Every building is inextricably intertwined with the site where it is located. The section will follow the topography of the terrain, and the ground plan will be suitably aligned to the natural light. But what is more important is that the location also influences the choice of materials, the appearance of a building and the actual texture it finally possesses.

If an architect takes these factors into account in his work, while remaining aware of the special features displayed by the surrounding area, natural characteristics become the fundamental values of architecture which does not subordinate itself to the current vogues or passing trends. Each project makes a fresh start though a process of analysis and reflection on these basic underlying values.

The architect must have some idea of what kind of architectural space he wants to create. Does he want it to suggest an invisible influence, radiate an aura of peace or evoke specific feelings? Or does he want to proclaim a visible influence and thus make it a more complex place to live in but with a more powerful form of expression? Whatever decision is reached, in both cases the use of light and the final texture of the building will determine the architectural result, which should be in harmony with the use to which the building will be put.

Light and texture are inseparable, forming a conceptional unity. The fall of light into a building depends to a large extent on the materials used and is therefore a factor that should be taken into consideration when choosing these materials. The right choice of materials can exert a powerful influence on the way in which an architectural space is perceived. Ribs and wave shapes in the facade, seams of light in the floor or intermittent lighting points make light an architectural element that harmoniously complements the actual texture of the building. However, it is not only light and its presence in buildings and on surfaces that is important; lack of light and the presence of shadows are of equal relevance. Although light and shadow are complete opposites, they should be combined to generate an overall effect.

Texture, however, not only depends on the type of material. Structures, proportions and the arrangement of elements also determine the texture of any body. In architecture, this body is the building – and the arrangement of its elements is the expression of common sense.

Fernando Menis
In a time of digital design, several architects take up the challenge of exploring the vast possibilities of bringing forward virtues in well-known materials by new means of constellation, structuring and cladding. After decreasing materialization and abstraction of surfaces during Modernism, architecture is currently rediscovering the texture of materials as a property that has a strong influence on the atmosphere of spaces and the ‘aura’ of objects. Surfaces are no longer treated as purely two-dimensional, but become three-dimensional in their own right, and in doing so become more susceptible to the interplay of lights and shadows.

We are proud to present the VELUX conference centre on Tenerife, as an excellent exponent of this tendency. Through the exceptional use of textures varieties in one building material, the ensemble brings a flow of scenes to life by the distinct daylight on the Canary Island.

Coming from issue #2, which dealt with how housing turns into homes, how processes and products turn out to become living environments, we move on displace to look at our physical surroundings. In the issue of Daylight & Architecture at hand, we focus on ‘Texture’. New ways are constantly sought and tried in the search of creating optimal living and working environments. We invite you to see traditional materials, seen through a different optic. How does the thermal insulation of a polar bear actually work? Can ivy be used as a façade material? In Graz, the InnoCad office casts new light upon building in a historical context with an active use of materials, thus demonstrating different textures in the exteriors as well as in the interiors.

In VELUX we seek to have a constant dialogue with professionals about the progress in construction business and architectural profession. The magazine aims to present another example of our engagement with the European Association for Architectural Education, EAAE. Since 2001 VELUX has been a sponsor of the EAAE prize ‘Writings in Architectural Education’. In the VELUX dialogue article, Per Olaf Fjeld looks into the topic of the 2003–2005 edition with the theme of ‘New Knowledge’. The current prize edition 2005–2007 deals with representations in architecture, Communication – Meaning – Visions. In these reflections and perspectives, we hope you will enjoy reading #3.

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**NOW**

The new Cathedral in Oakland and the headquarters of the Barcelona Waterworks are both buildings which embrace the enhancing effects of daylight. Jeroen Hoorn designs a pavilion made of glass blocks in gable, Mario Botta and Rudy Ricciotti spread a delicate glass veil over the Louvres’ Visconti courtyard. And more: The newly constructed ‘Camera obscura’ of Madrid, the Chamber of Commerce by Rafael de la Hoz.

**TEXTURES**

**CONGRESS CENTRE ‘MAGMA’, TENERIFE**

The desert lands of southern Tenerife are the site of an unusual congress centre. MAGMA, the work of architect Fernando Monni, comprises concrete cubes which appear to have been hewn from the island’s cliffs of lava, and a corrugated roof made of fibre cement panels. Light infiltrates the interior of the building through narrow gaps in the walls and roofs.

**REFLECTIONS**

**NATURAL SURFACES**

What do ostrich eggs, hazelnut shells and polar bear skins have to do with architecture? Actually not as little as one might assume, according to Dr. Udo Küppers, a scientist at the University of Bremen. His articles looks at the bionics of natural surfaces and highlights some of nature’s “inventions” which could become models for architectural components – or have already been used as such, for example in transparent heat insulation systems.

**VELUX INSIGHT**

**A DRESS FOR SPECIAL OCCASIONS**

By adding a shining gold-coloured façade made of copper shingles to their residential and commercial building at the edge of Graz’s old quarter, the young architectural bureau Innocad created an architectural landmark of national note. The building’s “Sunday best dress” communicates with its environment on many different levels: It picks up the yellow colouring of the adjacent historic buildings and simultaneously provides an interpretation of the logo used by the architectural bureau, which has moved its offices into the ground floor.

**VELUX PANORAMA**

Natural stone walls a metre thick juxtaposed alongside delicate exterior and interior construction in steel and glass: The Czech architect Lucie Kavanova explored the theme of opening extremes in her conversion of the Koubal mill for residential use. Also: The Shenhofen on the shores of Lake Neusiedler, an ensemble of old and new buildings set against a natural backdrop has been ‘rooted’ in its environment by architects Nalbach and Nalbach by dense ivy growth.

**MANKIND AND ARCHITECTURE**

**ARCHITECTURAL WEAVING**

Weaving, one of the oldest cultural techniques known to man, is of outstanding importance to architecture. This special association was recognized long ago by the German architect and theorist Gottfried Semper (1805–1879). Peter Bundell Jones looks at how Semper’s theories on textiles architecture have evolved since the mid-19th century, and at the links existing between weaving and architecture today.
The things that make architecture tick: events, competitions and selected new developments from the world of daylighting.

CHRIST THE LIGHT CATHEDRAL IN OAKLAND

The ‘Christ The Light Cathedral’ in Oakland, near San Francisco is scheduled to be completed by the beginning of 2008. The new construction by Craig Hartman from Skidmore, Owings & Merrill (SOM) replaces the historic St. Francis de Sales Cathedral which was destroyed in 1989 during a severe earthquake. Its name ‘Christ The Light Cathedral’ goes back to the document ‘Lumen Gentium’ which was published in the 1960s by the Second Vatican Council and begins with the words ‘Christ is the Light of All Peoples’. Hartman raised it to the agenda: ‘Ultimately, this Cathedral, like those throughout history, is about the consideration of light as a sacred phenomenon – and the poetic introduction of light within the spaces of worship. The infant is its own light to resemble modest materials – primarily wood, concrete and glass’, he writes.

As with many places of worship in the Pacific area, the new church is predominantly constructed from wood. Its arches are up to 40 meters high and their internal walls are shaped like two spherical shells. Lamella-like wooden panels are inserted between the curved beams. They gradually slope from the bottom to the top and make the wall appear ever more translucent. The external weatherproofing of the new cathedral comprises two conical segments from glass with ceramic glaze which are mounted at a distance of one to three meters in front of the wooden structure. At night, the light from the church streams through the panel construction and into the open. The cathedral is transformed into a gigantic lantern, which shines its light far over the water. The central space of the church is divided into two story heights like an abstract pixel pattern. Their light is replicated in the reflecting floor and ceiling panels, like in the entrance area, softened by translucent screens.

PHOTO BY GERALD RATTO

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TORRE AGBAR IN BARCELONA

Even when it is often assumed: Jean Nouvel’s new office tower in the Catalan capital received its name not from the Arabian ruler ‘Agbar’ is nothing but an acronym for ‘Aguas de Barcelona’, the municipal waterworks. The designers would like the structure to be understood as a symbolic ‘fountain’ from glass, light and air. Of course, the Barcelona inhabitants saw this differently: Since the commencement of works in 2002 they accompanied the building with partially amused, partially affronted comments on its phallic shape. The parallels to the “erotic gherkin” of SwissRe by Norman Foster are unmistakable and may even be intended. Different to this building Jean Nouvel’s tower on Avenida Diagonal unfolds a play with light reflections in all colours of the rainbow. Façade modules from varnished corrugated aluminium sheets in 25 colours form the inner façade layer; glass lamellas with four different degrees of transparency, which are attached externally with various inclines and angles, let the tower seemingly ‘spray sparks’ in the sunlight. The lighting atmosphere in the interior is decisively defined by the small windows, which cover the entire façade irrespective of the storey heights like an abstract pixel pattern. Their light is replicated in the reflecting floor and ceiling panels, like in the entrance area, softened by translucent screens.

PHOTO BY ROLAND HALBE

‘This is no tower, no skyscraper in the American sense [...]; it rather is a fluid mass, which has just oozed out of the ground, a geyser under a constant, measured pressure.’ Jean Nouvel
The building “could not allow itself to have a backside”, comments Jeroen Hoorn on his design for a new fast food restaurant in Rotterdam’s centre. The motorized and pedestrian traffic flows around it from all sides; adjoining are an underground train station and a busy skater park. Hoorn designed “a solid little box that’s high enough for the skaters and that echoes the robust styling of the surrounding offices from the late 70’s”. The client had suggested a façade from gabions, a solution that’s hip enough for the skaters and that also filters the light on the Islamic Arts.

The motorized and pedestrian traffic flows around it from all sides. Light leads the visitor through the museum; in the exhibition areas covered with light-weight roof structure, which is supported by four flyover steel columns. Only the roof’s 80-centimetre high spatial load-bearing system is clad on both sides with a composite, its surface being finished with thousands of small glass elements. This ‘veil’ functions as a weather protection for the room located below, but also filters the light and refracts it into the prismatic colours. This effect bathes the exhibition room in a diffuse and colour-intensive light, which favours the visitors’ comfort as well as the conservation of the exhibits and casts a positive and stylish light on the Islamic Arts.

In Spanish the word ‘Cámara’ means not only ‘chamber’ or ‘room’, but also ‘camera’. Based on this linguistic (and semantic) relationship, Rafael de la Hoz substantiates his winning design for the new Madrid chamber of commerce. ‘The Cámara de Comercio’ is situated on a narrow site between an arterial road and the motorway, a park adjoins at the side. De la Hoz makes all of them visible for the visitor, by opening up the building (or in his terminology: the ‘Cameras’) towards the exterior over three multi-storied glass façades. Additionally daylight enters the central atrium via a glass roof, which is supported by an enormous grill from reinforced concrete. Behind every one of these three ‘lenses’ of his camera de la Hoz positions an object as ‘crowning jewel’. In the west, towards the motorway, a solid metal cube penetrates the glass façade. In the south, in the direction of the park, a glass cube projects towards the exterior.

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When Gottfried Semper presented his argument about the four elements of architecture he was already fascinated by the question of polychromy: the claims that antique buildings had been finished in highly coloured ornament. He was also reacting against claims that architecture originated in pure construction, particularly in the masonry wall. The intellectual context was the debate about classical antiquity and supposed origins running back through Egypt and Assyria, with sideways references to China. Archaeology and anthropology were still in their infancy, so ideas about primitive origins were highly speculative. Semper presumed that the hearth was the starting point, first element and moral base. Elements two and three were the mound and the roof: mud or masonry being the basis of the first, carpentry of the second. This prepared the way for the fourth element to which he gave most attention: the enclosure made by the Wandbereiter through the process of weaving. According to Semper, because the enclosing wall had originated in a hurdle or a carpet, it was a Bauscheidung and should bear the noble memory of this origin. This not only opened the way to a revival of applied ornament in colour, but made it a moral duty, and suggested that an appropriate decorative vocabulary might be inspired by a study of weaving. Semper was working at a time when, as Ruskin put it, ‘ornament is the principal part of architecture’, and it is appropriate decorative vocabulary might be inspired by a study of weaving. Semper was working at a time when, as Ruskin put it, ‘ornament is the principal part of architecture’, and it is perhaps significant that Semper’s theory was revived during post-modernism, when justification for applied cladding was again being sought, and a new interest had arisen in the persisting memory of past technologies, for example in useless applied quoins or keystones. Semper’s argument about the primacy of cladding is hard to support today, at least as a general principle. Certainly there have been tents in many parts of the world, and houses of the Amaz- oonian rainforest like the Tukanano Maloca would have warmed Semper’s heart as the perfect proof of his theory: a timber framework covered in mat-like constructions of plaited grass. But there are also many mud and masonry constructions where the earthy material is primary, and the wall thick and solid. In some cases, through vaulting, the wall even becomes the roof. There is plenty of precedent, too, for the Gothic Revival obsession with spanning by the layering and interlocked construction is evidently carpentry, it is a building of roofs. The whole basic expression lies in the layering and interlocked joining of the complex wooden roof structure, which dictates both the curved outer forms and the elaborately bracketed corners (fig. 3). The carpenter is clearly the boss, and is the primary actor in building rituals, of much greater status than the mason who only builds the base. The building stands clear and open on its columns before the infill partitions and outer walls are added: the cladding is therefore secondary. There is, however, a strong differentiation between the wall of cladding – die Wand – and the solid wall – die Mauer – of mud or masonry. The latter is used in China and Korea as the outer property boundary wall, broken only by a roofed gate. Its strength and solidity keeps strangers and contagion out while the actual wall of the building, which may in places be no more than a paper screen, remains a mere filter between house and court or garden. The hot, humid summer climate brings a need for through airflow and for a finely adjustable barrier, but the effect of the layers of screens and blinds also produces a subtlety of spatial layering with strong social and aesthetic consequences. Recent examples from Japan show that this tradition persists in some places as strongly as ever. Traditional Japanese house planning revolved around the tatami mat (fig. 1), an archetypal work of weaving the size of a bed which sets the house’s module. The paper-clad sliding screens or shoji which stand in as their vertical counterpart possess a woven quality, particularly with their gridded geometries and modular frames. Modern examples reveal that the availability of glass has not altogether displaced the desire for the translucency and play of light which the shoji brought. Also woven in traditional Japanese architecture are bamboo fences: those of the Katsura Palace are surprisingly simple yet highly refined in their detail. Here is strong evidence for Semper’s claim that the logic of technique gives identity to the form.
The origins of weaving

A knowledge of modern ethnology would have both undermined and substantiated Semper. The primacy of the hearth, so obvious for a northerner, is in many warmer climates far less important. The focal nature of the fire for Native Australians, on the other hand, would lend strong support to Semper’s claim for his first element, and the interlocking of a few branches to make a quarter spherical enclosure as a shelter in corroborates his famous book on the Dogon, reporting a long narration of the loom that have since come to light. In Marcel Giraud’s series of oppositions. The Kabyle loom relates to the female role and the male protection of women: ‘It is in front of the loom wall, facing the door, that the young bride is made to sit... When one knows that a baby girl’s umbilical cord is buried behind the loom, and that, to protect a maid-en’s virginity, she is made to step through the warp, from the side facing the door to the side next to the loom wall, then the function of magical protection becomes evident... From the standpoint of her male kin, the girl’s whole life is summed up in the successive positions she symbolically occupies vis-à-vis the weaving loom, the symbol of male protection.” The stepping through the loom as a kind of symbolic threshold is especially significant in view of Bourdieu’s theory that geometry originates with the body, and in the basic bodily actions of moving forward and backwards, to left and right or up and down. Not only does this provide a pre-Cartesian account of the three dimensions in architecture, it also suggests a basic role for what one might call choreography, the coordination in space and time of many bodily movements. The primitive theatre in which Native Australians carried out their presentations of the Dreamtime myth in their all-important initiation rituals was no more than a marked out piece of desert with a few windbreaks and strategically placed piles of firewood, yet it served as the necessary frame and definer of roles for the whole pageant: as a marker for the choreography. The event that brings this idea of choreography together with weaving and the loom is dancing around the Maypole: each dancer holds a strip of cloth attached to the central pole, and they weave in and out, knotting their threads in a particular pattern. It is soon unravelled again, but for a moment the dance is shown to have a physical product: moving bodies recording their movement in a woven product.

Below (top) The timberwork of an ancient Korean temple reveals the high art of woodworking in the old, east Asian cultures. Skeleton structures like these provided the basis for the development of lightweight, open-worked or plaited external wall claddings.

Below (bottom) Front view of a Dogon dwelling house. In the same way that the interweaving of warp and weft symbolizes the joining of man and woman in marriage in the Dogon faiths, the niches beside the entrance represent the occupants’ family tree. Right: Wattle and daub wall filling of a half-timbered house. This too consists of coarsely interwoven, pliant branches, but is subsequently concealed behind a thick layer of clay, straw and plaster.

The Sago palm is the main building material of traditional Papua New Guinean dwellings. Posts are made from the trunk of the palm, wall shingles and the roof from the leaves, and floors from the skin of the trunk.
WEAVING IN ARCHITECTURE
Apart from its presence in various kinds of cloth used for clothes, bedding and furnishings, weaving appears in traditional rural architecture in three forms: the making of hurdles and fences, the use of similar techniques for the infill of timber framed walls, and in thatching, particularly the finishing and edging. Old lashed fences seen now only in open-air museums were particularly beautiful in contrast with the concrete posts and barbed wire we are usually faced with in the country today, and depended on a precise knowledge of the type and age of trees to be used. The infill in timber frame (fig. 1), made of intersecting horizontal and vertical elements, gained strength from the tensions in its interlocked materials, but was then lost to view by being plastered over on both sides. The woven nature of thatch is most evident around doorways and fences, the use of similar techniques for the infill of walls in timber framed buildings of Günter Behnisch. Some of these layerings are visual, others environmental, and it is a commonplace that the exterior of a building might be considered like clothing: a raincoat to keep out the rain, a pullover for insulation, and so forth. Perforated metal grids and screens, which produce the visual effect of a weave without being woven, have seen widespread use in the last 50 years, notably by Jean Nouvel. Herzog and de Meuron went further to create facades in large-scale mimicking of hurdle-like form with their signal box Auf dem Wolf of 1988–95 (fig. 7), but this was just one theme among many in their work about redefining the nature of facades, always with a consciousness of the effect of materials. Cable-nets and grid shells, as pioneered by Frei Otto and his Lightweight Structures institute (fig. 8), are like woven material in the sense that they have a warp and a weft, are flexible, and have forms dictated by tension forces. Cable-nets particularly are like spiders’ webs, a reminder that the spider may be nature’s lowest weaver, but it can produce material of great complexity and beauty, and it does a kind of ballet in producing it.

Peter Blundell Jones was trained as an architect at the Architectural Association in London, from 1966 to 1972. He has written extensively on architectural history and theory, and has published books on Hans Scharoun, Hugo Häring, Günter Behnisch, Gunnar Asplund, the Graz School of Architecture, as well as the anthologies ‘Modern Architecture through Case Studies’ (2000). Peter Blundell Jones has been a Professor at the University of Sheffield.

1 Griaule, Marcel Conversations with Ogotemmeli. Oxford University Press 1966, p. 79. (Original French title Disc from the ground. Rates the seemingly hovering silvery disc from the ground.)
2 Peter Blundell Jones, The Kabyle house or the world reversed, in his book Algeria 1969, p. 137.
MEGALITH CIRCLE
IN THE DESERT

Text by Jacob Schoof.
Photos by Torben Eskerod.

Down at the southern fringe of Europe and right in the heart of Tenerife’s tourism area on the south-eastern coast, Fernando Menis of Spanish practice AMP has created a congress centre of sheer archaic monumentality. Menis applied both patience and boundless creativity to foster an abundance of forms and textures that are largely unrivalled from only two external finishes – exposed concrete and fibre cement panels.
The southeast of Tenerife Island is a barren land—a semi-desert shielded by the volcano Teide (at 3718 metres the highest peak on Spanish territory), whose sparse vegetation rather betrays the close proximity to Northern Africa than to the distant mother country. If it was not for the booming tourism, one would have very little reason to suspect the existence of larger human agglomerations here—let alone one of the most important public buildings to be built on the island for the last decades. The 30 million Euro project MAGMA was originally planned as a pure congress centre, but during the planning phase the brief was extended to include theatre and concert facilities as well—finally a complete auditorium was added. In the future the building is to host regular concerts by the Orquesstra Sinfonica de Tenerife, which so far mainly performs in the auditorium of the island’s capital Santa Cruz that was designed by Santiago Calatrava and opened in 2003.

Last not least, due to its good traffic location MAGMA is expected to become a focal point for Southern Tenerife’s economic and cultural development: the motorway bound for Santa Cruz runs directly behind the building. The site was partially excavated out of the slope; facing towards the sea it forms a raised platform with a number of ramps running up to it.

At first glance, the congress centre situated above the town of Adeje curiously both draws on elements of international expressionism and a certain classic, tectonic heaviness, which the Spanish architecture of recent years has rediscovered. Fernando Martin Mencia is well aware of this ambiguity of his design. He writes: ‘From a distant point of view, the building presents itself as an arrogant construction in its forms, expressive and strong, while in short distance it dissolves in the territory, blending with the environment.’

Striving to label the unusual new building of Adeje with a common stylistic tag many critics have already likened it to Frank Gehry’s architecture. Just like the Californian in his best buildings, Mencia also plays with the tension of solid cubes and undulating roof elements. However, the congress centre lacks the vertical gesture of Gehry’s buildings that reach to the sky; it stays close
With mobile partition walls the upper conference level can be divided into a maximum of 26 small rooms. The space is mainly left open, then offering an unrestricted impression of the majestically curved roof, which towards the corners lowers down to the floor level.
to the desert sand, thus pleasantly keeping a very down-to-earth profile. Menis compares the solid concrete cubes carrying the roofs to blocks of solidified magma; the undulating roofs themselves symbolise for him a liquid in movement that outlines the space in every direction.

As one approaches the building, the fragmented shape as a whole is broken down into individual building elements with an impressive presence and many contrasting textures. Accordingly, Fernando Menis had all concrete finishes treated in such a way so they appear like rough blocks straight from the quarry: while the side facades received a diagonal formwork, which conjures up the image of a pattern left by a gigantic jigsaw, the far ends where subsequently roughened with jackhammers.

A massive steel lattice with suspended 45cm tall steel girders supporting the ceiling cladding below served Menis as roof structure. The irregular and double-curved roof surface was calculated and manufactured with the CATIA software. It was originally developed for aeroplane engineering and was successfully used on a string of biomorphic building structures during the last years. The undulating roofs are clad internally and externally with flexible fibre cement panels overlapping each other like scales. Even at the edges where the upper and under side of the roof meet Menis strictly avoided any edge profiles in order to sustain the rough, stony appearance of the building. Hence, the roof edges received a jigsaw pattern that harmonizes with the rough chiselled concrete finish. Interior mechanical services such as ventilation and electrical services, the soundproofing and guide rails for the acoustic partitions are concealed within the roof cavity.

A total of twelve concrete megaliths positioned in a nearly polar array subdivide the building plan, carry the roof loads and contain secondary spaces like WCs, escape stairs, offices and the press centre. The three building entries are located in between. They are equally low-rise and are shaded by sturdy balcony parapets and cantilevered roof segments. The main entrance leads from the forecourt to the foyer space and the adjacent public cafeteria to the left, which is to insure a minimum of public life.

Left View through the upper level. Lighting is provided by flush halogen spots in the ceiling and lighting slits in the roof, through which daylight enters the interior (always indirect).

Right The main staircase to the upper storey reveals Martin Menis’ sculptural qualities. The façade of the rear office wing (in the photograph to the right) shows the patchwork from the smooth formwork pattern and the subsequently hammered concrete surfaces.
Above The Tatami mat is the most important item of soft furnishing in the traditional Japanese residence and, at the heart of the room, a massive, triangular balcony cantilevers from the upper floor into the auditorium. Just as natural rock formations, the formwork pattern on the walls hardly ever run exactly horizontal or vertical; the diagonal is always dominant.
even on days without conferences. A second entrance leads from the rear of the building to the administrative wing; a third one is only used for large events and leads directly into the auditorium.

Visitors entering the building with the expectation of a common conference centre with industrial aesthetics, modular steel-glass walls and endless ceiling grids are bound to marvel at the resourcefulness of Fernando Menis’ architecture: with sheer skill he gave the cave-like large spaces not only a special atmosphere, but also a flexibility that lives up to highest international standards. The 2350sqm multi-purpose hall on ground floor that houses a concert stage can also be subdivided into a maximum of nine smaller conference rooms. Also the upper floor can be used either as one 1865sqm conference hall or can be subdivided into a maximum of 26 smaller rooms. This astonishing flexibility of the programme is ensured by sound-insulated sliding walls, which are stored in back-of-house zones (Menis calls them ‘wardrobe rocks’).

In the entrance hall epitomises all the archaic power of this building: it is low and wide and relatively dark; huge hollow reinforced concrete girders span across the hall at such a level that occasionally they almost appear to be within reach. The ventilation ducts have been integrated into the girders and the lighting system sits in the deep, dramatic recesses between them. Once again, Menis highlights here the concrete mass by showing the untreated formwork finish at the underside and by chiselling the sides. The adjacent main auditorium with its large ceiling span takes up the full height of the two to four storey building. Numerous recesses and alcoves not only make passing through the building a real sensual experience; they also enable many different uses at once: congress meeting and private conversation, lectures as well as informal social interaction.

Instead of simply fulfilling a programme and catering to every conceivable kind of use the building itself inspires a multitude of activities. The down-to-earth, stubborn architecture is at once functional and artistic: it is rational enough to enable all kinds of activities as well as being a sculptural work of art in its own right that does not depend solely on its use. In the best sculptural tradition Fernando Menis makes masterfully use of daylight. In southern Tenerife summer daytime highs of 40 degrees Celsius are common and generous direct day lighting of interiors is not advisable. Menis generally lights the spaces indirectly and makes restricted use of direct sunlight to highlight volumes or finishes. Narrow wall and roof light slots (grietas de luz) and circular openings – real ‘light holes’ (agujeros de luz) – are the most frequently use daylight openings in design. In this respect, the press centre on the upper floor with its repletion of boxed hollow concrete girders and roof strip lights makes for a particular dramatic spatial impression. At night time, powerful halogen floodlights fitted into the ceiling gaps light the building.

Both the final building and the design process followed a sculptural design intention: the first ideas for MAGMA were shaped in a plasticine model hardly bigger than a shoebox; this was followed by larger models out of plasticine and Styrofoam that where then directly translated into architectural drawings. Like the work of a sculptor, Menis’ work flow followed a pattern of trial and error: only a few details were pre-planned and many things were only drawn, redrawn and then changed again when the project was already on site. For such a geometrically complex building with such an abundance of details like MAGMA an extremely close involvement of the architect in the building process is probably an absolute must. In this particular case the building was only made possible by a totally loyal construction team that followed the many twists and turns of Menis’ ideas nearly without condition.
Left The congress centre’s colour and surface texture change in the course of the day. The roof overhangs are calculated in a way that they optimally protect the building from the strong midday sun.

Right Detail elevation of the concrete façade. The concrete was mixed with regional mineral powder, in order to adapt its colouring to the surrounding rock formations.
My home – which has had a decisive influence on my work – is the Canary Islands. Because of its particular geographical position with its large distance between Europe and America and the closeness to Africa, the archipelago forms an excellent cultural and economic connecting link between the three continents. The volcanic origin and the prevailing light conditions, colours and shapes account for the typical character of the islands which are surrounded by the Atlantic. These unique, natural conditions for their part influence the architecture, which does not submit to zeitgeist or short-term trends. When carrying out my projects – which try to capture at least a part of this uniqueness – I collect and analyse the materials which are characteristic for a building location. This approach has affected my architecture for many years. The design of a project partly on location has the doubtless advantage that examples can be produced on a 1:1 scale, allowing us to make changes in colour shades or discover unknown textures for certain materials. The site of the future building is thus also integrated into the project in this way. Because the materials used depend on the surroundings, independent of the outline of the building, what the facade will look like or how the building is to be divided up, I always choose the most suitable materials in my architecture, which are not only aesthetic, but also harmonise with the environment of the building. The appearance, the colour and the texture are the showpiece of a building. The art and congress centre MAGMA Arte & Congressos on Tenerife, for example, uses flowing lines to express itself, which start at the ground and continue over the walls to the wave-shaped roof, which sits enthroned above everything and gives the building a self-contained feeling. The dominating material is concrete, as this harmonises well with the hinterland and the desert-like landscape of the south of the island. In order to help match the concrete colour more to the landscape, brittle stone originating from local quarries, which is typical for this region, was added and is responsible for providing the ochre colour. The external texture of the building is a reminder of the eroding landscape of the south and also gives the building vitality, depending upon the day-light. The light thus underlines the texture of the building from outside. In the interior, on the other hand, light is used in another way: It gushes in cascades over the floor and walls and gives rise to a diversified play between light and shade.

Fernando Menis
Reflections
Text by Udo Küppers.

Packaging bionics is concerned with the matter of technical inventions which can be derived from natural surface structures. This branch of science has already brought considerable progress to civil engineering in the past, for example, the self-cleaning ‘lotus effect’ for paints and rendering, metal and ceramic surfaces. However, the bionics of natural surfaces hides even more surprises for us, as Dr. Udo Küppers explains in his article.

Natural Surfaces

Surfaces are interfaces and as such a universal characteristic of life. One could also say: Natural surfaces are the packaging of life. Even the smallest, thinnest piece of skin just a few millimicrons of a centimetre thick, a surface consisting of a double layer of fat molecules with its respective structure, provides an extremely effective way of conserving energy within the body. The surface of a layer of bark several decimetres thick of a giant sequoia tree protects its host directly and primarily against manifold weather influences, fires or animals.

An unmanageable wealth of highly specialized surfaces spans between the smallest and largest interface of life, which evolution has been slowly improving step by step for millions of years. Inside a host there are special networks of cells (organs), for example, which differ from one another by surfaces which form borders, but still communicate with one another. It is the external covering surfaces against the environment, for example, of the human skin, which fulfil the numerous multifunctional protective functions. It is these external surfaces, in particular, which we perceive primarily as human beings. Across all spheres of life on earth, they serve to fulfil specialized tasks which are important for the survival of the host. Beauty and functionality are closely related in the case of natural surfaces. Evolution has understood how to combine both of these characteristics perfectly.

The exploration of the secrets of natural surfaces is incomplete without a glimpse into the microscopic depths of the layers. It is not until one looks on a micron and nanometre scale that the true success strategies of natural organisms and respective inorganic laminates become apparent.

Bionics is the catalyst between natural surfaces, which can serve as ideal examples of surfaces in engineering and architecture, and the functional, technical and architectural analogous product which is ready for use. It is an independent scientific discipline which can be easily differentiated from other disciplines through its analogy research:

Bionics is concerned with the systematic technical implementation and application of the construction, processes and principles of biological systems.

Products, such as the dirt-repelling facade paints or a special film to reduce surface frictional resistance, are better known to a broad audience of interested persons by the terms ‘lotus effect’ and ‘rib-let effect’. Detailed investigations on natural surfaces of the lotus leaf and the shark’s skin led to these bionic, advanced technical solutions. These are just two of many exceptional results of bionic research and development, which not only make it clear to us just how superior nature’s technology really is, but also show how easy it is to change a decade of old textbook knowledge on technical surfaces. Nature has known all along: not only the smoothest but also the optimally structured surface is the cleanest.

Packaging bionics – motor for the development of forward-looking technical-functional surfaces

Natural packaging solutions satisfy a cross-section of tasks from protection and transport to storage and quality assurance of the ‘packaged life’ more easily than packaging solutions designed by human beings. If you look more closely at the natural surfaces of an organism, you will also soon discover their ‘packaging secrets’.

Packaging bionics has in the meantime established itself as a self-contained growth area of the future within the scientific discipline bionics. It systematically analyses the elaborate variety of shapes, the clever structural combinations and the systemic transpiring energy, material and information processes of natural ‘packaging’ and, hence, natural surfaces as well (Küppers 2006, 2004, 2003, Küppers/Tributsch 2002).

The following examples of ten organism-related surfaces and surfaces covering organisms open up to us only a small window into the fantastic and highly efficient wonderland of natural surfaces.
### The Ostrich Egg – Functional Surface with Protection for Developing Life

Eggs are one of nature’s many ingenious forms of packaging, in which life can develop protected from external disturbances. This life has to be supplied through the mineral shell with life-giving oxygen from outside. Expired carbon dioxide has to be able to escape from inside to the outside. Environmental influences, such as strong UV sunlight, have to be reflected from the shell surface. Furthermore, the developing ostrich has to avoid the penetration of micro-organisms through the shell structure. Finally, the shell has to be able to withstand mechanical impact, in other words, possess a certain degree of breaking strength. These characteristics make the shell of the ostrich egg a perfectly adapted packaging in the boiling hot habitat of the African deserts.

South African San (bush-men) have been living for thousands of years in close proximity with nature, which they use for their survival purposes without destroying it. The empty ostrich egg integument is therefore an excellent liquid depot for them. Brackish water, a mixture of fresh and salt water, is filled into the eggshells by the hunters, which are closed with clay plugs and given a tribal mark and buried. After returning from week-long hunting expeditions in the desert, the water is still drinkable.

The reason for this is to be found in the special structure of the eggshell: An inorganic calcium shell structure with a columnar cross-section followed by an inner membrane of tissue (protein network). The shell is rounded off to the outside world with a smooth calcified outer layer. An organic outer skin like a tomato, for example, does not exist for the ostrich egg. As this anti-bacterial outer skin is missing, the pores of the shell function as a bacterial barrier: They possess openings with a diameter in the sub-micron range, which makes them permeable to air but not to bacteria (size 1–2 microns).

Packaging bionics utilises the properties of the breathing ability and bacterial resistance of this biological packaging. A water-repellent, actively breathing membrane coated with ceramic material was manufactured according to the same principle as the ostrich egg. The bionic packaging films used presently consist generally of normal plastic, such as pet, which are given pores in the sub-micron (pore diameter 300...
nm) to micron range using a special radiation process. The film then receives its anti-bacterial and self-cleaning effect by means of a surface treatment with non-toxic nano-particles. These nano-particles sit tightly both on the surface as well as on the walls of the pores, so that an additional anti-bacterial 'in-depth effect' is achieved. In a first comparative test in practice using standard packaging films made of pvc, the membrane showed clear advantages for use with foodstuffs to prevent fungal attack.

Other examples of further uses for this bionically developed and structured surface are to be found in filter technology and civil engineering. The fact that this particular surface structure can be applied both to flexible as well as firm technical surfaces offers a number of starting points for the architect, for example, to prevent mould formation and decay in poorly ventilated rooms. It is imaginable to use wall elements made of thin laminate, which are stiff and provide support and possess the corresponding effects of the bionic films described above.

THE HAZELNUT SHELL – BREAK-PROOF COVERING WITH INTEGRATED SUPPLY LINES

The hazelnut is distinguished by a velvety smooth outer surface, which is reflected in its particular surface structure. As this is the actual outer wall of the fruit, the outermost layer is the regular epidermis from which short hairs can grow. The astounding results of measurements from breaking load testing show that the shell can withstand point loads of up to approx. 700 N. This is, hence, in the lower middle of the range between a peanut shell (100 N) and a macadamia shell (300 N) and far lower than that of a coconut shell (10000 N). By looking through the visible shell surface into the hazelnut at high magnification under the scanning electron microscope, the hazelnut shell clearly shows the different cell shapes and the integrated transport channels for the supply of nutrients. These inner transport channels are recognizable with the naked eye as peripheral reinforcing lines. The cell networks have perfectly matched breaking strength and an integrated tubing system, making the hazelnut shell an interesting bionic object for technical engineering and functional assembly parts. The first models for rigid, thin wall elements with integrated supply lines are being prepared.

THE POLAR BEAR'S COAT:
LIGHT COLLECTOR AND HEAT DONATOR

Polar bears live in the far North of our earth, the Arctic. The coat of the polar bear is white and hence adapts perfectly to the surroundings. Colour is, however, not only an evolutionarily adaptation feature. As researchers were photographic and counting the warm-blooded polar bears with infrared (ir) cameras (infrared sensitive films detect heat particularly well), they experienced a surprise. The developed films did not show a single polar bear, although the researchers had seen them with their own eyes. Ultraviolet (uv) sensitive films (uv light possesses higher energy and shorter wavelength radiation than ir light) showed after development the polar bears as black dots in the white Arctic Sea. The coat of the polar bear, which is covered with small tubular hairs, collects the high energy ultraviolet Arctic light, conducts it with the aid of different physical mechanisms through the tube-shaped hairs to the body surface and converts it there into heat. Little of this heat is lost to the outside. For this reason, it was not possible for the camera people to sight the polar bears to start with by thermal radiation. Experiments, in which the author was also involved, confirm this biological mechanism of efficient protection against heat loss.

A similar principle for the conversion of light into heat is known in the architectural world as Transparent Thermal Insulation (TTI). Building assembly parts which use this principle consist of a thermally absorbing, black absorption layer with a transparent capillary panel (capillaries are small tubes like those of the polar bear hairs) and an external, translucent weather-proof protective layer. Compared to an opaque, in other words non-transparent, insulation layer of the same thickness on the same masonry, Transparent Thermal Insulation can conduct considerably more heat to the inside of the house through the stonework. It is therefore a very effective, energy-saving application from the field of building biocenes, which has been used successfully for many years especially in one-family and multiple family dwellings.

References

Dr.-Ing. Udo Küppers studied production engineering/machine tools and wrote a doctorate at the TU Berlin with an experimental thesis on aerodynamic, evolutionary strategic wing optimisation. Dr. Udo Küppers has been active in the field of applied bionic research and development. His core competencies lie in packaging, organisational and evolutionary biocenes, as well as bionic dynamics. Udo Küppers has held numerous teaching positions in bionics at technical colleges and universities and is the author of numerous export publications as well as several books and patents.
REACHING FOR THE SKY
TWO PASSING SEA GIANTS
SMILE FOR MY CAMERA

Photo and haiku by Michael Kenna
www.michaelkenna.net
Light and materials are inseparably connected, indeed they actually determine each other: neither is visible to the human eye until the two come together. For this reason, great architects have always also allowed themselves to be directed by the light in the choice of their building materials. They use light to draw out contrasts between different materials and they use materials that allow them to create a very specific distribution of light in a room.

Light and materials are mutually dependent on each other. Materials are key to understanding light in architecture because they directly affect the quantity and the quality of the light. Two qualities of materials— their finish and their color—are most important in this regard. Specular materials, such as glossy finishes, reflect light as a mirror does, which can result in reflected images of the light source being visible on the surface. Matte surfaces, such as natural stone, wood, and plaster, reflect light diffusely equally in all directions. Of the three aspects of color—hue, value, and intensity—value is the one that determines how much light is absorbed and how much is reflected. A white wall reflects approximately 82 percent of incident light, a light yellow wall 78 percent, and a dark green or blue wall 7 percent.1 Colored surfaces lend some of their hue to light that is reflected.

A change in materials can alter the feeling of a room and the level of illumination as well. The cheapest way to increase the amount of light in a dark room is to paint the room surfaces white. A dark room, on the other hand, can be created either by using little light in a white room or through dark surfaces. With dark surfaces, a room will look dark during both daytime and at night. With light or white surfaces, however, the effect changes depending upon the light sources used. This effect can be exploited. For example, the interior surfaces of the chapel of Notre Dame du Haut at Ronchamp are white, but due to the small quantity of daylight admitted, perceptually the surfaces grade horn light gray to dark gray. Materials are important emotionally in relation to light. The sparkle of glass, the glitter of gold mosaics, the depths of dark polished wood, and the shadows on white walls all hold emotional messages. Some of them connected with cultural settings, some of them connected to individual recollection. Some regions have building traditions and materials that respond to particular local conditions, such as the stucco alla veneziana favored by Carlo Scarpa. Requiring a labor-intensive process of application with very particular materials, the stucco ‘over time takes on a softer, more moist look, a quality of fantasy and beauty.’2

Light emphasizes the materials in Patkau Architects’ New- ton Library at Surrey, at the same time as the materials empha- size light and foster its distribution. As the architects have stated, ‘because the light of the Vancouver area can be very soft, even weak, under the frequently overcast skies of winter, the robust light-absorbing character of heavy timber and concrete, in themselves, are not appropriate to distribute natural light into a relatively deep floor plate.’ The ceiling surfaces of the library have therefore been treated where needed with material that distributes light to the interior. Near the tall sloped north glazing, where the large area of glass provides abundant light for reading, the ceiling surface is the exposed underside of the wood decking. In such a situation, care must be taken so that the contrast between materials at the perimeter glaz- ing and the sky is not too great, causing discomfort. Here the wash of daylight over the wood beams and onto the under- side of the ceiling helps to mitigate the contrast at the edge as well as even out the brightness of the ceiling from the window wall to the center of the room. About midway between the glazing and the low center beam, sheet rock surfaces painted white were applied as the ceiling surface, better reflecting the daylight down to the area below. Each material is used hon- estly to do what is needed and no more, forming an econom- ical building shell. The layering of materials discloses the role that each plays in the total realized construction.

Usually the glazing material is not the object of attention in a room. Special glazing materials, however, such as thin slabs of stone, can be emphasized by the way they transmit light. Under the barrel vault of the trustee’s board room, overlook- ing the library at the Museum of Contemporary Art (Arata Isozaki, 1981–1986) in Los Angeles, California, onyx has been used to glaze a semicircular opening and four windows below it. The onyx fits tight to the ceiling, so that the glow of the enter- ing daylight is carried along the black concrete ceiling surface. Attention is called to the onyx as it is the brightest surface in the room. The thickness of the material saves the window from

Above: Carlo Scarpa: Museo del Castelvecchio, Verona (1963–64) Light creates contrasts: the rooms in the museum are plastered with rough ‘Stucco alla veneziana’. Scarpa uses it to diffuse the light evenly and without reflections and to provide a contrast to the smooth, dark pedis- tals of the exhibits.

Text by Marietta Millet.

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being a source of glare. Light reveals and celebrates the onyx, making it the identifying feature of the room.

In the central six-story light well in the Casa Batlló (Antonio Gaudi, 1904–06) in Barcelona, Spain, Gaudi designed the ceramic tiles that cover its surfaces to manipulate light. By modulating the hue, value, and texture of the tiles, he modified the qualities and quantities of light experienced in the light well itself as well as in the adjacent apartments. The tiles range in color from a deep blue through lighter shades of blue to an off-white. The deep blue tiles are placed in their largest concentration at the top of the light well, on the surfaces directly under the daylight, glinting, interspersed with a few darker ones. In between, the colors gradually shift from dark to light. This distribution of the colored tiles even out the perceived light gradient in the light well, establishing a balanced light. Thicker patterned tiles, which reflect the light from their corners, are scattered among the smooth ones along the entire height, adding a glint of sparkle. In addition to the use of materials to manipulate the light, the shape of the light well—wider at the top and the sizing of the windows—larger at the bottom—serve to balance access to light for all residents.

An additional geometric manipulation of the section of the light well is the insertion of balconies, with glass panels serving as flooring for the balcony and as a skylight for the room below. The light that enters the apartments through the windows in the light well is therefore more equal than in the usual situation where the rooms at the top garner all the light and the rooms at the bottom are in shadow. Ventilation apertures are separate from the glazed windows, thereby adding more light to the interior when they are open. In the Casa Batlló, light was used in a thoughtful way with consideration for the well-being of the inhabitants, their need for light and air, and awful ways to provide them. Light was apparently considered at each step in the design process: concept, development of plan and section, window size and placement, surface treatments which are acting as daylighting fixtures. In the Resurrection Chapel (Erik Bryggman, 1939–41, renovated 1984) in the Turku Cemetery in Finland, the brass lighting fixtures reflect daylight with a cool yellow that warms to an amber glow when the incandescent lamps are turned on. The material and details of the fixture respond to the incandescent light. The vertical blades that diffuse views of the lamp glow with the light reflected between them. The ‘crowns’ of brass loops circling the top catch the light, as do similar ‘crowns’ higher up. The pools of gold light in the cool interior lend a warm glow over the nearby wall surface. When illuminated from below, the white material becomes a reflector, casting the light back down to the congregation. As it does so, it obscures the view of the wall directly behind it and casts a warm glow over the nearby wall surface. The material reveals what is revealing it and reflecting what is in front of it, as does a screen curtain in theater productions. Through it, one becomes more aware of the difference between the nature of daylight and electric light.

**Light muting materials**

Materials can also be chosen to mute the effects of light, to make dissimilar materials appear similar, or to make the light seem changing. The shoji screens in traditional Japanese houses diffuse all the daylight that enters, whether the skies outside are sunny or overcast. The light is first shaded by the large overhanging roofs acting as a parapet, so that the interior muted effect is constant. The interior surfaces are carefully crafted to interact with the light. Junichiro Tanizaki explores this connection between light, materials and culture, a very-soft atmosphere as in Venice.
Opposite Louis Kahn: Kimbell Art Museum, Fort Worth
(1966–72)

Light modulates material contrasts: the surfaces of the walls in the museum are made of travertine, the arch of exposed concrete. According to the direction (direct or indirect) and nature of the light (daylight or artificial light), either the contrasts between the materials are emphasised or the materials appear to blend into each other.

Converse of glass balls, Niijima Floats, by Dale Chihuly (1995 at the Seattle Art Museum), the light that is produced in a similar way to the traditional Venetian stucco, and consists of plaster impregnated with color introduced by using a wash of pink paint. The light of Boston is not the light of Venice, but the appearance can fool the eye on certain days. The surfaces seem to glow in and of themselves so that the light is more real than the material. Likewise, in the exhibition of glass balls, Niijima Floats, by Dale Chihuly (1995 at the Seattle Art Museum), the light that is cast by the glass seems to be the point of the piece. It is not the balls themselves that are so important, but the patterns of light that they cast on the surface below. The material (of the balls) transforms the light which then transforms material (the resting surface).

Louis Kahn was very aware of the nature of a material’s response to light. Kahn’s selection of concrete and travertine as materials for the Kimbell Art Museum (1966–72) in Fort Worth, Texas, was related to how their surface characteristics shaped that response: “Travertine and concrete belong beautifully together because concrete must be taken for whatever irregularities in the pouring are revealed. […] Time, he believed, would unify all materials eventually, but the architect could achieve unity by carefully choosing certain materials—wood, travertine, concrete—‘which are so subtle that each material never ruins the other […] And that’s why the choice’.”

The travertine, unfilled and unpolished, has certain characteristic ways of reacting with light that complements the reaction of concrete to light. As the light changes – outside and inside – the surfaces of the two materials shift subtly in relationship to each other. First one seems warmer, then the other does. First one appears to be lighter, then the other. One seems to have a glossy surface, and the other a matte finish, and then they switch. One looks more mortared, then the other one does. The surfaces respond to the changing light. Light is the real material here.

“I think light is as material as anything else.” – James Turrell

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1 Reflectance can be calculated by measuring the incident illumination in foot-candles (1 foot-candle = 1 lumen per square foot) on a surface and then, under the same lighting conditions, measuring the luminance in foot-lamberts (1 foot-lambert = about 3.426 candela per square meter) of the surface. Reflectance is luminance divided by incident illumination.
Golden gleams the façade of the ‘Golden Nugget’ in Graz, entirely complying with the philosophy of the young architects from Innocad. Their office, designed by the four architects themselves, embodies corporate identity and is simultaneously a residential block that glamorously presents itself in its neighbouring urban fabric characterized by the Wilhelminian style.
The Line: One unit towards the top, then to the left, further upwards, until the level on which it is positioned leaves its dimension towards the sky above Graz. The façade envelope now becomes the roof, evenly covered with a net from gold-coloured copper. The Seven Squares: They seem to change their location like pieces in a framed puzzle; the golden curtains however follow their own directive. The puzzle master does not care, he continues the moving around and places the three open squares one above the other. A Golden Termination huddles against the eaves of the neighbouring house. The light steel balcony recesses from the façade level. The ‘Golden Nugget’ located on the edge of Graz’ historic district places an accentuation, resembling a gleaming evening dress in the last rays of the sun. The external texture is a laminar net from shining gold-coloured copper tiles. It connects the neighbouring Wilhelminian style buildings painted in yellow hues, closing the street front as a homogenous entity. The staggering of the new building contour also mediates between the adjoining houses of various heights. Invisible from the outside remains the courtyard building dating from the 18th century. It was restored and coated with a gold-coloured paint (the building substance is symbolically conserved with a ‘gold coat’ for the ensuing ages).

The collaboration of the architects and project developers Andreas Reiter, Peter Schwager, Martin Lesjak, and Bernd Steinhuber began during a design seminar at Graz University. Here they had got to know and regard each other, before they founded the architectural practice Innocad in 1999, after passing their diploma. As luck would have it, all of them had individually dealt with the narrow building site of the ‘Golden Nugget’ during their studies. Four different design concepts had been developed. These days the young architects pursue a common principle. The ‘recipe’ sounds simple, which they had developed as their logo and which can be traced back to a central piece of furniture in their former office: Seven golden squares – and innumerable possibilities to combine them – form the logo’s construction set and since June 2005 also the window areas distributed in the façade of their new office, the ‘Golden Nugget’.

The ‘Golden Nugget’ is the first building the four architects have realized at their own risk and for which they especially founded the project development firm 99 Plus. Presently they are building two other houses at their own expense. The undertaking had been a courageous step, admitted the young entrepreneurs. The wide acceptance of the ‘Golden Nugget’ however proves that courage yields fruit: All seven apartments had already been sold before completion, and the city of Graz widely praised the building: At the ‘International City Forum Congress’ it was presented as an ‘outstanding example for the treatment of modern architecture in historical urban districts’.

The Innocad office occupies the ground floor and the two-storied courtyard building. An open ramp leads to the staircase providing access to the apartments. The corporate identity of the young architects is consistently translated in the interior design: Gold-painted lecterns, printed or illuminated wall elements and curtains equally emphasize the corporate presence and the communicative character of spaces opening up towards the street. The prevailing attributes are gold-painted ceilings and crude fair-faced con-
crete. On the contrary, the courtyard house interior is entirely white (a rest area not only for the eyes).

White ceilings, white floors, even light fittings and curtains, the lattice steps, and net-like balustrades form a neutral, almost unreal scenery. The homogeneous white background reflects the light entering through the inclined roof onto wall and floor surfaces, whilst offering freedom, retreat and opportunities for thoughts and their originators. In the calm of this space, which is sheltered from the street noise (and occasional customers), interne sit-ins, meditative moments and creative breaks take place.

The apartments on the contrary observe the ‘golden’ principle of the open areas facing the street: Organized in pairs they are accessible via a central platform stair, which from the first storey upwards projects from the building mass as a filigree, seemingly weightless structure. The balustrade is reticulated, like in the courtyard office building: the bottom plates and balcony parapets are made from fair-faced concrete, which can hardly be distinguished from the façade’s gold-coloured metal coating. The two-storied penthouse forms the crowning termination, which offers wonderful views to the surrounding from its generous terrace that stretches across the complete depth.

According to the planners and client, the apartments address a clientele, who esteem the value of the architecture and appreciate the fact that we offer unconventional, well cut and flexible living environments, which are otherwise not to be found on the market (Innocad in a conversation with the architecture critic Oliver Elser). It is exactly these people, the four architects can be classed among, and to whom they refer to as ‘urban people’: sophisticated and young, self-conscious and educated above average. Even when the district, in which the ‘Golden Nugget’ is located, is amongst property experts considered as not being a top location (on the edge of the historic part of town, which is classified as World Cultural Heritage; in a zone, the Graz residents refer to as ‘shards district’), it means a considerable added value for the occupants: transparency and openness of continuous floor-to-ceiling window areas on the side deliberately turned towards the public view, which suggest communication: the façade as shop window, internally as well as externally. Occupants preferring the layout to be less open, on a temporary or permanent basis, will use curtains or flexible partition elements. Again the rule applies: Appearance and texture are noble, gold is the predominant colour. Effective is the contrast to the crude fair-faced concrete walls and the white, individually designable wall and ceiling sheathing, onto which the user can perfectly well paper a ‘blossom pattern’, when he so desires (Innocad). This is a suggestion of the young architects for all those people, who have not succumbed to the charm of bare concrete or the golden textures of curtains and partition elements.
North, south and east elevations

First floor

Second floor

Third floor

Fourth floor

Fifth floor

Sixth floor

Facts
Location  Grazbachgasse, Graz, Austria
Building type  Residential and Office Block
Client  99 Plus Projektentwicklung und Bauträger GmbH
Architects  Innocad Planung und Projektmanagement GmbH
Completion  2005

Opposite The 'Golden Nugget' integrates into the existing building structure due to its colouring and cubature, without being subordinate. Quite the opposite: The golden façade has a strong presence and emphasizes the building as a unique unit.
The two young Slovenian architects Tomaž Maechtig and Ursa Vrhunc had already spent a long time looking for a suitable location for their new office when their attention was drawn to an art-nouveau building in the city center of Ljubljana. Protected as a historic building, its outside could not be changed but the run-down attic had sufficient spatial quality to make it possible to adapt to the functional and aesthetic requirements they envisaged for their architect’s office. As is usually the case when architects plan their own office, Maechtig Vrhunc Arhitekti were not only interested in having modern ‘functioning’ premises (the heating, electrical wiring and data lines, for example, had to be completely renewed) but also wanted an office atmosphere which, in everyday business, would spur on the young team of architects to their highest performance. In line with the way in which MVA works, the rooms were set out so as to be as open as possible. A walk-in wall cupboard accommodating the auxiliary rooms such as a tea-making kitchen, a toilet and a store nestles against the rear wall. A gallery for resting and as an additional work space was created on a ceiling suspended from the rafters. New skylights on two levels light up the office space, which is completely white except for a grey-green carpet. With the exception of the desk lamps, all artificial sources of light which are absolutely essential for the frequent night shifts in the office are accommodated in the “wall cupboard” zone. After the sun goes down, they bathe the cool white of the walls and furnishings in a warm yellowish shimmer.
Much love of farms and attending to details have brought new life to an old DDR holiday settlement from the last century. For the architects Jo- hanne and Gernot Nalbach, husband and wife from Berlin, it was an unexpected dream come true.

The estate, ‘Seehotel am Neuklostersee’, used to be a classic farm. Only two hours by car from Hamburg and two and a half hours from Berlin you find this very peaceful and relaxing place surrounded by forests, flowery meadows and fields. It is situated in a protected area adjacent to a bathing lake, where geese, dogs, sheep and cats feel at home as well.

In the year 2004, a new ‘barn of bathing’ as an ‘archetype’ complemented the existing ‘barn of arts’ and the two main buildings, the stone house with a restaurant and the hotel, thus forming a traditional three-winged farm, which is typical for the place. With much love of details the buildings have been furnished with a harmonious combination of old furniture from the master builder’s time and new, modern furnishing and fittings. The mixture of new and old creates a very special charm, which varies from building to building.

The ‘barn of bathing’ is available for conferences, concerts, workshops and other arrangements. The girders and oak staircases interact harmoniously with the terracotta flooring from old French monasteries. The rooms with winter gardens placed in front of them are fabulously light and nature finds its way in. Local granite stone pavement stretches from the terraces into the winter gardens, thus establishing the connection between the inside and the outside.

The stone house has a touch of Mediterranean style with beach wood parquet flooring, bright colours and a furnishing characterized by the modern cottage style. Light-coloured armchairs with cloth covers, white-lacquered tables as well as excellent food invite you to linger on. The rooms have been decorated with different materials, the shades of the design carpet are reflected in the colouring of the room. Modern built-in wardrobes are set like sculptures and although contrasting with old pieces of furniture, such as a beautiful old table, the result is harmonious.

Like the two other houses the furnishing is influenced by the surrounding. You see walnut both on the floor and in the fixtures and limestone in the damp rooms. The walls are built from clay and straw giving the surface a slightly different, structured gloss. A bale of straw as coff ee table expresses the concept of the symbiosis between nature and modern furnishing elements. Natural and artificial light have intentionally been applied as creative elements in the houses. Creole lights with mirror reflectors emphasize tables and walls. The roof windows bring the outside inside and add a special and cosy ambience to the rooms.

**Facts**

<table>
<thead>
<tr>
<th>Type of building</th>
<th>Hotel</th>
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<tbody>
<tr>
<td>Location</td>
<td>Seestraße 1, Nakenstorf</td>
</tr>
<tr>
<td>Client</td>
<td>J. und G. Nalbach, Berlin</td>
</tr>
<tr>
<td>Architects</td>
<td>Naalbach &amp; Naalbach Architekten, Berlin</td>
</tr>
<tr>
<td>Completion</td>
<td>2004</td>
</tr>
</tbody>
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1. The swimming hall is upgraded with generous window elements. Details such as the tree stumps used as tables illustrate the architect’s concept of allowing nature and a modern building to merge and become a unity.

2. The Seehotel at night – a monolith with a diaphanous outer skin, shimmering from the inside. With uniform outer walls made of larchwood, the upper floor and attic rest on a ground floor closely undressed by the surrounding vegetation.
The Kotrč mill stands on the banks of a new man-made lake in the forest of Lipnice near Lipnice nad Sázavou in the Bohemian-Moravian Uplands. Not only the granite walls of the almost 170 year-old structure are reflected on the surface of the water, according to the words of the architect Lucie Kavánová, but “the entire valley and the spirit of this place (genius loci”).

The architect from Prague planned to reconstruct the mill into a weekend house, which should also offer the possibility to live there in the long term. She wrote about the starting condition of the project: “Almost nothing was preserved of the furnishings and fittings of the mill. The water from the mill stream had been diverted a long time ago. Just the rotten shaft protruding from the massive walls of the mill still left the impression that once a mill wheel had stood there.”

First of all, natural stonewall gables were built up on the massive building, which is approx. 9 x 8 metres, to give the building its “face”, according to the architect. “This made the house slightly larger, so that it had a slight chance against the endless, high forests of the surroundings.” She wrote about the starting condition of the project: “Almost nothing was preserved of the furnishings and fittings of the mill. The water from the mill stream had been diverted a long time ago. Just the rotten shaft protruding from the massive walls of the mill still left the impression that once a mill wheel had stood there.”

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The stonemasonry of the mill’s massive stone gables can hardly be distinguished from the new parts in the upper area. The protruding tiled roof has been replaced by a sheet-metal roof that is almost flush with the wall.
The series documents recurring themes and preoccupations which run through all of Utzon’s work. What emerges is a rigorous yet free “process of work” rather than a style. These volumes are a must for anyone interested in Utzon which, to my view, should include anyone interested in the ability of architecture to inspire.

**Plan Magazine – February 2006**

**VELUX DIALOGUE**

**The EAAE Prize: Setting the agenda for architectural education**

By Per Olaf Fjeld.
Photos by Jacob Boserup.

The EAAE Prize aims to stimulate original writings on the subject of architectural education in order to improve the quality of architectural teaching in Europe. Organised biannually the competition focuses public attention on outstanding written work selected by an international jury. The EAAE Prize was first awarded in 1991 and has been sponsored by VELUX since 2001.

In reading the 75 papers of the 2003–2005 EAAE Prize: ‘Writings in Architectural Education’, I realized how important this competition is for our teaching community. It clearly sets a base for a much needed discussion about the content and direction of architectural education. It is easy to forget that what is taught and how it is taught will have a direct impact on our built environment.

Architectural education in both Europe and North America has no common goal or direction apart from a very simplistic or basic understanding of what architectural education should entail. Each school strives for an identity or direction that suits the region, of the school, its students and their future employers. Each school sets its own course in the hope that its pedagogical direction and content will fulfill these immediate demands and at the same time miraculously anticipate future needs. As a whole, the competition material revealed that we know very little about each other, the way we teach, and the content from which we teach and where priorities lie within a given content. It is here EAAE has made visible the pedagogical methods and theories from which new knowledge originated. Is existing or traditional knowledge less relevant because of age? If this base ‘old knowledge’ ceases to be relevant other than as a short-term factor, methods and principles of the past will reappear as new. We are so preoccupied and fascinated by newness, we tend to pass over or even forget the principles and situations from which new knowledge originated. The shifting demands of our result-oriented information society clearly tend to produce a short-term memory, but how truly creative and fruitful this will be is still unknown.

There is clearly a deep concern over the changes taking place within architectural education in respect to the comprehension and application of past and present knowledge. Pressure from the information society to be simultaneously precise and progressive also affects the role of architecture and creates an uncertain relationship to culture and cultural definitions of content. Again it is not enough just to look ahead, we must also have a clear cognizance of what we leave behind.
Computer technology is unquestionably a core instrument in today’s information society. We are more and more dependent upon it to produce ready information that can both help and influence architectural realization, but very few believe that these instruments are able to identify new content, or give the current architectural situation direction. The technology has no conscious capability beyond direct and specific problem-solving. The limitations of the new technology in relation to both architectural education and practice will be a major challenge of architecture to be more than direct problem-solving. The question is then, what is the role of an architect, and what is the role of architectural education? What is the task architecture is expected to solve? Is our mission also to improve life through the built environment, but rather the papers concentrated upon the importance of being viewed in relation to both architectural content, just as it does not offer or depend upon a particular culture or belief. One paper reminds us that we have a tendency to forget the difficulties of creation, and to take the creative act for granted in assuming that information and know-how alone can replace creativity. There was also the critique that many architecture schools do not necessarily connect with all the levels of comprehension of space inherent to architecture. The machine presents a spatial assumption quickly and easily, but we come and the educators continues. Educators in general will continue to face the dilemma of choosing between the best interests of the students’ long-term professional life versus education directly related to the demands of the immediate job market. There is a certain agreement, however, that architecture is pursuing and in need of new content. Curiously, few papers applied the essay question to many of the most pressing challenges that architecture will eventually be forced to face, such as ecological concerns, providing shelter for the displaced or homeless, and not least the use of material and its corresponding energy in relation to the world’s ever-growing population. We have major physical and internal problems, but these problems are seldom the recipient of this new knowledge, and they are even more rarely the source of new knowledge and invention. It is rather strange, or typical, that architectural schools in general focus so little on these major and critical problems.

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teach the physical aspects of architecture from a distance, as an abstraction, and thus a deeper and more complete understanding of architectural space is often compromised, because the skills needed to understand physical space, material and volume are replaced by skills needed to understand virtual space, material and volume. This process is both interesting and exasperating. The shift between two realities supports a diffuse sense of unlimited choice and material.

We must also be aware of the rather complicated architectural language that has evolved in recent years. I will contend that in reading the 75 papers, the language and its structure was often far more complicated than the actual complexity of the content. Yes, it is important to expand architectural content to incorporate many academic areas, and spend enormous amounts of energy in this field we call ‘architecture’. But does this really bring architecture forward? Hopefully it does, and I think if any architectural forums can help, it is those that bring architects and institutions together to investigate and discuss architectural education. Therefore I am proud to be part of this competition, as your papers set the stage for an important and essential discussion. The enormous interest in architecture and design that we experience today in newspapers, magazines, TV and "easy-read picture books has helped take architectural education out of its ivory tower, but it has not eased the pressure on education to define its position in relation to content, method and ideology.

EAAE

The EAAE is an international, non-profit association committed to the exchange of ideas and people within the field of architectural education and research. The EAAE aims at improving the knowledge base and the quality of architectural and urban design education. Founded in 1975, the EAAE has grown in stature to become an institution fulfilling an increasingly essential role in providing a European perspective for the work of architectural educationalists, as well as for concerned governmental agencies. The EAAE numbers more than 100 active member schools in Europe from the Canary Islands to the Urals, representing almost 5,000 tenured faculty members and more than 200,000 students of architecture from undergraduate to doctoral level. The association is establishing associate membership worldwide. The EAAE addresses a variety of important issues in conferences, workshops, and summer schools for young teachers. The Association publishes and distributes the proceedings. It also grants awards and prizes. For more information, see EAAE homepage: www.eaae.be.

Per Olaf Fjeld, professor and former principal at the Oslo School of Architecture, began his architectural career in 1973 in the office of Norwegian architect Sverre Fehn. He has been a guest professor at University of Arizona Architecture in 2003 and a board member of the European Association of Architectural Education (EAAE) since 2001, where he was recently elected as president.

WRITINGS IN ARCHITECTURAL EDUCATION

Representation in Architecture

Communication – Meaning – Visions

At the present the tools of the architect are in the midst of an accelerated process of development and change. New technology has opened up for a greater design complexity and spatial variation. The digital working process offers a capacity of 2D and 3D visualisation that simply was not possible half a century ago. This new mode of communication has changed architectural representation at every level. One may argue that this will change architecture, but in what way? What, then, is representation in architecture today? Does representation have its own architectural content and agenda, and what impact will this have on architectural education?

The EAAE Prize is open to all members of the teaching staff of the EAAE member schools of architecture, or individual members of the EAAE.

Download the prize invitation and registration form: www.eaae.be or contact the Organising Committee via: ebbe.harder@karch.dk

The deadline for contributions is October 12, 2006
Broken Glass
Glass in art and architecture
Editor: Wolfgang Becker
Wienand Verlag 2005
ISBN 3-87909-751-7

Broken Glass is the catalogue for an exhibition, which took place in 2005 in Heerlen, the Netherlands, in the former Schuckendepot store (the so-called ‘glass palace’) which was renovated by Wiel Arets. The theme of the book is the meaning of glass in everyday objects, sculpture, glass painting, and visual arts. The catalogue describes the versatile way that glass can be used in such a way that it becomes an artform in itself. The book is divided into three parts: architecture, sculpture, and glass painting.

In an architectural context, glass is still considered to be a controversial material. In recent years, it becomes more and more common to use glass in various ways. The book presents some of the milestones which have been reached in this field, such as glass in modern architecture and the rediscovery of the sensuousness of glass. In the 19th century, glass was mainly used in the construction of glass houses, but in the 20th century, it became more and more common to use glass in the construction of buildings and sculptures. The book presents some of the major projects which have been realised in this field, such as the Fagus Factory in Alfeld in Lower Saxony, the Ihme-Ihme House in Berlin, and the Glass House in New Canaan.

In the context of art and sculpture, glass has been used in various ways. The book presents some of the major projects which have been realised in this field, such as the Glass House in New Canaan, the Ihme-Ihme House in Berlin, and the Glass House in New Canaan.

In the context of glass painting, glass has been used in various ways. The book presents some of the major projects which have been realised in this field, such as the Glass House in New Canaan, the Ihme-Ihme House in Berlin, and the Glass House in New Canaan.

The book is divided into three parts: architecture, sculpture, and glass painting. The first part presents some of the major projects which have been realised in this field, such as the Fagus Factory in Alfeld in Lower Saxony, the Ihme-Ihme House in Berlin, and the Glass House in New Canaan.

The second part presents some of the major projects which have been realised in this field, such as the Ihme-Ihme House in Berlin, the Ihme-Ihme House in Berlin, and the Glass House in New Canaan.

The third part presents some of the major projects which have been realised in this field, such as the Glass House in New Canaan, the Ihme-Ihme House in Berlin, and the Glass House in New Canaan.
1 Much Untertrifaller
2 Chris Leung
3 Piergiorgio Robino

1 MUCH UNTERTRIFALLER RECOMMENDS

Richard Serra – Dirk’s Pod
Sladen Verlag
ISBN 3-86522-099-9

Dirk’s Pod, one of the largest permanent installments by the American sculptor Richard Serra, was erected on the Neuerinz’s campus in Basel in May 2004. When this large sculpture was unveiled, a 128-page accompanying book was brought out by the Swiss publisher. Besides articles by Daniel Vasella, Dieter Riehle and the sculptor himself, the book contains numerous photographs by Nic Tonnaeghennin as well as by Dirk Reinartz. Reinartz, who died in 2004 and was Serra’s long-standing friend and companion, has captured the tedious production process of the ten steles. The photographs of the final assembly and the completed sculpture were taken by Nic Tonnaeghennin.

2 CHRIS LEUNG RECOMMENDS

Frai Otto – Complete Works Architecture in the Digital Age: Design and Manufacturing
Birkhäuser
ISBN 3-7643-6729-6 (German edition: Dynamische Taktilogie/Architektur
ISBN 3-7643-6728-7)

The 320-page book offers a comprehensive insight into the status quo of digital architecture, thus bridging the gap from the origins to the contemporary situation. How can computer-aided means applied in architecture and what influence do they have? How can they be favorably used in the future? Chris Leung: “The availability of CAD (Computer Aided Manufacturing) software and small scale CNC (Computer Numerically Controlled) facilities has closed the gap between thinking about the design and its realization. The book raises the bar of expectation with accounts of individuals and practices at the cutting-edge of working with these tools.”

3 Dynamic Daylighting

Dynamic Daylighting Architecture: The Pursuit of Novelty
Nick Callicott
Architectural Press
ISBN 0-7506-4647-0

The 302 pages of this book, which has been published in German and English, presents basic principles and examples, and deals with the subject of the topic ecological construction. Chris Leung: “This book is a veritable feast of knowledge, which because it introduced me to many of the rapid prototyping techniques that are available to designers and that I am becoming increasingly familiar with, but more significantly it formed the mode of engagement with them that this book advocates.”

Piergiorgio Robino

MVRDV – KM3

Excursions on Capacity

MVRDV: KM3

Zaha Hadid: Architecture

The Snow Show

Archilab

This collection of illustrated essays describes the story of three “other” American metropolitanism, such as New York or Mexico City. City Deep-who experts, amongst them Carlos Fuentez, introduces the single cities, explores the development of the slums as well as the masterpieces of Neo-traditional architecture from Luis Barragan to Luis Barragan. The articles are accompanied by illustrative, which reveal the reality of Latin American and European artistic perspective. Also printed is a revised translation of ‘Leyes de las Indias’ from 1573, containing numerous stipulations for urban planning, thus decisively influencing the form of Spanish colonial towns.

The architect Angelo Mangiarotti, born in Milan in 1921, is regarded as one of the most important protagonists of the Italian architectural scene. Nonetheless, the volume published in the series’ ‘Su’ abstains from recording the complete works of the much respected architect and urban planner. For purely unknown reasons from architecture, design and sculpture are presented in historic as well as recent illustrations, plans, sketches, and articles. Seventy percent of his material was so far unpublished. Another stimulus for the reader is the enclosed essay on ‘Constructive Systems in Architecture’. Mangiarotti himself has graphically designed this article.

The book was originated in 2003 on the occasion of a Zaha Hadid exhibition in the Viennese Museum for Applied Arts. Amongst the numer-
osely presented works in Hadid it was the first to ‘document the artist’s most recent project’ (according to the publishing house). Illustrated are amongst others projects of the Rosenthal Center for Contempo-
rary Art in Cincinnati, the National Li-
brary in Monteleone and the Tramway for the 2000 Pet Shop Boys world tour. Several, so far unpublished drawings and graphics by the Lon-
don architect round off the volume.

For the second time, the ‘Snow Show’ enthused tourists from all over the world during the 2006 Olympic Winter Games. It was the successor event to the first ‘Snow Show’ in La-
pland, which Lance Fung presented in his book. Seventeen works of art, created in the co-operation of one architect and one artist each, are documented in more than 250 photos-

tographs, numerous drawings and project texts written by the designers. Illustrated are not only the final results, but also the partially complex genesis of the perishable artifacts.

In this book Frédéric Migayrou, Di-

ector of the Centre Pompidou Dep-
tartment of Architecture, presents 60 of the world’s most innovative young architectural practices. Their answers to the questions on how we are going to live and work tomorrow and the day after are again and again surprising. Detailed practice pro-
dfiles, more than 200 illustrations, and texts of leading historians and critics of architecture make the 528-

page volume a substantial source of inspiration regarding architectural design and visualization.

1035 6384 3851

Frédéric Migayrou

Thames & Hudson

ISBN 0500238197

Archilab

Radical Experiments in Global Architecture

Frédéric Migayrou

Thames & Hudson

ISBN 0500238125

This book, the 320-page book, which has been published in German and English, presents basic principles and examples, and deals with the subject of the topic ecological construction. Chris Leung: ‘This book is a veritable feast of knowledge, which because it introduced me to many of the rapid prototyping techniques that are available to designers and that I am becoming increasingly familiar with, but more significantly it formed the mode of engagement with them that this book advocates.’

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Dichroic Light Field, New York, USA - by James Carpenter