completely glass. Large sun terraces were created on the

flat roofs of the building and the occupants were thus encouraged to spend long periods outside during the day.

P36–37: Zonnestraal at dusk. The sanatorium is located in a large park without any direct neighbours. As a result, the buildings, which are transparent on all sides, extend far into the landscape.

By Hans Ibelings

Sunlight and fresh air, hygienic living and better working conditions for the masses were the main goals of architectural modernism. The latter had its roots in the fight against devastating epidemics and therefore found its purest form of expression in the large sanatoriums of the 1920s, such as the 'Zonnestraal' building by Jan Duiker in Hilversum.

ZONNESTRAAL SANATORIUM (1926–1928) in Hilversum is regarded both inside and outside the Netherlands as one of the high points of functionalism. In the Netherlands it is equalled only by the more or less contemporary Van Nelle Factory in Rotterdam, designed by the firm of Brinkman & Van der Vlugt. Both buildings embody in a convincing, even compelling form, the essence of functionalist architecture – the provision of light, air and space. In the case of Zonnestraal, designed by Jan Duiker, Bernard Bijvoet and Jan Gerko Wiebenga, the name alone – 'ray of sun' – says it all. Sunlight and fresh air were essential for the recuperation of Zonnestraal's tuberculosis patients and so functionalist architecture was an entirely logical choice.

It is certainly no accident that functionalism found such wide acceptance for hospitals and related building types. Zonnestraal, Alvar Aalto's sanatorium in Paimio, the French hospital designs of Paul Nelson, as well as various open-air schools and the modernist holiday camps built throughout Fascist Italy to build up the strength of undernourished city children – they are all examples in which modern architectural principles and contemporary medical thinking coincided, united by the common theme of hygiene. The significance of hygiene in medicine is obvious, but hygienic principles are just as firmly entrenched in modern architecture. With its dazzling white, shiny, smooth-tiled, chromium-plated, glazed and plastered surfaces, modern architecture appears as clean and spotless as freshly washed and ironed bed linen. Modern architecture was also implicitly, and often even explicitly, regarded as a form of medicine. It offered an architectural and town planning 'cure' for human beings and for the built environment itself. From this perspective, just about all modern architecture and town planning can be construed as medication for a dying city, insalubrious living conditions and unhealthy, sometimes even life-threatening working conditions. Behind many of the principles of functionalism, from the spatial separation of home and work to the emphasis on row housing for optimum insolation, lie hygienic considerations prompted by the conviction that the city and its inhabitants should be made healthy. In few buildings do architecture and health coincide more convincingly than in the Zonnestraal Sanatorium, whose architecture is as radiant as its name. Zonnestraal was a collaborative effort by three contemporar-

ies: the architects Jan Duiker (1890–1935) and Bernard Bijvoet (1889–1979), and the civil engineer and concrete expert Jan Gerko Wiebenga (1886–1974), who also had a hand in the Van Nelle Factory.

The client who commissioned Zonnestraal was a trade union, the Algemene Nederlandse Diamantbewerkerbond (General Union of Dutch Diamond Workers, ANDB), which had already demonstrated an interest in architecture. Around the turn of the century, H.P. Berlage, the godfather of modern architecture in the Netherlands, had built the union's headquarters in Amsterdam. The same Berlage was approached by the union at the end of the 1910s with a request to design a convalescent centre for tuberculosis patients but, too busy to do it himself, he passed the commission to his young colleagues. His choice of Duiker and Bijvoet was no arbitrary decision, but closely related to a recent competition for a building to house the Rijksacademie van Beeldende Kunsten (State Academy of Fine Arts). Berlage, who had been on the jury of this competition, was greatly impressed by Duiker and Bijvoet's entry which had been awarded first prize.

Zonnestraal Sanatorium was paid for by members of the diamond workers union, who had been contributing since 1905 to the Koperen Stelenfonds (Copper Handles Fund). The fund was made up of the proceeds of the recycling of the copper handles that the diamond cutters used to position their stones during cutting. This ductile and pliable metal made it possible to fix the diamond at precisely the right angle in relation to the wheel used to cut the facets. In time, the copper handles snapped off as a result of metal fatigue and were collected by the Koperen Stelenfonds, which was so successful that the ANDB soon found itself with more money to spend on combatting TB than the Dutch government. As such, there was no longer any need to restrict their aid to their own members.

The success of these collections made it necessary, and financially possible, to expand the nursing capacity for TB patients. The result was a plan to build their own convalescent centre. After some vacillation and a false start elsewhere, a piece of woodland in Hilversum was purchased in 1919 and Duiker and Bijvoet were commissioned to design the complex. In 1926, Duiker delivered the definitive design, comprising a main building and four pavilions, only two of which were actually built.



PHOTO: MICHEL KIEVITS / SYBOLT VOETEN



Left: The large hall on the top floor of the main building was used as a dining hall. Duiker and Bijvoet adorned it with a wide roof lantern in order to bring daylight into the middle of the room.

Below: Semicircular staircases such as this one lend structure to the building on the outside as well in that – often with large windows – they serve as oriels next to the facades. For the occupants, this allows views to the outside and the entry of direct sunlight.



At the time when they received the commission, the work of Duiker and Bijvoet still belonged to the (brick) tradition of Berlage, which was no doubt one of the reasons why the old master held their work in so high regard. In the early 1920s, however, Duiker and Bijvoet emerged as leading exponents of functionalism. In the same period, Wiebenga realized the building that is often regarded as the first example of functionalism in the Netherlands, the Intermediate Technical School in Groningen (1922).

During the design of Zonnestraal, Duiker and Bijvoet went their separate ways. Duiker went on to build the Openluchtschool voor het Gezonde Kind (Open Air School) in Cliostraat, Amsterdam, a building closely related to Zonnestraal in architecture and approach, and, also in Amsterdam, the Cineac, a cinema that showed non-stop newsreels.

Bijvoet moved to Paris in 1925 where he worked with Pierre Charreau on the celebrated Maison de Verre and from where he kept in touch with his former partner. In 1935 he returned to the Netherlands to complete the Grand Hotel Gooiland in Hilversum which Duiker had been working on at the time of his premature death. After the Second World War and in partnership with the younger architect Gerard Holt, Bijvoet re-emerged as the designer of a large number of high-quality concert halls, although they never attained the architectural heights of Zonnestraal.

The building is copybook example of the functionalist ideal of a strict separation between the loadbearing construction – in this case reinforced concrete – and the facades, which here consist mainly of glass in very slender steel frames. The almost total transparency of Zonnestraal satisfied the medical demand for light and well-ventilated rooms while at the same time allowing Duiker and Bijvoet to demonstrate the functionalist character of their building.

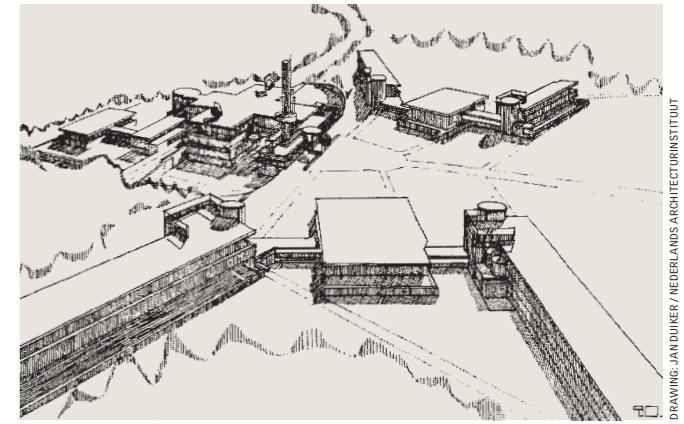
Zonnestraal consists of a main building flanked by two pavilions. On the first floor of the main building was a dining and recreation hall, while the ground floor housed all the core facilities, from treatment rooms to the kitchen and from offices to the boiler room. The boiler room's prominent location in the main building served to underscore the functional, machine-like aspect of this architecture.

The two V-shaped pavilions are angled to catch the maxi-

mum amount of sunlight. Each pavilion accommodated fifty patients, all with their own room opening onto a sun terrace where the patients, if necessary with bed and all, could recuperate in the bracing open air.

In addition to the main building and the two pavilions, Zonnestraal comprised a range of outbuildings which included a servants' house, De Koepel, since reconstructed by Delft architecture students, and several workshops. Under the motto 'recovery through work', patients who were considered strong enough were set to work, which gave them something to do and also enabled them to repay (part) of the cost of their own care. Among other things, bicycles, summer houses, sailing boats, furniture and tools for the diamond industry were made

Right: The facility as a whole from a bird's eye view (drawing by Jan Duiker). On both sides of the main building, there are the bed pavilions, each of which housed 50 patients and had their own terrace or balcony. To the north-west of the main building, there is the in-patient section (left), which is protected from the sanatorium but connected to it by a bridge between the buildings.



at Zonnestraal, usually without much publicity being given to their provenance owing to the unfounded but nevertheless existing public fear of infection via these products. Altogether Zonnestraal provided work for nineteen different occupational groups, from book binders to market gardeners.

By the 1950s, the success in combatting tuberculosis had rendered the complex obsolete as a TB sanatorium. Thirty years after Zonnestraal's construction, tuberculosis had been brought under control in the Netherlands. So in 1957 Zonnestraal became a general hospital, a change of use that required numerous constructional modifications. Initially these were designed by Bijvoet and Holt but later on other architects were engaged. Little by little, the main building and one of the two buildings for patients, the Henri van der Meulen Pavilion, underwent a radical transformation. For example, the sun terraces were enclosed and integrated with the hospital wards. The other part of the complex, the Dresselhuys Pavilion, remained empty and over the years it degenerated into a modern ruin.

Since the 1960s, architects and architecture lovers have tried to preserve Zonnestraal from damage and deterioration. Architect Jaap Bakema (who carried on the Brinkman & Van der Vlugt practice together with Jo van den Broek) even went so far as to argue that this high point of modern architecture should be treated with the same respect and solicitude as Rembrandt's *Nightwatch*.

Despite Zonnestraal's high reputation among aficionados, it was not until well into the 1980s that the dilapidated complex finally acquired listed status. Oddly enough, this provoked an equivocal reaction from the surviving hard core of functionalists and Duiker experts who claimed that it would be contrary to Duiker's functionalist spirit to treat a building conceived as a purpose-built 'implement' which had since lost that original purpose, as a sacrosanct monument. In their view, Duiker himself would have seen the eradication of tuberculosis as a reason to declare the building redundant.

Listed status did not lead to a speedy return to former glory, but it did prove to be Zonnestraal's salvation. It safeguarded the complex from further modifications and encouraged the user to be more circumspect in its treatment of this piece of national heritage. It also served to keep the idea of restoration on the agenda from the 1980s onwards. The actual restoration

came within view when the hospital, after a regional merger, no longer needed the Zonnestraal complex and a new user appeared on the scene in the form of an institution for preventive and curative therapies, a programme not all that far removed from the original function of Zonnestraal.

During the arduous, decades-long process, the steadfast commitment of the Department for the Preservation of Monuments and Historic Buildings and, more especially, of Hubert-Jan Henket and Wessel de Jonge, was of immense importance. For many years, these two architects, who have carried out the restoration along with the necessary modernizations and additions, have campaigned on behalf of Zonnestraal and of other examples of modern architecture. They are the founders of Docomomo, a worldwide association dedicated to the documentation and conservation of the architecture of the Modern Movement. The knowledge and expertise that Henket and De Jonge have accumulated over the years in dealing with modern architecture from the first decades of the twentieth century makes them pre-eminent experts with respect to those early experiments in concrete, steel and glass. Given the many stumbling blocks inherent in experimentation, this did not always result in the most perfect architecture imaginable. Moreover, energy efficiency standards have changed dramatically since those days. Henket and De Jonge have the necessary architectural and constructional know-how to reconcile those erstwhile experiments with contemporary requirements in an outcome that does full justice to the airiness and transparency of the original functionalist architecture, introducing the necessary contemporary additions in a subtle, often barely visible fashion. Emblematic of that subtlety is the virtually transparent lift that has been inserted into the main building of Zonnestraal. Anyone placing photographs of the building in 1928 alongside those of the current situation will be hard put to spot the differences.

Hans Ibelings (Rotterdam 1963) is the editor and publisher of the magazine 'A10 new European architecture', which he founded in 2004 together with graphic designer Arjan Groot. He studied architectural history at the University of Amsterdam, worked as a curator at the Netherlands Architecture Institute in Rotterdam and was visiting professor in architectural history at the Ecole Polytechnique Federale de Lausanne (EPFL). He is the author of several books, including 'Supermodernism: Architecture in the Age of Globalisation', originally published in 1998.

DAYLIGHTING

The natural gift of daylight put to practice in architecture

HOME AWAY FROM HOME

Special school in Schwechat

Text by Jakob Schoof.
Photos by Adam Mørk.

The fasch&fuchs special school in Schwechat offers its 81 pupils a rehearsal stage for life, upon which they can practice all important human behavioural patterns. Just as the outside of the building gives a dynamic impression, the rooms inside allow just as much freedom of movement for the pupils – and not only in the gymnasium, the open mid-point of the new building.



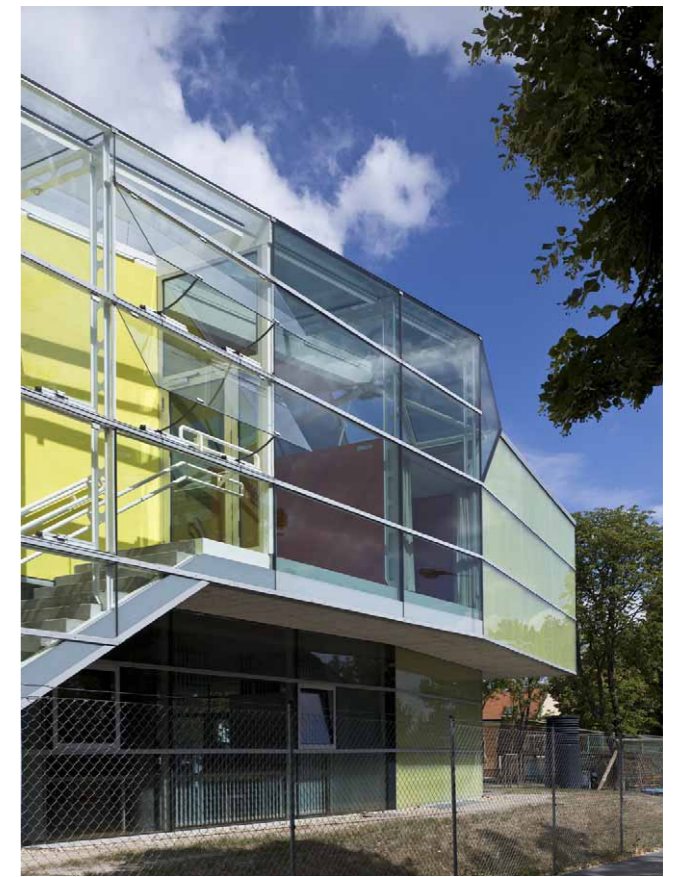


P40-41: The special schoolchildren experience their most intensive contact with the sun on the south side of the building, where the glass roof slopes down to the ground and encloses a series of light-filled winter garden. A mobile sun-shade system made of aluminium slats provides protection against the sunlight.

This page: The open-plan interior concept of the building also performs a didactic function: the intention is to enable the schoolchildren to get used to living in a community. Two staircases in the west and east connect the three levels of the building.

"A child has three teachers: The first teacher is the other children. The second teacher is the teacher. The third teacher is the room".

Otto Seydel, Educationalist



The room as a teacher – who would not want to agree with that? But much is demanded of this teacher every day at school – to provide space, room to develop and shelter. And on top of that (as every good educationalist is aware), it must be responsive to the individual needs of the children and adolescents. "81 schoolchildren with 81 learning objectives," as headmistress Ingeborg Schramm says, attend the ten classes of the special school in Schwechat. Many of them have multiple disabilities and require particularly intensive attention and care, besides the 'normal' school day.

So it is all the more astounding that the special school was housed for a long time in a traditional schoolhouse on the town's main square. Despite the central location, contact between pupils and the public was almost zero. Looking back, Ingeborg Schramm describes the rooms as "unacceptable" – there were neither enough classrooms in the school nor a staff room or working rooms – not to mention facilities for intensive mentoring.

A window into the future was opened for the special school in 2000, when more than 100 architects took part in an open

competition throughout the EU for a new school building. "Effective sound proofing, low-energy building and favourable building costs were some of the hard facts the builder-owner had demanded," recalls Hemma Fasch of the architectural firm fasch&fuchs even today. "The users, in particular the headmistress, tried to communicate the 'soft factors' early on in the competition: the behaviour of the pupils, their position in society and the challenge to promote their development and, in so doing, to support them in leading a 'normal life' as far as possible."

For disabled children 'to live normally' does not just mean gaining the self-confidence to see themselves as a part of a community and yet still being able to withdraw if they want. "The children need protection from the outside world and from 'enemies', such as unwanted people, bad weather, noise and information overload, without feeling locked in," adds Hemma Fasch. The relationship between inside and outside, as well as between openness and protection, was thus a central topic of their discussions with teachers and schoolchildren. The special school borders on the public park

of Brendani Gardens to the north, with traffic rushing by day in and day out on federal Highway 10 to the south. Furthermore, the proximity of Vienna-Schwechat airport meant considerable disturbance from noise. The school (including the gymnasium, which is half buried in the terrain) therefore opens outwards to the north over three levels with large areas of glass but ducks under the traffic noise in the south. Here the glass skin of the roof reaches down to the ground and encloses a conservatory that also serves as an extended play and adventure area for pupils in the special teaching rooms. Three of these rooms for physically and multiple-disabled schoolchildren, a teaching kitchen and the physiotherapy area with swimming pool are situated on the south side at ground level. A sliding sun-shade of aluminium lamellae is intended to protect the rooms from extreme temperature variations. "The building shell offers the children the possibility of observing their surroundings from the shade of their hideout; it enables them to make contact and to step freely outside. By first interacting through the facade, the children can decide whether they want



contact with the outside world or prefer to stay inside," say fasch&fuchs, explaining the advantages of the complex roof and facade construction.

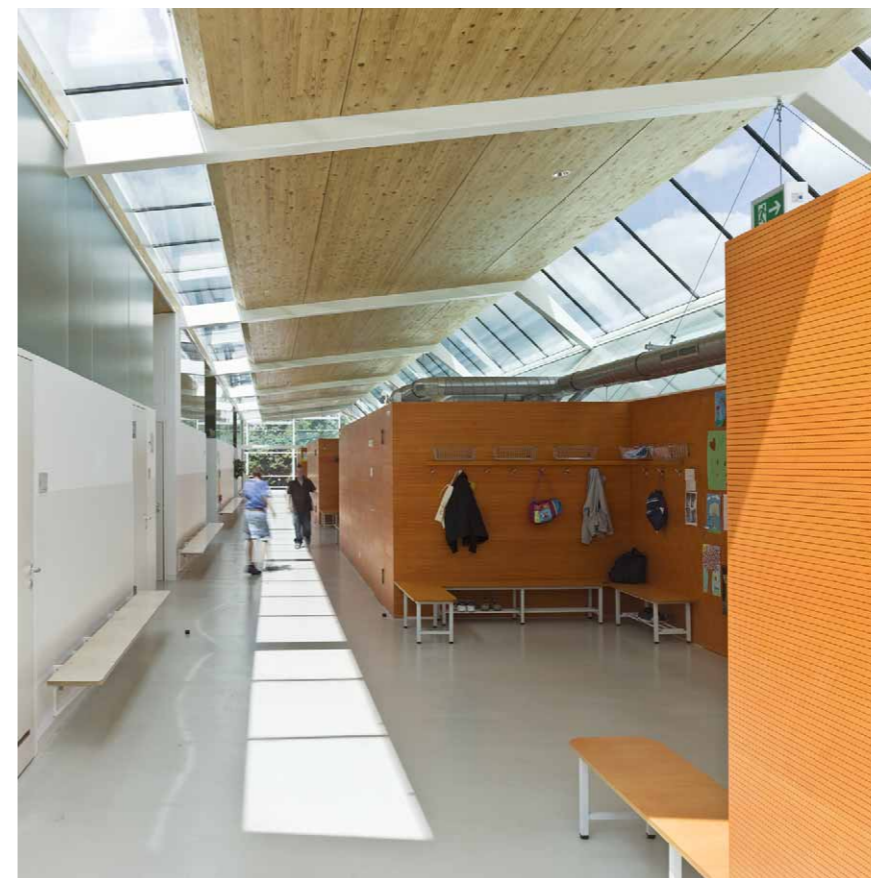
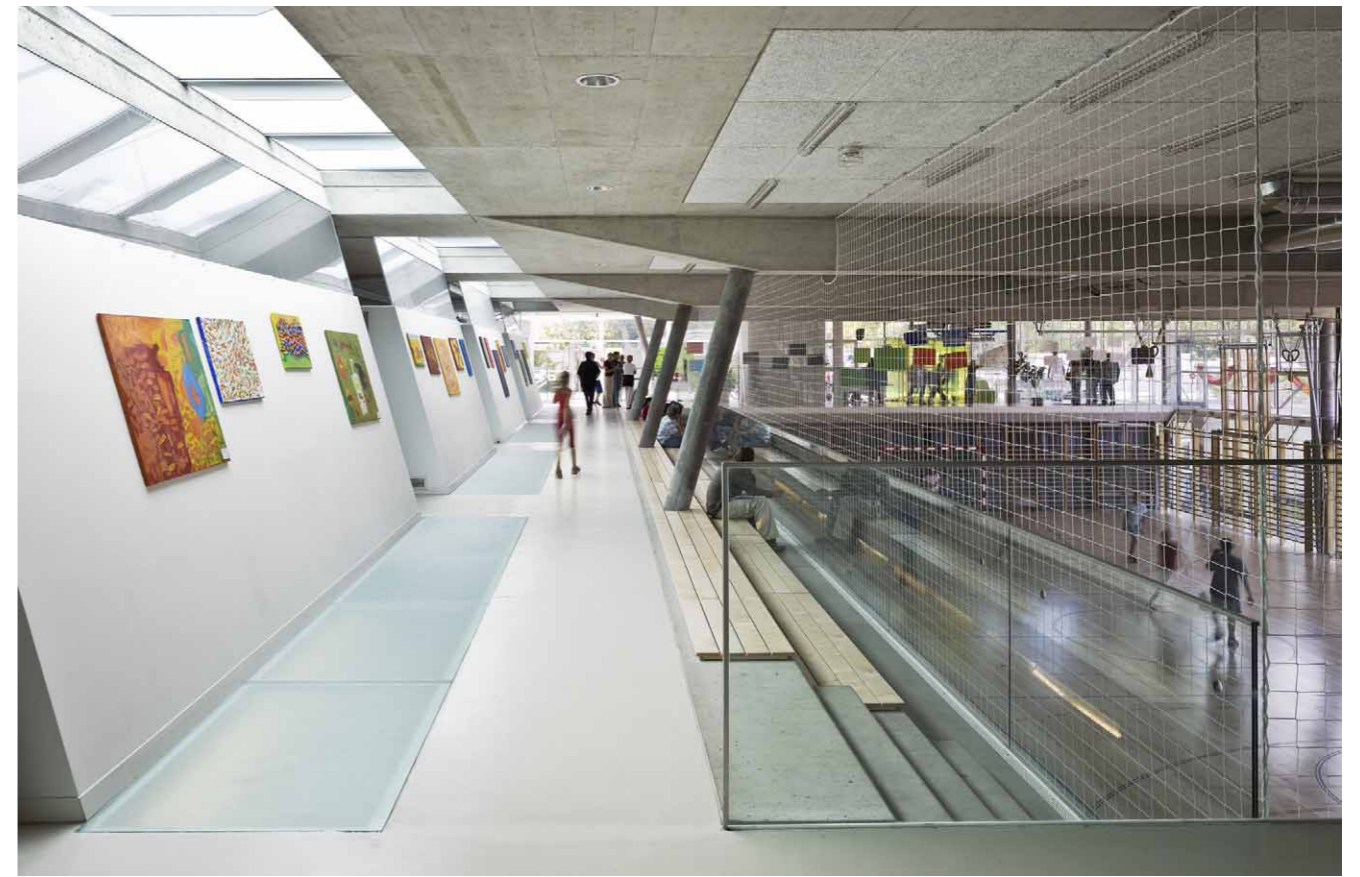
The reasons for the open spatial concept of the school with its numerous views – also between the levels – are to be found in the architectural stance of the architects, as well as *in the children's need for feeling safe and secure by knowing where they are in the building at all times.* "The inner transparency gives the children an impression of all the activities taking place inside the building," states Hemma Fasch. The open, emotional centre of the new building is the two-level gymnasium that extends from the basement to ground level. Wall bars separate the hall from the surrounding corridors and equipment rooms in the lower level. A gallery on the entrance level above runs around the hall; step seating invites passers-by to linger and watch. "Every child is a member of the community and at the same time a Robinson Crusoe," comments Hemma Fasch. "Here in the middle of the building, children can experience companionship and strangers are also allowed into the building

up to this point. The children can observe them and still be sure they can withdraw again at any time. The centre is thus opened to the world and at the same time a kind of protective shield for the privacy of the children." lead to the semi-private and private parts of the building via the stairs to the classrooms and terminate at the intimate withdrawal alcoves. Seven of the ten classrooms are situated on the north side on the upper level above the gymnasium. Two of them separate a so-called 'time-out' room, a cushioned cell which is lighted from above, in which pupils can quickly calm down if they become aggressive. The corridor in front of the classrooms is also totally different from the traditional 'barracks style' school architecture: at both ends it offers views of the surroundings and is interrupted here and there in front of the classrooms by niches to hang clothes that help encourage communication between the schoolchildren.

Virtually every room in the building gets daylight from at least two sides – including the roof areas. This reduces the glare from incident light. Many inner partition walls are not the same height as the level

The swimming pool is one of the school's most popular facilities. It is an extension of the conservatory on the ground floor and is also used for therapeutic purposes.

Previous page: In the north, the classrooms project over the two-storey sports hall. The ground was dug up here to allow direct access to the outside from the basement as well.



Above: The sports hall with a gallery for an audience is the open core of the building: it is used for teaching and also for numerous events. Even the corridor at the rear of the hall receives direct daylight.

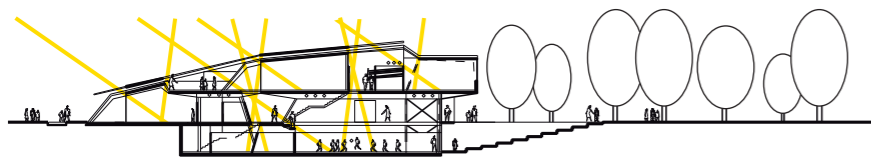
Left: View into the corridor from the classrooms on the upper floor. The complex folded roof shape enabled architects fasch&fuchs to supply nearly all areas with daylight from two sides.



1-2: The winter gardens, by far the part of the building with the most light, allows the schoolchildren to experience the movement of the sun. This encourages them to make their own experiments with light and shadow.

3: Cross-section on north-south direction with daylight concept.

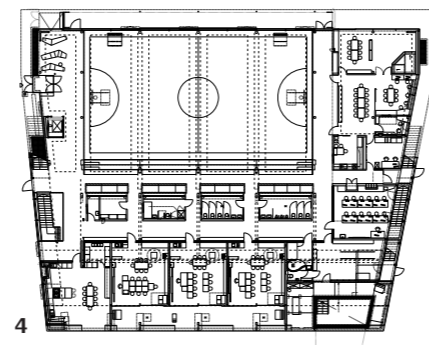
4: Ground plan of ground floor



3

Facts

Type of building	Special school for approx. 80 pupils in 10 classes
Builder	Special school community Schwechat, A
Architects	fasch&fuchs, Vienna A
Location	Schrödlgasse 1, Schwechat, A



4

they are on but connect with the ceilings by skylight strips. Such details are essential to giving the user the impression of transparency and the feeling of seeing daylight everywhere in the rooms. "Planning with light means, of course, a lot more than just using glass to bring light into the building," write the architects. "The use of specific daylight systems permits us to create different atmospheres that vary greatly throughout the day. The daylight in the interior of the school changes all the time, both during the day and the seasons."

The daylight concept has been developed by fasch&fuchs in a quite traditional way – initially with their own experience and with the help of numerous working models, but without computer-aided simulation. If one asks the users what they think, the response is overwhelmingly positive: "Although some rooms can get quite warm in summer, our school is a paradise for the pupils, teachers and visitors," says headmistress Ingeborg Schramm. A mother whose son started school a few months ago described the school as "an oasis of light and hope." Above all the school has become a

real second home for the children, as is obvious from the comments. Not just because the schoolchildren are looked after here from 0800 to 1700, whereas most schools in Austria are only half-day tuition institutions. Ingeborg Schramm tells us that the children feel so at home in the building that some of them simply do not want to go home at the end of school. This is probably a much more essential quality criterion than interdisciplinary benchmark tests and other offspring of educational bureaucracy, particularly for a special school.

INGEBORG SCHRAMM HEAD TEACHER



At present, our school has 81 pupils divided into ten classes. They are at school five days a week from 8 am to 5 pm. They all have special educational requirements. Some of them suffer from Down's syndrome, some from Pelizeus-Merzbacher disease and others have various congenital genetic defects. There is also one Intensive Care class for children with extreme behavioural handicaps and other development related learning handicaps.

All those different needs place special demands on the physical design of the school building. One example of such a design decision is that the classes for the seriously handicapped children take place on the ground floor and are easily wheelchair accessible. Each of those classes also has direct access to the garden via a winter garden.

One of the pupils in those classes is Minnea: she suffers from Cri-du-chat syndrome (cat cry syndrome) and is severely mentally handicapped. She loves playing with light and shadows and spends a lot of time in front of the huge glass wall that separates the garden from the classroom and uses the incoming

light to project shadow figures onto the wall.

In contrast to our old school building – a simple structure with badly lit cave-like classrooms – our new school is a bright and calm building that lets you experience nature's changes during the year.

The sports hall is the heart of the school. It is a meeting point for the pupils during the break and other events.

The children can move around freely without putting themselves or others at risk. Even though more pupils attend this school now than in the old school, it seems that everything calmed down a little bit. You can feel this during the classes as well in the school breaks.

Except for the 'Snoezelen Room' every room is lit by direct sunshine. The children often stand by the big glass windows in the upper floor to look out and enjoy the view or to just talk and learn or play. The overall mood during the day is calm and relaxed. Even in the teaching breaks, when it used to be noisy and hectic in the old school, it is nice and calm now. One of our special features is the indoor swimming pool. Some children ask me daily if they may

come to school at weekends too, because they really like to be there and play in such a nice environment. I'd also like to mention that it is not just the children who like to spend their time at our school – even the teachers use their time to chat, prepare their classes or sit together and socialise at the school.

Every evening we have to 'fight' with some children who simply don't want to leave school and go home. Hanna, for example, cries every day when she has to leave school. She has a loving and caring family but her mother often has to wait for an hour or so until Hanna is ready to leave.

When I became principal four years ago we had 57 pupils. Now I get two or three calls a week from parents asking if we can accept their son or daughter in our school. Everyone describes our school as a place of peace and harmony. People often mention qualities like openness and friendliness when they visit our school.

One of our parents recently expressed his thoughts about our new school in a letter:

"I love my Pascal, even though a handicapped child can bring a lot of chaos to the family. To us, it brought a divorce and a lot of sorrow, and we

never felt 'at home'. On the 10 January, my son and I were on our way to the new school in Schwechat with heavy hearts at the prospect of an unknown future in the new school. Then we took our first steps into the school and all the sorrows were left behind on the street. The school felt like an oasis of light and hope. Its wonderful atmosphere of harmony engulfs every person from the first moment. Maybe this sounds like an exaggeration, but it is just as I have described. Thank you for this wonderful building."

But there's also a saying in Austria: where there is light, there is also shadow. That's also true for our school. A building with a lot of glass doesn't only have advantages. The glass parts in the winter garden are dusty and dirty from the rain, but cleaning is pretty expensive – so the glass stays dirty. In the school kitchen the glass is equipped with a rain sensor, so you can't open it when it is raining and on very sunny days the winter garden gets hot. That's all – honestly!



VELUX INSIGHT

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LEARNING THROUGH LIGHTNESS

Primary School in Kingsmead

Text by Oliver Lowenstein.
Photos by Torben Eskerod.

With his highly regarded new primary school in Kingsmead, a town in the north of England, Craig White and his office, White Design, achieved two objectives: the building is not only an ideal learning environment for schoolchildren, offering a great deal of daylight and fresh air, but also allows them to gain first hand knowledge of the advantages of a new, lightly built architecture which is oriented to ecological criteria.

Previous: The Kingsmead Primary School was made almost completely of wood. Its robust architecture leaves enough leeway for artistic creativity and the children's need to move about freely.

Below: Cross-section with ventilation concept

Opposite: The concave entrance side of the school faces the street. The teacher's room and the offices are located here. The schoolchildren can park their bicycles under the projecting roof.



When Cheshire County Council placed their advertisements for new teachers to run their new £2.4 million sustainably designed school showcase they were taken aback by the level of interest in the posts – over four hundred applications – remarks the head teacher, Catriona Stewart. That interest, however, was only the beginning for Kingsmead primary school. Ever since opening in the autumn of 2004, Stewart and her colleagues have been showing architects and planners, educationalists and teachers, as well as politicians and journalists round Kingsmead primary school's friendly, warm spaces on a regular basis. The school in north west England has won a string of awards in the UK, and set new standards for sustainable school design, to the extent that Sunand Prasad, the new president of the Royal Institute of British Architects (RIBA), stated at the time that the building then led the field in the UK.

All this would have been praise enough at any time. However, coming as it did early in the present British Government's programme massive £45 billion *Building Schools for the Future (BSF)* programme,

such attention has propelled the whole project process into a small group of exemplars for many aspects of the programme. It has also been remarkably prescient for all involved, as mainstream British culture has been rapidly, if belatedly, waking up to the challenges of global warming and environmental issues in general over the past two years.

Kingsmead was an early result of a Cheshire County Council policy review document in 2002/3 that committed the Council to a further 'greening' of its building stock. The County Council worked in a partnership that included developers Willmott Dixon Construction and White Design, who applied a joined-up sustainable systems approach to the design and construction process. Titled *Re-thinking Education*, the approach draws into the mainstream many well-known sustainable ideas – including using local contractors, emphasis on natural materials, minimising waste through recycling and high value design. The long, north-facing, crescent-shaped building, comprising 7 classrooms for 210 children, is in the middle of a new mid-range private

housing estate. The developer donated the site to the County Council in exchange for allowing the development of the estate. While many children walk to school from these local homes, it would be interesting to know how sustainable the estate design and construction process actually were.

The building itself sits on a piece of open land amid a new residential development, curving in a concave semi-bow shape away from the entrance, protecting the large playing field on the far side of the school. The entire single-storey building is clad in Western Red Cedar and held up by a glulam timber frame column and beam system from a Danish factory. Although the initial brief was to use timber available locally this proved impossible. The school furniture is also mostly wooden, with bamboo used in some of the flooring and recycled materials in some of the carpeting.

The raised central entrance projects out towards arriving visitors; inside, the reception foyer opens onto a circulation corridor following the curve of the building. To the side of the foyer, a sports hall space joins the two wings of the buildings. The wings con-



tain the staff, admin and other office rooms to the front of the building and classrooms on the far side, opening onto the playing field through five facade buffer winter garden spaces; in effect potential greenhouse learning rooms as well as fire exits. Flexibility has been designed into the classrooms, with partitioned walls enabling class sizes to be increased or reduced according to need. The class and admin rooms are bathed in well-provisioned natural light, and the north-facing classrooms benefit from more constant light levels and lack of sun-glare. The building employs natural ventilation techniques to maintain optimum temperatures, with the air entering via controlled opening and closing of facade and roof windows by a building management system. Even though these techniques are backed up by a biomass boiler to cope with seasonal variations, natural lighting and ventilation are important articles of faith to White Design. The practice is committed to designing buildings for human beings rather than, as they put it, places for machines to live in.

For Stewart and her staff, the natural lighting is one-half of the two best ele-

ments in the school's design – the other is the super-insulation. Each of the classrooms is bathed in light from two sizeable roof windows, while much of the rest of the school – along the corridors to the library and hall – also benefits from access to daylight. Stewart talks of how even on dull, overcast days they do not have to switch on any artificial lighting. As Stewart observes, 'the natural daylight is more human to work under and reduces light fatigue and the 'institutional' feel to the school, as well as cutting our carbon emissions.' She mentions another head teacher she met at a recent schools conference who had taken over another brand new school and found her budget being eaten away by the need to light not only much of the school but also much of the playground – and this in daytime. That school's electricity bill was equivalent to a part-time teaching post, she says, further demonstrating to Stewart the pragmatic, economic benefits of designing in natural lighting and ventilation.

Kingsmead school's appreciation of these natural features, is underlined by the use of timber, giving the school the feeling

of warmth characteristic of this renewable material. The sustainability dimension is also immediately evident in many other examples throughout the building. This is because White Design's approach to school buildings seeks to promote the sustainability elements as learning and teaching instruments, helping children to become more aware of how the different aspects of a sustainable building actually work. So while the inverted roof holds a £28,000 photovoltaic solar energy array, 4 Solartwin water panels (heating an expected 30% of the school's water needs) and a rainwater run-off system, far more interesting for the children is a vertical perspex pipe in the foyer reception area. Rainwater runs through this pipe before being re-used in the toilets around the building, vividly demonstrating to the children exactly how much run-off there is and how it is being re-used. Similarly, there is an electronic measuring device in the corridor showing how much water is being collected and in the adjacent library, a Solartwin panel has been donated by the manufacturers, providing tactile 'before your very eyes' experience of how this piece of kit works.



Left: Kingsmead is intended to allow the schoolchildren to appreciate the benefits of lightweight and ecological building. The construction of the school was therefore left openly visible and would even be usable for gymnastics.

Opposite: The spacious classrooms are on the north side of the school building and receive uniform light through the roof windows – ideal for art lessons, for example.

Stewart has also made the most of the specially designed corridor area, which includes a cooking and home economics area. The cooking area is used to introduce elements of the maths and science curriculum, through counting and measuring processes. The school also uses the area to cook the school meals from fresh raw materials, which, while not particularly new to some parts of European educational thinking, has not been much incorporated into recent English educational practice. With an extensive expanse of open land, the school has been growing organic foods, which, when ripe and ready, are then eaten by the children – the ultimate in learning by doing. Apple trees and a small organic garden are used by the children in a hands-on approach.

In terms of its reception across the British educational and school design scene, Kingsmead School has been a success. It is used as a template by Cheshire County Council both for further new schools and in other building types across its public sector stock. Post-occupancy evaluation research has shown that many of the sustainability aspects are not working to expected lev-

els of efficiency but these issues are being addressed. Since Kingsmead's completion, White Design has been refining this building model for a number of other schools in different parts of the country. Today, almost three years since the school opened, the architects have moved on to what they call Kingsmead 2, with a new primary school building in South Wales about to open. With the BSF programme well and truly kicking into gear – the third and fourth of its fifteen waves are now at different stages of completion – schools like Kingsmead continue to set the agenda of what is expected in UK school building design culture.

Oliver Lowenstein runs the green cultural review *Fourth Door Review* (www.fourthdoor.co.uk) The new edition, no 8, out this autumn features a special focus on sustainable school buildings, with White-Design's Linda Farrow writing on the role of systems theory in designing schools.

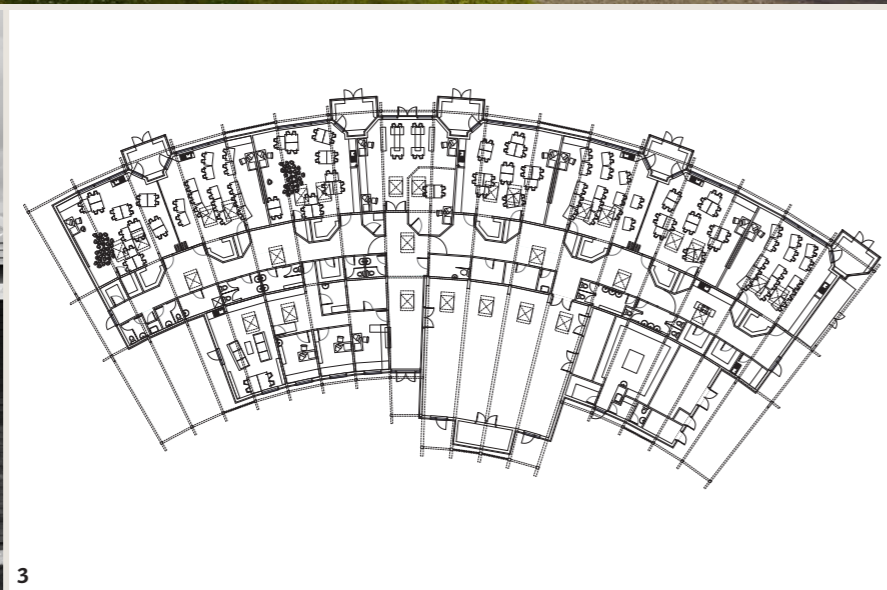


Facts	
Type of building	Primary school for 210 pupils
Location	Kingsmead, UK
Client	Cheshire County Council, UK
Architects	White Design Associates Ltd, Bristol, UK
Year of completion	2004

1. The facade seen from the north is highly varied in spite of the serial method of construction. All the classrooms receive daylight through two rows of windows, one of which is at eye level and one just under the roof. Small winter gardens serve as emergency exits and extensions to the classrooms.

2. Two solid glued wooden trusses along each axis of the building support the roof which rises towards the north and south. The facades were panelled with red cedar.

3. Ground plan



INTERVIEW WITH CRAIG WHITE



Mr. White, your practice has designed a number of new schools of the highest environmental standards in recent years. What do you consider the main challenges in contemporary school buildings?

In the UK, one of the main challenges is connected with the structural problems of how we provide funding for this massive school building programme, which is called *Building Schools for the Future* (BSF). There is a vast amount of duplication in the preparation work. It is a waste of time and is not delivering what we need. One way round this has been the One School Pathfinder schools, which is a locally funded alternative to BSF. Each local authority is able to test a building and other approaches through this separate Pathfinder funding strand. This is happening all round the country, including Manchester where we have just handed over a new school, and also Cheshire, which resulted in the Kingsmead School.

Another challenge is the quality of the design. We're able to engage in design, while many practices still consider schools as boxes where teaching takes place. When architects are designing a school building, it is important to realise that those who will inhabit it are real people. So a participatory approach for the hundreds of people will have great potential. Some architects may pay lip service to this but once awarded the contract they will get on with their design. But the participatory route has a very liberating power to it. We attempt to engage all the stakeholders – head teachers, teachers, pupils – right from the beginning, to enable them to get the most out of it. It is very participatory, which is very important. Young people, and also staff, have brilliant ideas. These can be integrated by using the school-building process as part of the teaching and learning process.

What does the term 'sustainability' mean to you – and White Design?

First of all it means understanding the impact we, both the industry and

as individuals, have. And not just in the sense of having seen Al Gore's *An Inconvenient Truth* film. You have to consider all the consequences, which include the environmental, economic and social, and look at each of these and what their impacts are. People underestimate what these impacts are. In terms of specification, people have to understand issues such as – do you know the materials and products you're using? Where have they come from?

This comes from the initial question of knowing that if we build, it will have a fundamental impact in one shape or form. We accept that, although there are some who say the answer to that question is to stop building. You have to look at all the impacts of engineering and designing buildings. In the UK, 48% of carbon emission is attributable to the building sector and 20% of building materials end up on landfill sites. This is changing because of more stringent regulation and it's a matter of both carrot and stick. These stringent regulations and energy studies are raising the bar. We would even pose the question of whether it should not be illegal to be building bad-quality schools and other buildings.

Many practices can hardly keep up with the cycle of new, updated regulations every four years. The environmental imperative is forcing the industry into having to do this self-examination of practice faster. When we talk with other practices, we offer the advice that if they aim only to keep up with the regulations they'll be out of date. We say you need to be targeting for 2010 and working from there. The architectural world needs to understand and get beyond this short-term approach, although it is hindered at present by various differing guidance conflicts. While some practices continue to adhere only to minimum standards, I think, this will soon be perceived as not being enough.

Are health and sustainability issues particularly important in buildings for children, such as schools?

Health and well-being in schools are intrinsically linked to sustainable design. To reduce energy consumption, we design buildings to maximise on natural daylight and ventilation. Both of these have direct and measurable positive impact on teacher and student performance. Professor Brian Edwards from Edinburgh College of Art School of Architecture¹ surveyed 42 'green' schools and 42 con-

trol or 'ungreen' schools. His reported results were higher exam performance and improved teacher retention and recruitment costs.

How important is daylight in your work, and do you think its importance in architecture has increased over the last decades?

I'd like to turn the question around, and ask why should it not be important? In terms of natural lighting and natural ventilation by passive means, we introduced natural ventilation and natural daylight as a core principle in our design. These deliver healthier environments and healthier children, which contributes to improved learning outcomes. This is backed up by high level research – for instance Lisa Heschong of the Heschong Mahone Group in the USA². Heschong has contributed significant level research using very, very large samples – around 3,000 – over long periods of time. She showed that access to natural light and ventilation speeds up the ability to learn in both maths and reading.

In the US about a decade ago it was policy to teach in what were, in effect, enormous, artificially lit barns, with neither libraries nor English literature classes. Heschong's research helped get things changed by providing solid evidential reasons. One piece of Heschong's research concerned two groups of children, each in their classrooms for the same lengths of time – one in a classroom with natural daylight and the other, the control group, in an artificially lit classroom with no daylight. The control group of children learned about 20% more slowly than those with natural daylight. Heschong factored in possible external influences as quality of space and quality of teaching.

This also is an influence on workplace environments. When the naturally-lit building of ING Bank in Holland was opened, research was conducted that demonstrated a 10% improvement in work levels in a new building.

The conclusion is that artificial light is significantly less healthy. Artificial light gives a uniform level and transmission of light, which, at a rate of 750 lux, lowers people's abilities, sterilises the environment and reduces our ability to learn. At its extreme, the absence of natural and continuous artificial lighting is a recognised method of torture.

But when all that is said, I am not against artificial lighting. We need it in certain contexts. But the spec that

says 500 lux lighting at every desk-top is a mistake. Dynamic daylighting is preferable. And people know natural lighting is better at a common sense, intuitive level.

Are you saying that 'green design' is a moral imperative for you and that it should be made legally binding, or is it 'just' a business and ought to be regulated by the free market?

For us designing a building is a moral issue. I would prefer to ask the normal bulk builders why they would want to design buildings that deny the spirit that is working, living, learning and teaching in it? Why would you want to build a box that is dulling rather than uplifting?

This ethical dimension is also being seen at a corporate and social responsibility level. I actually think some of Industry is ahead of the government and way ahead of the architects. It has set an interesting challenge to the profession.

In terms of what is happening here compared to the rest of Europe, although I haven't practiced in Germany or Denmark for two years, these countries are ahead of the UK at a regulatory level in day-to-day terms. None the less, they can appear to be a bit lackadaisical, slack and complacent – they take sustainability as a matter of course. If things have not progressed quite so far in the UK, there is a momentum here at the moment that suggests our architects could catch up and leapfrog what is happening in parts of Europe. The challenge really lies not in today's context but in what we will be able to do by 2050.

Interview by
Oliver Lowenstein

¹ See Brian Edwards 'Green Schools: Speculations on the relationship between design and performance with particular reference to Hampshire'

² Lisa Heschong's research can be found on her practice's website www.h-m-g.com

MORE LIGHT!

We all know what daylight is. But do we? The 2nd International VELUX Daylight Symposium, held in May at the Guggenheim Museum in Bilbao, presented a host of new findings about daylight, as well as new tools for daylight simulation and evaluation. Daylight is complex and, as many speakers argued, architects and engineers will have to embrace this complexity in its full scope, while at the same time making it manageable in the design process.



For the second time since 2005, VELUX brought together more than 200 experts from all over the world to talk about daylight. With its light-filled architecture, the Guggenheim Museum by Frank Gehry provided a suitable setting for the VELUX Daylight Symposium.

What do sailing and architecture have in common? Far-fetched as it may seem, this question may have arisen in more than one participant at this year's VELUX Daylight Symposium, which was preceded by the award ceremony of the VELUX 5 Oceans Race. Only four out of seven single-handed sailors who had taken up the race in October 2006 had finished the three legs of the race, enduring up to 159 days of thunderstorms, heavy seas and chronic lack of sleep.

So what do sailing and architecture have in common? What is important in both cases is not only the sparing use of resources and the quality of the materials employed, but also the way in which people and technology interact. However, another important question in both aspects of life is how people act and react towards nature. Should they try to master it while paying the price of failure, should they allow nature to direct them as it will and go along with the flow, or should they try to avoid extreme situations by taking appropriate action in advance and thus still succeed in arriving at their goal? One of the reasons why Bernard Stamm from Switzerland, the undisputed winner of the VELUX 5 Oceans race was so successful is said to be that he sailed his yacht, *Cheminées Poujolat*, in such a way as to minimise stress on the material at all times, even in the heaviest storms.

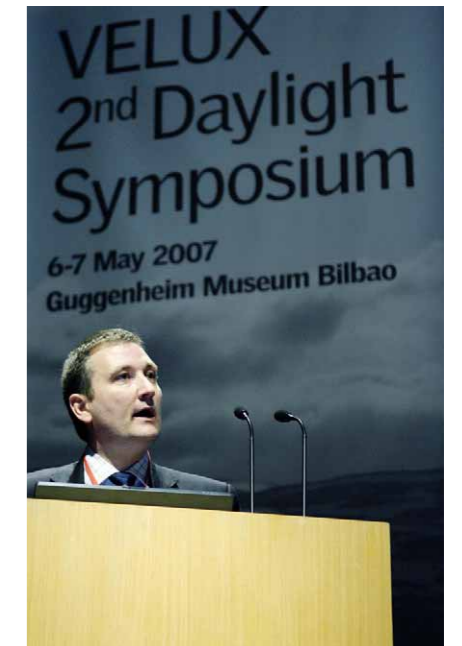
As in the area of sailing, the use of daylight in architecture concerns new uses for

one of the oldest and most environmentally compatible sources of energy that exists. The influence of the climate and daylight on the human body and the latter's physical well-being, as well as the goal of not only withstanding the elements but also making profitable use of them, were key points in the discussions during this year's VELUX Daylight Symposium. This series of events started in 2005 in Budapest and, in future, the symposiums will take place regularly every two years to enable representatives from research and practice (light planners, architects, college teachers, home construction companies and people from the political scene) to take part in a professional dialogue and exchange of ideas.

Light and Health: old knowledge and new discoveries

In Budapest in 2005, the symposium had focused on how daylight conditions in buildings could be defined in a simple and understandable, but comprehensive, way and how the best possible use of daylight in the built environment could be achieved. This discussion continued in Bilbao but was complemented by a second, equally important topic: how does daylight, including direct sunlight, affect human health and well-being, as well as on human learning and working performance?

James Benya, head of Benya Lighting Design, Professor of Environmental Design



at the University of California and moderator of the symposium, says: "In the past two decades, medical and health research has begun to focus more on light and its effect on human health. Beyond sleep disorders, the profound role of the circadian rhythm and the cycles of endocrinal activity became undeniable. At long last, a unified understanding of light and its impacts on the human, from vitamin D synthesis to the vast array of body activities directly affected by light, has been accepted." According to Mr. Benya, there are two main drivers in the development of daylighting solutions for buildings at the moment: the energy and environmental issue, as well as human health and performance. "Studies conducted throughout the world, as well as a growing number of codes and standards, all support the need for daylight and a view. While the cause is not yet totally clear, the effect is repeatedly demonstrated through research of many different kinds."

Richard Hobday, an expert on daylight and human health from the University of the West of England, stressed the importance of direct sunlight for life, and hence, for architecture: "Sunlight has been used as a medicine for thousands of years. The ancient Egyptians practised sunlight therapy, as did the Greeks and Romans who had solariums on the roofs of their houses where they could sunbathe for health." According to Hobday, widespread problems such as vitamin D defi-



Left: Due to her committed presentation on daylight in American schools, Lisa Heschong (Heschong Mahone Group) remained in the memory of many members of her audience.

Right: In the breaks during the symposium, the participants had the opportunity to exchange opinions in discussion rounds with a chairman.



ciency and unhealthy conditions in hospital wards are a direct result of sunlight deprivation: "We get 90 percent of our vitamin D from the sun, but we spend 90 percent of our time indoors. Therefore vitamin D deficiency has become endemic in our societies. And even people in very sunny countries do not necessarily get a lot of exposure to sunlight, because they have adopted western lifestyles."

Also, there is little point in trying to escape the circadian rhythms that are imposed on us by the sun, says Richard Hobday: "The sun is the single major driver of the human body's biological rhythms, more so than the normal daily routines of breakfast, work lunchtime and so on. People who do not expose themselves to the sun can feel permanently jetlagged."

Light and learning: the sun as the ultimate teacher

Few people have conducted as profound research on the effects of light on human learning as Lisa Heschong has. Heschong, an architect and head of the Heschong Mahone Group in the USA, has carried out studies with thousands of students in the western USA in which the effects of spatial qualities such as classroom size, orientation, daylight and view on pupils' learning performance were assessed. In almost every single study, daylight and views out of windows were among the most consistent factors with a

high influence on students' learning. They were much more significant, in fact, than the number of pupils per class or absenteeism rates. In her presentation at the VELUX Daylight Symposium, Lisa Heschong pointed out the reasons for this: "Light is a 'drug' that stimulates the production of serotonin, dopamine and gamma-aminobutyric acids in the human body, enhancing impulse control, motivation, muscle coordination, calmness and focus."

Problems with insufficient daylight, lack of a view to the outside world and insufficient space are nothing but a faint memory now at the special school for handicapped children in Schwechat, Austria, the main case study that was presented during the first half of the VELUX Daylight Symposium. Head teacher Ingeborg Schramm, herself a speaker at the symposium, said: "In contrast to our old school building – a simple structure with badly lit cave-like classrooms – our new school is a bright and calm building that lets you experience nature's changes during the year." The new building, designed by architects fasch&fuchs from Vienna, allows not only more daylight in, but also provides more openness in a literal sense, as Hemma Fasch, principal of fasch&fuchs, explains: "To plan with light means much more than just to put glass in a building. Our intention was also to give a sense of self-confidence to the children by exposing them to society to a certain degree."

Tools for daylighting design: cardboard or computers?

One of the main characteristics of the new school at Schwechat is its playful complexity. In this respect it may come as a surprise that the daylighting design for the building was developed entirely with 'hands-on' methods such as cardboard models, but without the aid of advanced computer simulations. This is by no means atypical in contemporary architecture. While the building design process, including structural engineering and climate design, is largely computerised already, daylighting design still largely relies on 'rules of thumb', personal experience and, at most, large-scale physical models. For how long will this situation last? Jan Ejhed, professor at the Royal Institute of Technology in Stockholm and moderator of the second part of the symposium, observes: "The complexity of the daylight planning process will increase. As a consequence a suitable design methodology and new design tools have to be developed. Questions that have to be discussed are: What do the new tools offer and what do we really need? and Is there a risk that we are missing some really essential qualities?"

Magali Bodart, a researcher and teacher at Université Catholique de Louvain, is strongly in favour of traditional methods, especially in architectural education. "Experience indicates that it is essential for architects to personally appreciate the luminous

environment of a space and to compare several solutions quantitatively and qualitatively. This intuitive appreciation obtained by scale models and the three-dimensional perception of the light distribution cannot currently be obtained by use of computer simulations. Moreover, the correct use of a daylighting simulation programs is too complex to be taught in that context."

Zack Rogers, head of daylighting consulting for the Architectural Energy Corporation (AEC) in the USA, points out that there is a huge variety of computer programmes available on the market that assist architects and lighting designers at virtually every step in the design process. He adds: "When designing a building, architects should think about daylighting from the very beginning, as questions of siting and building orientation are vital."

The demand for easy-to-use tools that take into account direct sunlight and shading, orientation of the building and climate data is immense, and computers seem to be a more-than-welcome help in this respect, as they also allow for greater interactivity and quicker changes in the designs. In his presentation at Bilbao, Henrik Wann Jensen, chief scientist at Luxion in California, provided the audience with a glimpse into the future of daylight modelling in computer-rendered visualizations. To convince a client of a design, he argued, a realistic, unbiased visual representation is equally important as

accurate lighting calculations. Luxion's latest software allows for a photorealistic representation of complex objects such as cars in different settings in real-time. These software solutions are already common in the car industry, where they can actually save money; design decisions can now be based on the computer-rendered images rather than on costly clay models in 1:1 scale. And if this sounds futuristic already, the Luxion software designers have more up their sleeve; Molecular Appearance Modelling is a method by which the visual appearance of a substance, including colour, transparency and refraction of light, can be simulated based solely on the molecular structure of the substance.

Beyond the Daylight Factor

In the discussions at the Budapest Symposium in 2005, participants had already perceived a need for new methods to calculate, simulate and assess daylight in buildings, and eventually also for new legislation that make their use mandatory. As John Mardaljevic, a researcher from De Montfort University in Leicester, explains: "The Daylight Factor method, established a half-century ago, is still the most commonly used approach to determine a quantitative measure for daylight in buildings. Despite the fact that its limits are manifest, it continues to be the dominant approach because of its familiarity and simplicity rather than as a reliable

measure of daylight provision."

Christian Vogt, lighting designer at Vogt & Partner in Winterthur, says: "At the moment, the daylight factor is still the best – and only – measure we have at our disposal." Others were more critical towards this measure, which is founded on illuminance ratios under a standard overcast sky, thus insensitive to both the orientation of the building and any notion of climate. Lisa Heschong says: "The daylight factor is useful yet very crude. New tools are needed that take account of the variability of daylight, and of climate issues." Yet these tools, she maintains, must not make things unnecessarily complicated: "In daylight design, architects basically have to deal with too much information. The future challenge will be to work this complexity into a simple guideline."

One concept for a new measure in daylighting was presented by John Mardaljevic at the VELUX Daylight Symposium. It is based on what Mardaljevic calls 'useful daylight illuminance (UDI)'. UDI defined as the time per year when the illuminance levels in a given spot in space are between 100 and 2000 lux, i.e. in a range in which daylight can make a substantial contribution to the lighting of a space, while at the same time avoiding excessive glare.



The need for daylight – and for continued dialogue

Whatever methods of calculation will finally be universally accepted, the need for a change was perceived by many participants at the Symposium. "It is time for architects, engineers and designers worldwide to always consider the impacts of daylight on human health and performance in the design of the built environment," says James Benya. "Beyond good design practice, it is perhaps time to demand daylighted environments through codes and standards that make well-daylighted buildings the rule rather than the exception. In schools, where mankind's future spends much of its waking hours, it's a no-brainer."

Moreover, daylight has proven to be a priceless but cost-free tool to reduce energy consumption in buildings, as Magali Bodart observes: "In the framework of global climate change, the good integration of daylight in buildings leads to reduction of energy consumption and is a way to sustainable architecture. However, for most architects, daylight remains a theoretical concept as they never really take time to study and to experiment this field. For these reasons, it is essential to teach daylight to architects during their studies."

Lisa Heschong points out that architects should by no means be afraid of the complexity of daylight: "Daylight is highly variable. So embrace this variability! Play

with daylight, don't fight it, take advantage of it – but don't necessarily build the place that always provides 'perfect', uniform light conditions."

Daylighting, as one of the last fields in building design, is now probably replacing 'rules of thumb' with advanced tools for modelling and simulation. The resulting increase of accuracy, speed and interactivity will be a benefit to the whole building sector – if the new tools are easy enough to operate for a broad variety of users. In any case, there is plenty of movement in the field of daylighting, and plenty of demand for continued, interdisciplinary dialogue. The VELUX Daylight Symposium has proven to be a unique platform in this respect as well as a showcase for up-to-date daylighting solutions. As one delegate from Poland put it: "Thank you very much for inviting us to this conference. It is essential for us to recapture the value of daylighting. It may have been abandoned for a while, but it is now definitely coming back."



The atrium of the Guggenheim Museum rises more than 50 metres above the heads of the symposium participants – a homage to daylight which is as unique as the outer form of the museum.

BACKGROUND

Throughout its history, VELUX has keenly focused on the optimal use of daylight in all kinds of buildings. This keen interest is naturally linked to the roof windows, a product which the company has developed and refined for more than 60 years. Through the design and production of its windows and accessories, which regulate the inflow of light and control sunlight, as well as initiatives relating to legislation and research in the areas of daylight and indoor environment, the company has continued to express its interest in the use of daylight.

Stimulating an interest in daylight in modern architecture is an important mission for VELUX – not only the daylight that enters through the products VELUX manufactures – but also daylight in general. From large-scale town planning to the individual building and its space. The VELUX Daylight Symposium and the international award assignment for students of architecture – "the International VELUX Award for Students of Architecture" with the common theme of "Light of Tomorrow" – are some of the most important initiatives in this area.

FACTS

Date: 6–7 May 2007
Place: Guggenheim Museum, Bilbao

PARTICIPANTS

Around 300 (architects, lighting specialists, teachers and others with an interest in the subject) from 24 countries

MODERATORS

James R. Benya, Benya Lighting Design, University of California, USA
Jan Ejhed, Royal Institute of Technology (KTH), Stockholm, S, President of the European Lighting Designers' Association (ELDA)

SPEAKERS

Dr Richard Hobday, University of the West of England, Bristol, UK
Lisa Heschong, Heschong Mahone Group, USA
Hemma Fasch, Architect, fasch&fuchs architects, Vienna, A
Ingeborg Schramm, Director Sonder-schule Schwechat, A
Christian Vogt, Vogt and Partner, Licht-gestaltende Ingenieure, Winterthur, CH
Dr Magali Bodart, Postdoctoral Researcher FNRS, Lecturer at Université Catholique de Louvain, B
Zack Rogers, Architectural Energy Corporation, LightLouver LLC, Boulder, USA
John Mardaljevic, Institute of Energy and Sustainable Development, De Montfort University, Leicester, UK
Henrik Wann Jensen, Chief Scientist at Luxion and Associate Professor, University of California, San Diego, USA

DISCUSSION FACILITATORS

Steve Selkowitz, Senior Scientist, Lawrence Berkeley National Laboratory, USA
Marc Fontoynt, Professor, Director Laboratoire Sciences de l'Habitat, Département Génie Civil et Batiment, ENTPE, F
Werner Osterhaus, Centre for Building Performance, School of Architecture, Victoria University, Wellington, NZ
Per Olaf Fjeld, Professor at the Oslo School of Architecture and Design, President of the European Association of Architectural Education.
Jens Christofferson, Senior Researcher at the Danish Building Research Institute (Statens Byggeforskningsinstitut – SBI).

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BOOKS

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THE LIGHT REVOLUTION

Health, Architecture and the Sun

Author: Richard Hobday
The Findhorn Press
ISBN 978-1-984409-087-7

Human beings are rediscovering the sun. New medical findings in the past five years have repeatedly made clear what unimaginable effects the light from our central star has on our health. Sunlight is just as effective against depression as the most common psychopharmacological drugs – but it has far fewer side effects. Sunlight accelerates wound healing and suppresses the sense of pain. What is more, sunlight supplies the body with vitamin D, thus protecting us against cancer, heart diseases and osteoporosis.

But does the rediscovery of the sun also have practical consequences? Richard Hobday, British engineer with many years of experience in solar building, is sceptical about whether mankind will actually be able to turn these findings into a new sort of architecture and appeals in 'The Light Revolution' to

learn building anew with the sun, with architects working and thinking in terms of harnessing the sun rather than excluding it. 'The Light revolution' is about man's quest to construct more hygienic, better ventilated and better lit buildings – in a nutshell, healthier buildings. His protagonists are a rather different collection from those who generally emerge in books concerning architectural history: Imhotep, who was a doctor, high priest of the Egyptian sun culture and building master in a single person; Vitruvius, in whose work the correct alignment of a building to the sun plays just as important a role as formal aspects; George Bernard Shaw, the Irish writer, who had a revolving shed built with which he could always follow the position of the sun; and Florence Nightingale, the pioneer of modern nursing, who insisted on having direct sunlight in her wards –

"It is the unrestricted result of all my experience with the sick that their need for sunlight is only exceeded by their need for fresh air..."

Richard Hobday did not call the first chapter of his book 'Nothing New under the Sun' without good reason. The ancient Romans knew about the disinfecting and psychologically stimulating effect of sunlight. However, the blind confidence in psychopharmacological drugs and antibiotics allowed the positive effects of sunlight to fade into oblivion from about the middle of the 20th century – with fatal consequences as Hobday writes. To mention but a few: Vitamin-D deficiency is rampant throughout the world with over 50,000 people annually falling victim in the USA alone as a consequence; depression will probably have developed by 2020 to become the worldwide second most frequent cause of death; and mankind is experiencing

the return of so-called 'super-bugs', highly resistant pathogens whose treatment can barely be managed even with antibiotics.

According to Hobday, three factors impede building with the sun. First, direct sunlight is still considered to be injurious to health and a cause of cancer; second, building standards require non-glare for many interiors and therefore favour indirect daylight or even artificial light; and third, the tendency towards energy saving has resulted in buildings in which window areas are minimised and insulating material thicknesses are maximised.

Hobday's suggestions for how a new "solar architecture" might appear remain rather vague. In fact, the author gives only a sparse number of examples from the 20th century in his book – from Alvar Aalto's sanatorium in Paimio to Richard Neutra's Lovell House in Los Angeles – but their description is altogether too superficial. The strengths of 'The Light Revolution' lie clearly in the medical-historical area. Hobday supports his thesis of the "healing sun" with a multiplicity of studies and quotations. The fact that he questions a whole number of established beliefs held by from orthodox medicine and architecture makes his book interesting.

'The Light Revolution' is a provocative contribution to the debate on future preferences in architecture. As such it should be taken seriously, because he represents a somewhat unorthodox point of view in a highly eloquent and well-founded way.

DOMESTIC LANDSCAPES

Authors: Bert Teunissen,
Saskia Asser
Aperture
ISBN 978-1-59711-040-2

For about ten years, the Dutch photographer Bert Teunissen has been photographing interiors from a slowly disappearing world. Houses, usually in rural regions, built before the world wars, before electricity and running water were introduced into human life; and their inhabitants, nearly always members of the older generation, often scarred physically and emotionally by a life of manual and low income, but always radiating a calm dignity.

The motives for the series 'Domestic Landscapes', which have now appeared for the first time as a book, lie partly in Teunissen's own biography. He writes in the introduction:

"Domestic Landscapes is my quest for the special light and atmosphere that were so familiar to me when I was a small boy, and that still exist in this world. Because I am sure that they are fated to disappear, [...] I would like to retain them for my children, and yours, to get acquainted with."

When photographing, Teunissen always uses only the natural light that falls through windows into a room. This moves his work rather unconsciously – without it ever having been his intention – close to the realm of the genre and window pictures from the golden age of Dutch painting, from painters such as Jan Vermeer and Pieter de Hooch. But 'Domestic Landscapes' is about more than just light, room and atmosphere; it also says something about the life-styles and customs of pre-industrial Europe that have all but disappeared:

"Domestic Landscapes is also about identity and originality. Every area of the world has its own distinctive culture, which is expressed by its customs, language, cuisine, and all kinds of traditions. The inhabitants of the houses I photograph still know how something should taste, how it has to be made; they understand the importance of time and maturity, they know the meaning and value of repetition – every day, every year..."

There is little to add to Teunissen's own representation. 'Domestic Landscapes' is a fascinating journey of discovery from the first to the last page, a book in which time seems to have stood still, the documentation of 'another' Europe beyond that of big city society, economic growth and great visions of the future. "I simply have to take these photographs. There is no way I can, or want to, resist the need to do so," says Bert Teunissen.

ENVIRON(NE)MENT

Authors: Gilles Clément/
Philippe Rahm:
Publisher: Giovanna Borasi
French/English
Skira Editore
ISBN 88-7624-959-1

When it comes to the environment, mankind has always had two world views competing with one another. The one sees it as an inexhaustible reservoir of resources, there to be exploited for the benefit of the human race; the other sees it as a highly complex network of biological and physical processes with which man should not interfere too much for his own sake.

But in the last few decades more and more artists and architects have

taken sides for a better environmental balance and decried the century-long policy of exploitation. Two such people introduce this book, which came about during an exhibition in the Canadian Centre of Architecture in Montreal.

The French landscape architect and horticultural engineer Gilles Clément became famous at the beginning of the '90s for his concepts "garden in motion (jardin en mouvement)" and "third landscape (tiers paysage)". Instead of trying to impose a strange form from the outside on landscape, Clément's landscape architecture understands itself only as a framework, within which the natural diversity of species should be able to unfold optimally. His preferred places are the residual areas (spaces that are not used any useful purpose) that have temporarily or permanently fallen out of favour, whether protected nature reserves or green spaces gone wild in the municipal area of our cities.

In his essay for this book, Clément stresses that he "always wanted to work for but never against nature", whereas architect Philippe Rahm's approach is less philosophical. He analyses physical phenomena of nature, such as light, temperature and the composition of the air we breathe and their influence on humans, animals and plants. In his installations, Rahm exposes the viewer to dazzling light, oxygen deficiency or water mist; he classifies whole buildings not according to function, but according to the dominant climate zones inside. Shape and function are irrelevant to start with in Rahm's rooms; they develop only as a consequence of the climatic conditions and the reactions they provoke in the human body.

At first glance, the differences between both artists could hardly be greater. Gilles Clément lets natural

areas develop in which humans are happy with the role of being a viewer; Philippe Rahm, however, creates architectural areas in which he maintains total control – at least of the climatic conditions. But the publisher of the book, Giovanna Borasi, rightfully stresses the things both have in common: renouncing artistic form, the visualisation of the invisible in nature and the preoccupation with the processes of life at a scientific level. "Environ(ne)ment" is a visually unspectacular but nevertheless stimulating book on which to reflect about two artists who have each defined their own trend-setting term for 'nature' and 'environment'.

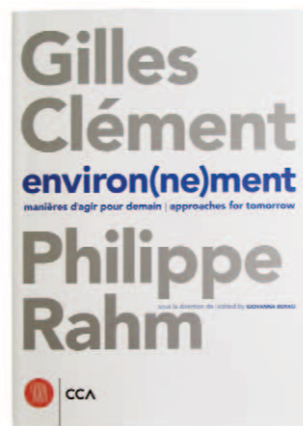
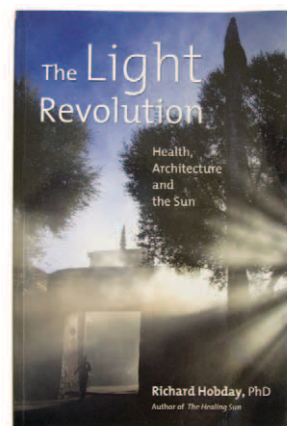
SPA

Authoress: Colette Gouvion
German version
Knesebeck Verlag
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Les bains dans le monde
Aubanel
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The culture of spa bathing became a fringe phenomenon in the fitness and fun society of the late 20th century. But in the past ten years it has taken the world of tourism and architecture by storm. The reasons are various: stress taking the upper hand with many town dwellers, a new awareness for gentle and alternative methods of healing and probably also the model function of outstanding buildings such as Peter Zumthor's hot springs in the Swiss town of Vals. With the rediscovery of relaxing spa baths, an interest has also been found in the associated traditions. This is satisfied in the book

'Spa' in a brilliant way. Colette Gouvion takes her readers on a journey through the baths and spas of the world, from the hot springs of ancient Rome to the Japanese *onsen*, the Russian *banja* and the *hamams* of the Maghreb. The author weaves historical facts, beliefs, hygiene and moral aspects into an inspiring narration about the culture of bathing. She describes how medical findings and the structure of society, religion and superstitions affected the architecture of the baths, and how these nearly completely disappeared during the baroque period in Central Europe, for example. Long upheld prejudices are also dispelled; for example, the story concerning the physical hostility of Islam. In Christian Europe, however, a true religiously sanctioned bathing prohibition brought about a hygiene disaster that, as Colette Gouvion writes, spurred the Englishman Havelock Ellis to remark that a Christian would rather let the constantly changing outer surface of his body bathe in dirt than run the risk of sully the shining purity of the immortal spirit.

Although one would have wished a little more detail here and there, and the author deals with the great European spas of the 19th and 20th century more or less in a subordinate clause, she has succeeded in writing a visually stimulating and, as regards content, impressive work with 'Spa'. That she errs in the final chapter by stooping to the depths of the do-it-yourself enthusiast and cosmetic industry, and gives furnishing, travel and shopping tips, must be put down to 'customer service'. However, it suits neither the style nor the pretensions of the book. Nevertheless, this conceptual break cannot really detract from the overall positive impression made by 'Spa'.





Philippe Rahm: *Météorologie d'hiver / Interior Weather*, 2006. Installation at the Centre Canadien d'Architecture, Montréal. Photo: Michel Légendre / CCA Montréal.

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