



University of Oregon

SOLAR

INCIDENTS

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Bank ING - A Model of Sustainability

By Valerie Wedel

The Niderlansche Middenstandsbank, or NMB Bank building (now known as the ING bank building), is located in Amsterdam Southeast, a new-town development some distance by metro from the city center of Amsterdam. The NMB Bank was designed by a team headed by Anton Alberts, architect, and completed in 1988. The builders strongly emphasize the role team-work played in this project, with clients, architects, landscape architects, engineers, and artists all working closely together from the earliest phases of this project. The resulting building has unusual form and appearance, arising from both spiritual and functional considerations.

A coherent spiritual philosophy guided this building's design, although this has received less press than the technical side of the building. This philosophy is called Anthroposophy. Anthroposophy was developed from the visions of Rudolph Steiner in the early part of the 20th century. Anthroposophy, as applied to architecture, teaches that 90-degree angles tend to block the harmonious flow of human energy. As promotional literature for this building gently states, "...the cube, employed in many buildings, is seldom found in nature; that is why in this building other shapes are applied" (p.3, *Building With A Difference*, ING Communications Dept.). Or, as the architects write of their

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Solar Information Center

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SPECIAL THANKS
TO EWEB FOR
THEIR CONTINUED
SUPPORT!



What is the Solar Information Center?

The Solar Information Center is a student run organization sponsored by the Associated Students of the University of Oregon (ASUO) and Eugene Water and Electric Board (EWEB). The purpose of the center is to serve as a research, education, and information center on solar energy and alternative energies, and their applications in architecture and technology.

One of its vital functions is to sponsor a lecture series on local, regional and global energy issues to promote a higher awareness toward conservation and renewable energy. The center also provides an in-house information source of books, periodicals, abstracts, proceedings, topic-files, product-files and a world wide web site.

Solar Talk

The Solar Center would like to bid a fond farewell to our two former directors Sandra Leibowitz and Matthew Swett. Both have been invaluable leaders of the solar team. Sandra has graduated with her masters degree in Architecture and Matthew with an undergraduate degree in Architecture. Congratulations Matthew and Sandra. Welcome to our two new directors, Ross Leventhal and Jason McLennan.

The Solar Center would also like to say goodbye and thank you to Will Sturges. Will has been an active and supportive Solar Center advisor for the past few years while serving as an adjunct professor at the Uof O. His work at the U of O has been invaluable. We will miss him and wish him luck in his future endeavors. Thanks Will!

Solarfest '96

The Solar Information Center recently participated in the First Annual Summer Solstice Solarfest. This Event was promoted by KRVM who used photovoltaics to power their live broadcast of the event. The Eugene downtown mall served as the playground, as we peddled human powered vehicles and admired the PV powered fountain. Real Goods celebrated their grand opening on the downtown mall. Many other displays and large crowds made this event a great success.



The Solar Information Center once again organized the annual Renewable Energy Fair, coordinated with the U of O Survival Center's week of events to celebrate Earth Day. The fair took place in the EMU Courtyard at the University of Oregon. This year's event broke from tradition, in that we were able to schedule some sun.

The solar cooking demonstration led by Dean Still of the Aprovecho Research Center heated up some food samples from the Community Supported Agriculture (CSA) booth. Sandra Leibowitz also debuted her custom solar oven complete with checkered enclosure. The racing pattern apparently was not enough to cause her oven to cook faster than the Aprovecho model, as was seen in the cook-off. The efficiency of the Aprovecho model is achieved by panels that create a concave form to concentrate the sun into the insulated plywood cook box.. Sandra's oven is much simpler to construct, made from two cardboard boxes with the lid acting as a reflector. The afternoon solar cooker workshop was attended by 12 people. Dean lead the workshop participants through the construction of a new oven.



Jason and Dean debate the virtues of the two solar cookers

Booths from private solar contractors, as well as Eugene Water and Electric Board (EWEB) and Emerald Peoples Utility District (EPUD) were staffed with knowledgeable experts who passed out literature and educated fairgoers about renewables and conservation. These two local utilities serve as models for the nation in that they are non-profit; allowing them to encourage conservation instead of trying to increase electricity consumption. The Solar Monitoring Lab



Ross and Matthew enjoying life and the sun

from the U of O was in attendance to show how their research is supplying the regional data necessary for solar design.

The Urban Farm and CSA passed out organic food samples. Some fairgoers (and staff) were caught making repeated trips to the CSA booth, apparently making a meal of the many delicious samples. These booths provided valuable insight into how local food production reduces the need for transportation and packaging. Both of these steps in the currently centralized and prepackaged food industries are very energy intensive. Organically grown food is produced without chemical fertilizers that are also energy intensive to produce and transport, as well as being expensive and ultimately destructive to the entire watershed.

A last minute addition, Patti and Jim Merkel from the Global living Institute, displayed books and pamphlets on reducing our 'needs' to live more simply and in harmony with the Earth. The Solar Information Center was also in attendance with a sampling of our books and periodicals. We also displayed the Eco-Dollhouse, giving people tours through a design for a self sufficient solar home.

Attendance was high thanks to the weather, as well as the soothing sounds of the Sitar player. Local Television KEZI stopped by to film the festivities. Many thanks and kudos to Airenne Buffum for putting together this excellent event. Also thank you to all of our booth participants and fairgoers for making this a fun and educational experience •



The guys from EPUD show off their renewables



own design philosophy, "...when people are continuously confronted with cubic shapes, a kind of rigidity occurs in their way of thinking... these shapes involve a coldness, which has a negative effect on the user. This is why free forms are used which are associated with movement and action. They make the user more creative..." (p.31, Alberts, 1988).

Anthroposophy also teaches that humans need a very strong connection to nature, to the seasons and cycles of growth, and so Anthroposophic buildings tend to be highly responsive to nature and daylight. In the words of the head architect, Ton Alberts, "...nature is the source of inspiration for my work. The beauty of nature is linked with organic architecture" (p.3, *ibid*). Some of the links with nature in the NMB Bank include; outdoor gardens, many indoor plants, daylight spaces, operable windows, and the creative use of flowing water both indoors and outdoors.

The NMB Bank contains many rooftop, outdoor gardens which include an English wildflower garden, a Finnish garden, and bi-level Japanese garden complete with a waterfall and pool. Herbs are grown in the Finnish garden, which are then used by chefs from the restaurants located within the NMB building.

Daylighting plays a major role in determining the building layout and form of the NMB building. In this building, every office worker is always close to a window or atrium space, providing a close connection with the outside and minimizing the need for energy intensive electric lighting. No work station is located further than 6 meters from a window, all of which are operable, allowing employees to adjust temperatures and introduce fresh air when needed. The building is organized around a series of stair towers that also serve as atrium light wells. Wall sculptures also become shimmering light reflectors, bringing natural light further into the building.

Water design also plays a major role in the NMB building. Rain water is collected from the rooftop of the building, de-acidified by passing over crushed shells, and then run through sculptural flow forms that circulate through the building. These flow forms are used to oxygenate running water both indoors and outdoors. Inside the building the running water is used to water plants and to help humidify the air to a comfortable level. The indoor plants also help create a properly humidified and healthy indoor environment for the people who work in this building.

Color is also an important aspect of Anthroposophy, and is consciously used in the NMB

Bank. According to this philosophy, yellow relates to elevation, exchange, and light; blue to calm, introversion and coolness, and red to dynamism, presence and warmth (Towndrow, 1988). In the NMB Bank building reds tend to be used on the North side of the building where the north light appears cooler, while blues tend to be used more on the south side of the building.

Although the Netherlands requires 1% of a building's cost be spent on art, the NMB Bank has exceeded this amount. The interior may even be thought of as one large work of art. There are specially designed details throughout, in walls, doors and windows. In this building what is functional is also beautiful, such as the wall sculptures which also reflect daylight into the spaces. Electric lighting, where required, is also beautifully designed as sculpture, with the goal in mind to create a harmonious, well lit interior.

This building has also been called the most energy conscious, high-technology building in Europe (Spiedel, 1988). According to a Dutch building research organization, TNO, the NMB Bank is the most energy efficient office building in the world (p. 166, Vale, 1991). Yet, one may see the functional aspects of this building as integral with the spiritual. For example, the faceted exterior reflects traffic noises up away from the building, and away from adjacent properties. The non-orthogonal footprint of this building locates offices further from the street. The horizontal and vertical chamfering of the exterior facades also reduces the surface areas exposed to traffic noise. The resulting slant of interior walls also improves acoustics in the interior (Alberts, 1988). In this way the lack of 90-degree angles, consistent with Anthroposophy, also improves the performance of the building.

As an office building with multiple people and electronic equipment, one would expect a high year-round cooling load for this building. However, the NMB Bank requires no conventional air-conditioning. It relies instead on a heat exchange process, as well as operable windows for natural ventilation and the use of daylight to reduce demand on electric lighting. The heat exchange process works in the following way; hot air which rises to the ceilings is exhausted from the building, and flows over a ceramic heat collector as it leaves. Fresh outdoor air is drawn into the building and pre-heated when necessary both

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An Improved Cook Stove From Thailand

Written by Suwapa Kaewsuk: *Feature Magazine*, February 1995



In a country so renowned for its cuisine, surprisingly little attention is given to the place where the food is cooked. In Thailand, culinary innovation has been greatly diversified while cook stoves have hardly changed over a century.

Made from terra-cotta, Ung-lo stoves are very popular in rural Thailand because of their availability and affordability. They cost about \$4 each--an all-too-familiar item, as many as 7,000,000 households in Thailand feed wood and charcoals into the *ung-lo* stoves to prepare their meals everyday.

In light of the country's fast dwindling forest area, the stove whose efficiency is comparable to a three-stone fire is targeted for modification. Thailand's Department of Energy Development and Promotion (DEDP), in cooperation with the Royal Forestry Department, is promoting a newly improved *ung-lo* cook stove. The new version yields a temperature of up to 1,000 degree Celsius, consumes 30 to 40% less fuel than the old one and has a longer lifespan.

"The difference is that the top part of the improved cook stove is even. The original one normally has dented top which unnecessarily diffuses the heat. The new steam plate is much thicker, with more and smaller holes. Having more holes lets more air into the cooker while their smaller size maximizes the charcoals which will not fall down unless they become extremely small," Mr. Songsak Jangtiyanon from DEDP said.

The holes in the steam plate are designed to have a conical shape. The air that passes from

the stove's door to the charcoal is thus accelerated, intensifying the burn and reducing the smoke.

In the original cook stove, the size of the door is up to its maker's preference. A careful calculation, however, tells how large the opening in the improved stove will be to facilitate a complete burn and yield highest heat.

"Insulation in the new cook stove is much thicker compared to the original one. It prevents any heat loss from the side of the stove," added Mr. Songsak.

The improved cook stove heats up to 1,000 degree Celsius and will last from two to four years, while the original *ung-lo* stove heated up to 500 to 600 degree Celsius and lasted for only one year. With all its more appealing specifications, the improved cook stove does not beat the original one in terms of popularity because it is not commonly available.

Those who are interested in the improved cook stove can call DEDP at 662-221-1877 and 662-223-0021-9, ext. 350. For people who would like to produce the new stoves and need prime-rate or interest-free loan, applications are available at Division of Energy Conservation and Renewal Energy, Office of National Energy Policy, Tel. 662-280-2013-4 •

*Scientists cannot prove what is happiness
Economists tend to think that when we consume things
we will be happy
If we eat oranges, we think that happiness is in oranges
the more oranges we eat, the happier we will be.
That is the thought of economists.
But we don't know whether happiness is in the oranges,
or in ourselves.
That we eat oranges and we are happy may be because
we are already happy inside. If one is unhappy no
matter how many oranges you eat, you are still unhappy.
You have to understand this thing, otherwise,
we will think that happiness is in the thing we consume.
Economists think that happiness is in oranges,
thus, they then try to develop the quality of oranges.
But I think that happiness is already in ourselves.*

-Mazanobu Fukuoka

Translated from Thai by Atiya Achkulwisut



Masonry Heaters

By Jason Frederick McLennan



On my last trip to Europe I had the opportunity to come into contact with several beautiful, masonry heaters. These heaters, known as *kachelofens*, grace the living quarters of many traditional homes in Austria. Most of the masonry heaters that I visited were over twice as old as the people who currently used them, and still they were providing warm gentle heat, with minimum maintenance and trouble. . . not to mention that they were beautiful.

True masonry heaters are not well known in North America, but are very common in many European countries. Variations appear in Germany, Austria, Russia and the Scandinavian countries.

So what exactly is a masonry heater and how are they different from fireplaces or woodstoves? A masonry heater is essentially a

very massive wood heater, with an intricate flue that snakes its way through the masonry. The major principle at work is that the heat generated from the burning fire is absorbed in the massive amounts of surrounding masonry and is later released into the room rather than disappearing up the chimney. Because of the large amounts of thermal mass, heat is dispersed evenly from the firebox and the outside of heater rarely rises above 150 degrees Fahrenheit, (masonry also does not conduct heat well) making it warm, not hot to the touch. This unique feature has led to many designs that incorporate benches or beds beside or on top of the masonry heater. Imagine the pleasure of sitting in a cozy nook surrounded on three sides by warm brick. In rural Europe, many early masonry heaters were often equipped with a sleeping platform on top.

Masonry heaters are quite simple to operate and maintain. Unlike large fireplaces the masonry heater requires only a small charge of fuel, usually small chopped pieces of wood. The *kachelofen* will burn this fuel in a short amount of time, but will continue to radiate heat for hours. The *kachelofen* is so efficient that even in very cold climates it is possible to add fuel only twice daily, usually once in the morning and then again at night. The process can become a rewarding ritual, waking in the morning to a warm room and then lighting the fire and relighting it again before bedtime without ever having to face cold indoor temperatures.

Another amazing thing about masonry heaters, is their great efficiency rating. Any confined fire depends on three variables; oxygen, heat, and fuel. The percentage of fuel that gets turned into heat is known as the efficiency rate. Most wood burning heaters, fireplaces and woodstoves have a very poor efficiency rating, thus accounting for the saying “all of our money went up the chimney!”

The only drawbacks to the *kachelofen* that I am aware of are the following: cost, availability, and size. There are currently very few places where a person can purchase a masonry heater. This is changing, and more and more *kachelofen* craftsmen are appearing, due to the resurgence in interest of this kind of gentle, heal-

ing heat source. The price of these masonry heaters is also very steep as every masonry heater must be custom made. The third drawback is their size and weight. Because they are often so bulky and heavy they often do not easily fit into existing homes.

The *kachelofen* easily has the highest efficiency rating of any wood burning heating system and I recommend them highly as a main heating source in residential applications. In our constant search for more healthy, beautiful and sustainable ways to build shelter, the *kachelofen*, an age old heating source, has proven itself as one of the best ways to heat a home •

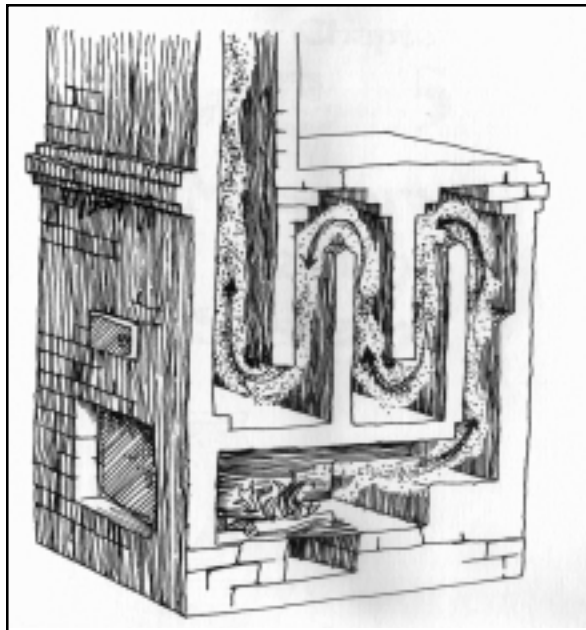


Diagram of heat flow through a typical *kachelofen*

Bank ING

Continued (from pg. 4)

by flowing over the ceramic elements and by solar collectors in the roof panels of the towers. The building also relies on thermal mass, to capture the excess heat during the day, and night ventilation, to flush this heat, thereby maintaining cool temperatures in hot weather. The night ventilation process further improves the quality of the indoor air.

The cost of this building, while initially higher than a typical office block, is proving to be far lower over time. There are very low energy costs to

run the building, since it relies so much on daylight and natural ventilation. There is also another very interesting cost saving; the workers in the NMB building display a startlingly high productivity. Apparently, people like to be in this building, and find it to be a very healthy environment, resulting both in very few sick days and increased productivity. The NMB Bank building is thus extremely cost-effective.

The NMB Bank building has also been hailed as an improvement to the local neighborhood. It is seen as fitting happily into its urban environment, unusual form notwithstanding. The towers, linked by bridges and walkways, and the broken facade impart a sense of human scale to what could otherwise be a massive, hulking object, dwarfing to the pedestrians who walk below. The gardens help provide beauty and a sense of belonging within nature to this human-made structure.

It is, or should be, of interest to us all that the NMB Bank building is as efficient as it is, in terms of economics and function. It is often thought that “organic” buildings are foolish, too expensive to be practical, and mere whims of fantasy-prone individuals. It is also sometimes said that in the urban fabric only rectilinear buildings can properly fit, because of pre-existing buildings and lot sizes. For those of us interested in shaping space, the NMB Bank may serve as a reminder that there are many visions, and many forms, with value. In our quest for ecologically responsible buildings, we do not yet know all that the buildings of the future, using technology and vision in the present, can become •

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CALENDAR

July 12-14

Oregon Country Fair

The Solar information Center will have a booth in Energy park packed with knowledge of solar and sustainable living. See you there!

S	M	TU	W	TH	F	S
	1 JUL	2	3	4	5	6
7	8	9	10	11	12 Oregon Fair	13 Country
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