



ING Bank

Amsterdam, Netherlands



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Amsterdam, Netherlands



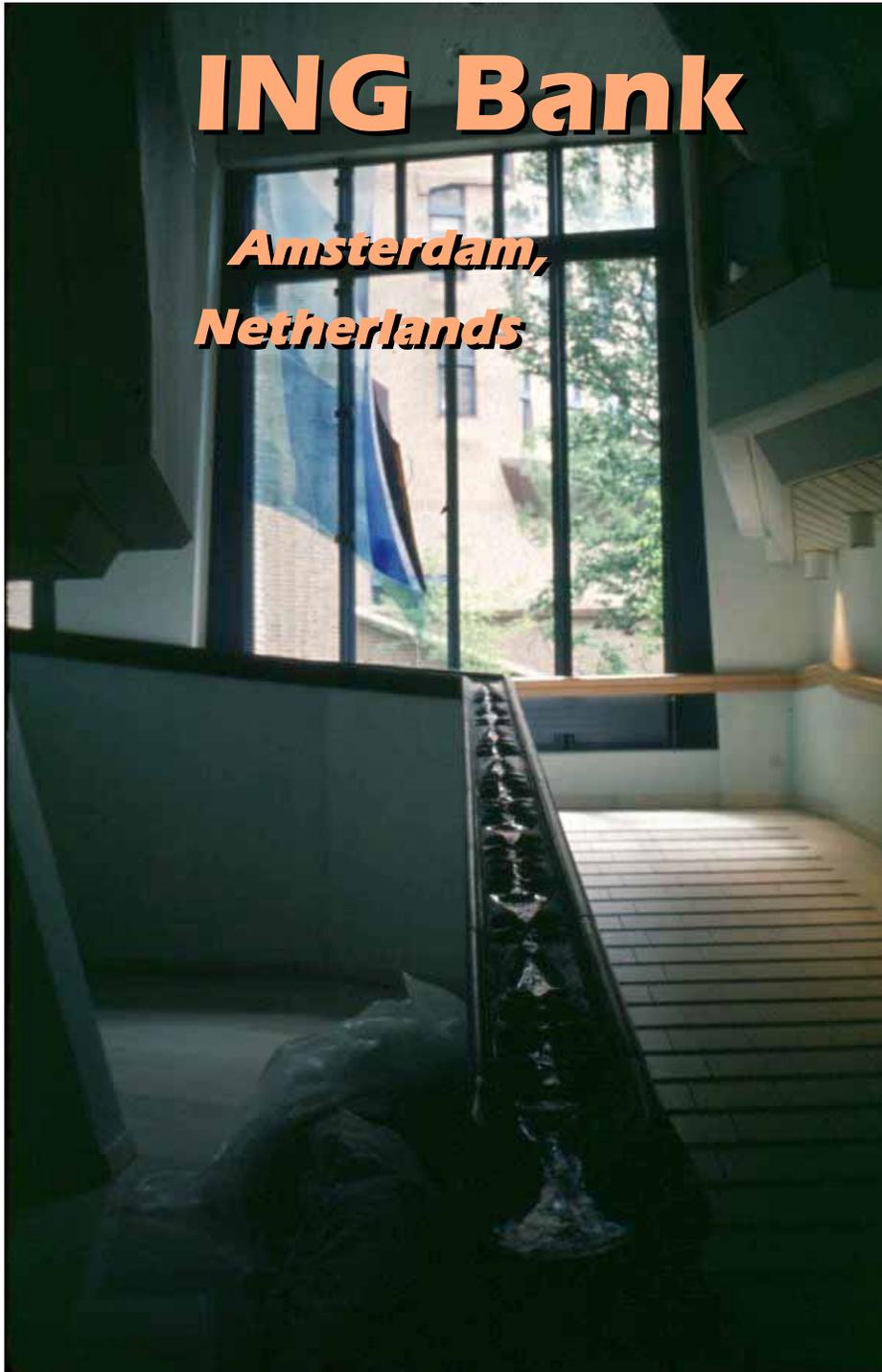
ING Bank

Amsterdam, Netherlands



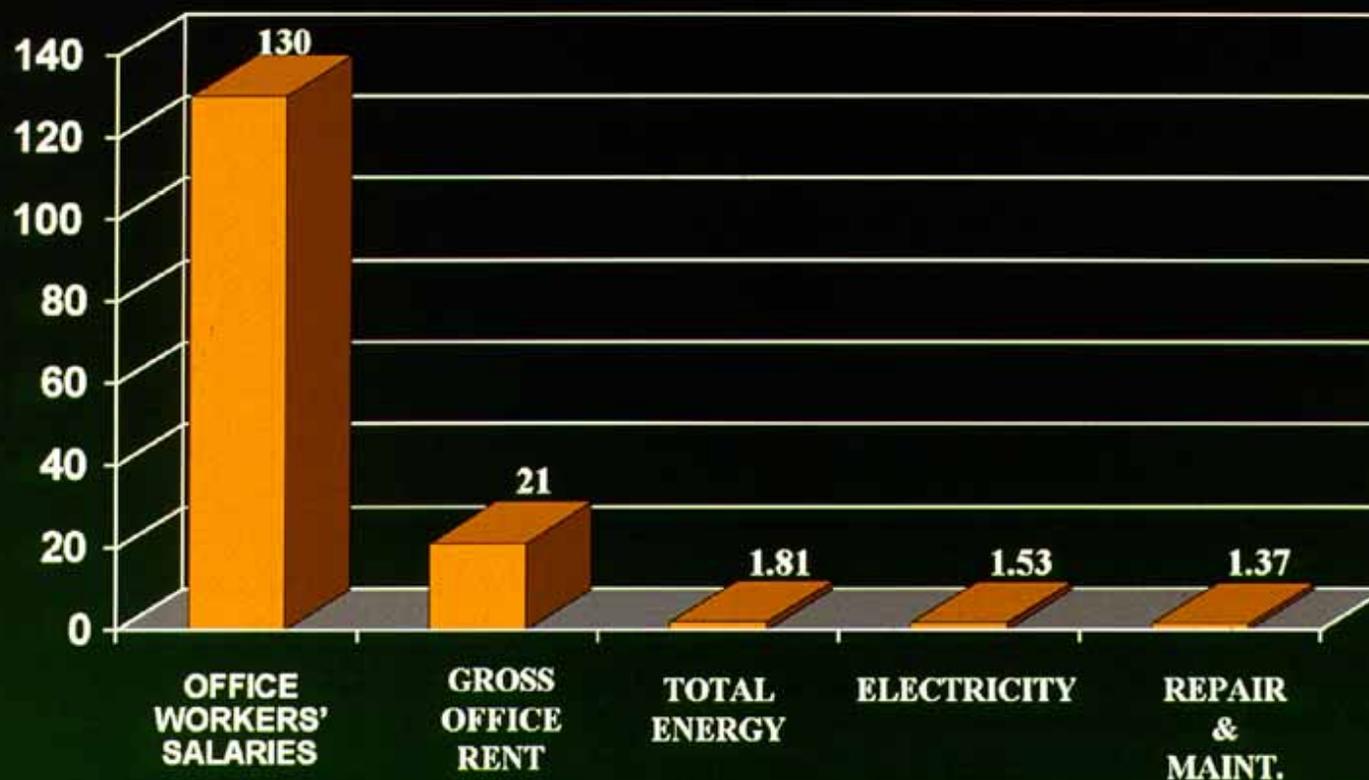
ING Bank

*Amsterdam,
Netherlands*



Comparative Costs in Large Office Buildings

*Data from Building Owners and Managers Association: Electric Power
research Institute, Statistical Abstract of the United States, 1991*



Gotz

Manufacturing

Wurzburg, Germany



Gotz Manufacturing *Wurzburg, Germany*



Walmart



Daylighting Study

Pacific Gas & Electric
Heschong Mahone Group

Retail sales are **40% higher** in
daylit stores

<http://www.h-m-g.com/toppage11.htm#Skylighting> and Retail Sales



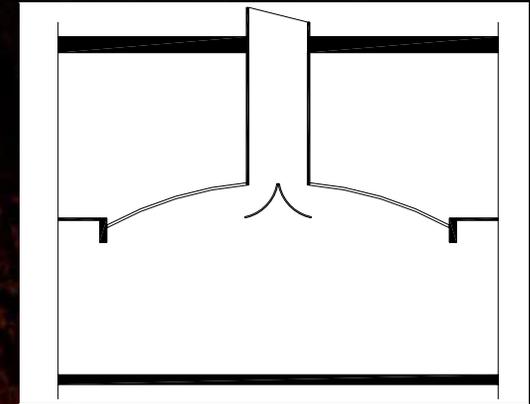
Stop & Shop

Skylights



Stop & Shop

- 60-90% Daylight Contribution
- 30% energy savings
- Higher per cart sales
- Improved customer satisfaction
- Preferred by employees





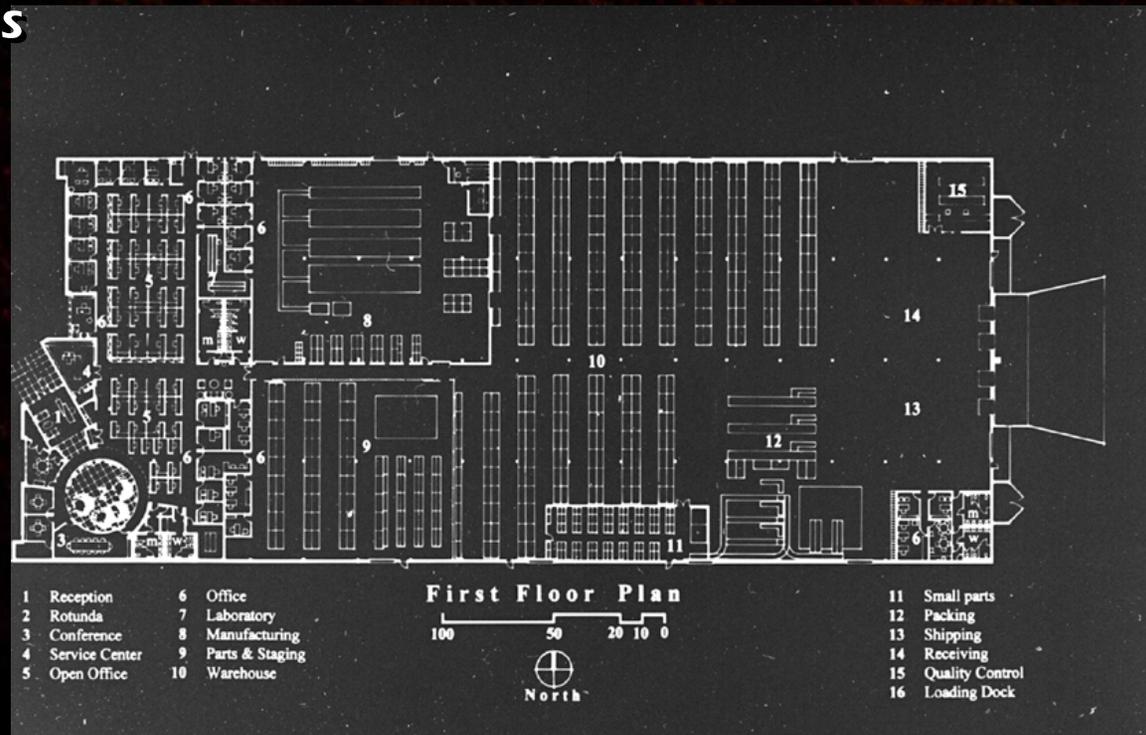
Sainsbury Grocery Store *Greenwich, UK*



Verifone

Irvine, CA

- Day-lighting
- Double-filtered air supply
- 3X standard AC/hr
- Non-toxic materials



Verifone

Irvine, CA

59% lower energy use than
Title 24

Utility costs went from
\$1.54/SF to \$.43/SF

7.5-year payback, eclipsed
by . . .

**47% drop in
absenteeism**



Pittsburgh Convention Center

Raphael Vinoly



LEED™

LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

Monsanto A-3 Building

St Louis, Missouri



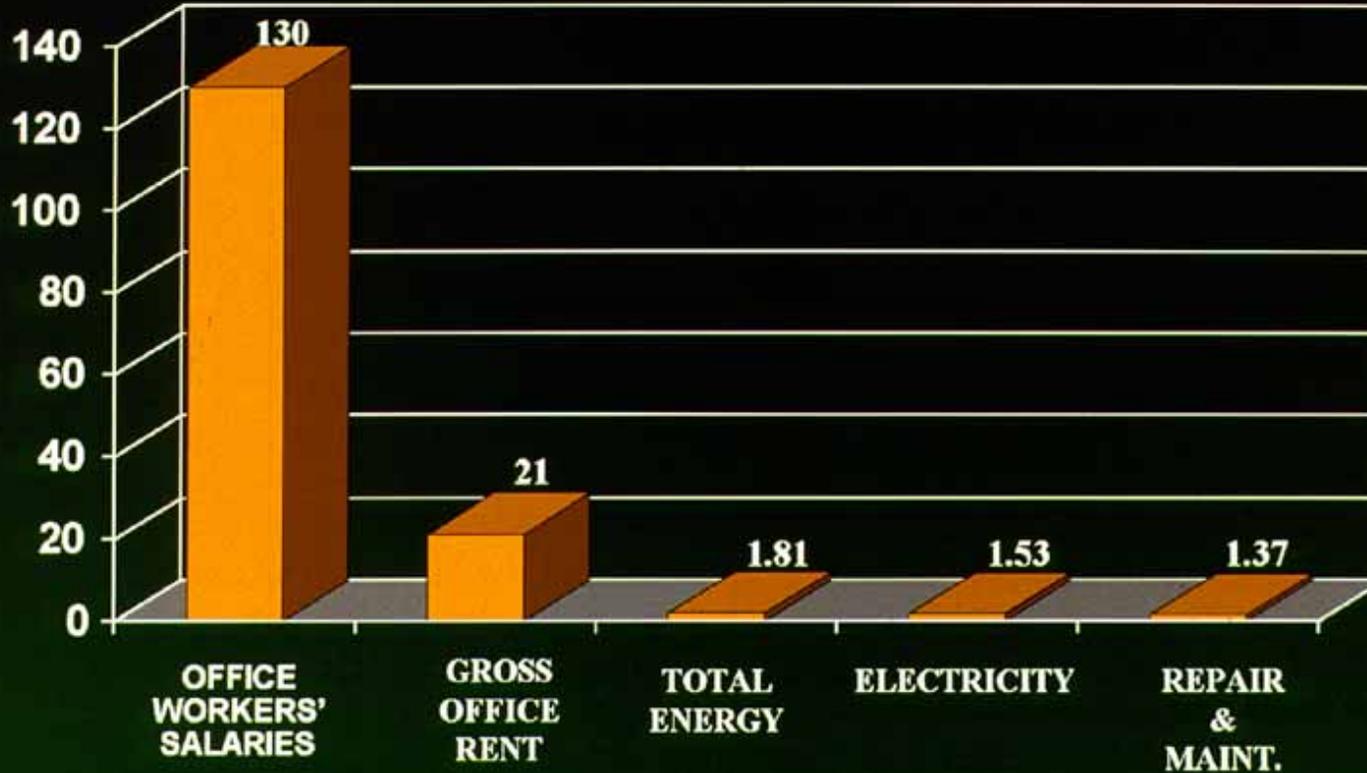
Monsanto A-3 Building

St Louis, Missouri



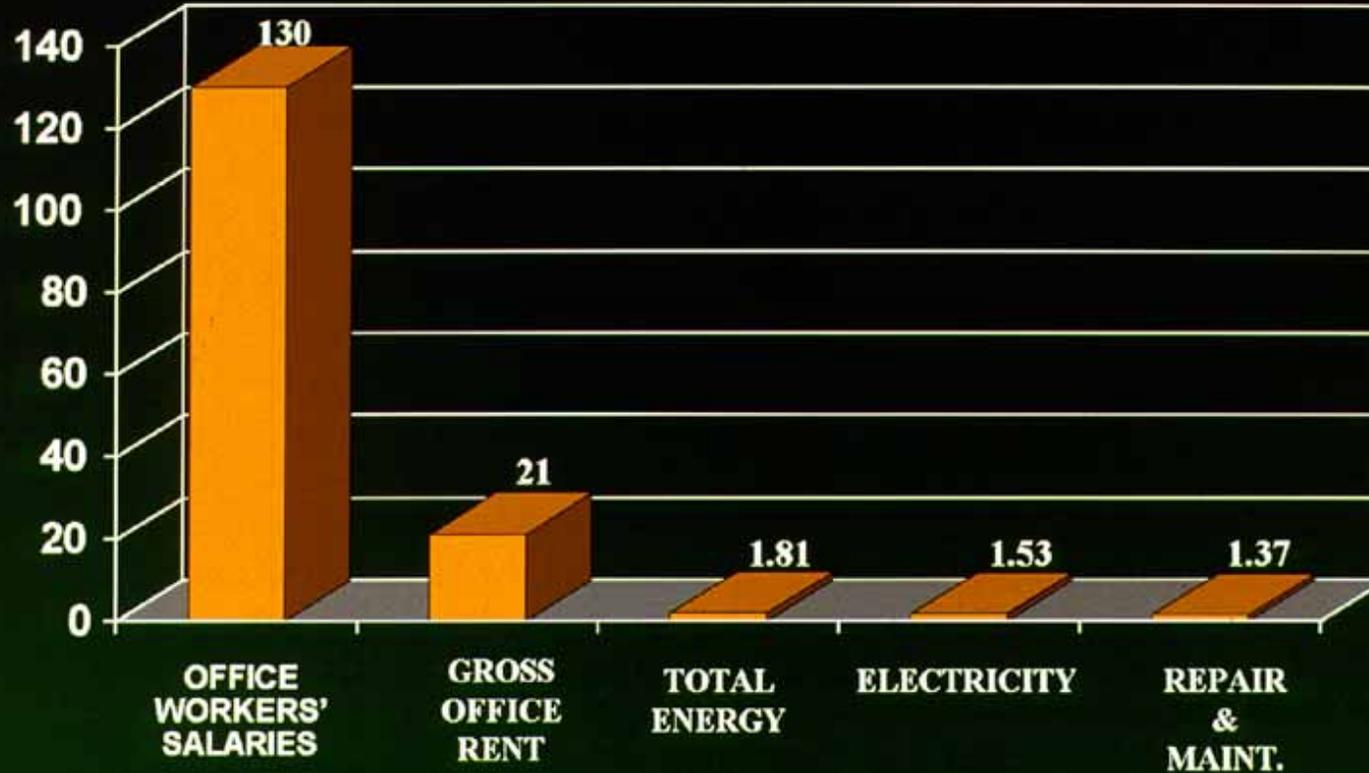
Financing Productivity Improvements

- assume a 1% gain in productivity = \$1.30 per square foot per year



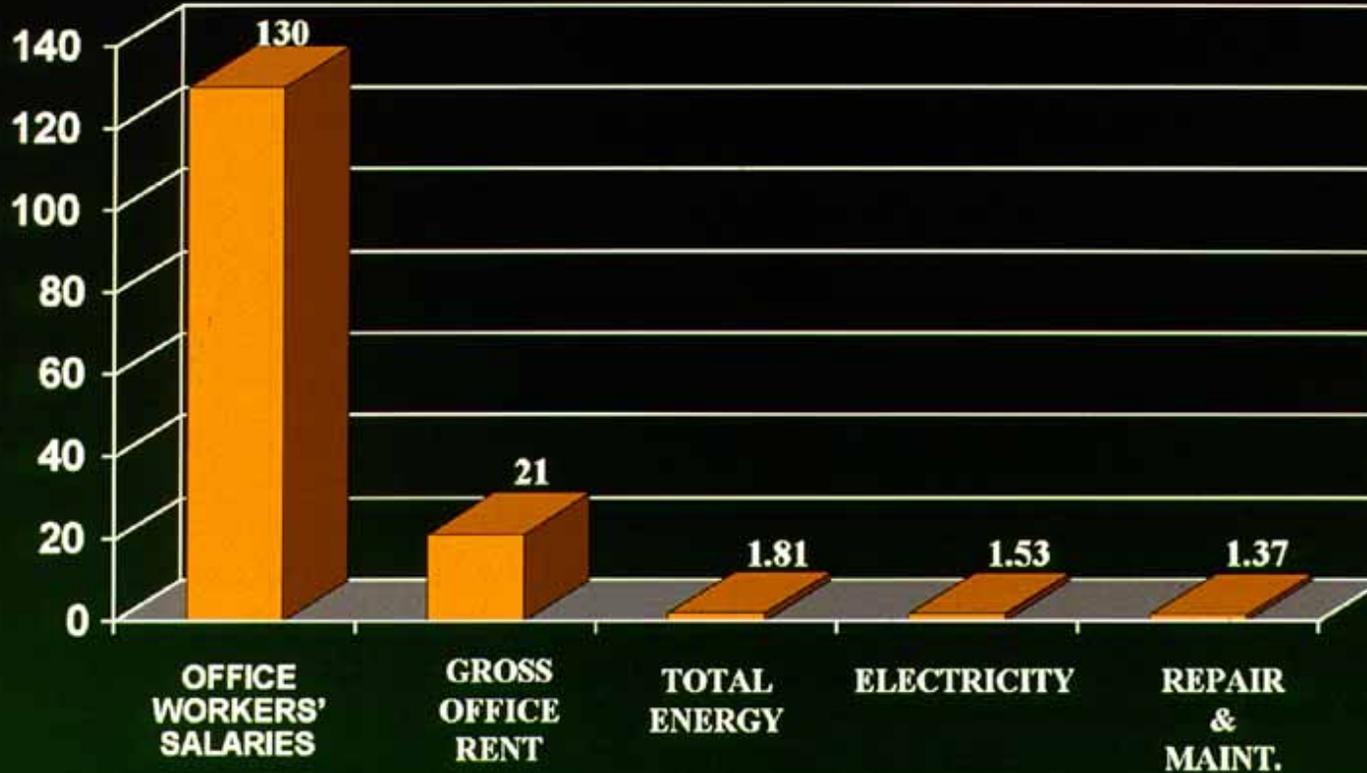
Financing Productivity Improvements

- assume a 1% gain in productivity = \$1.30 per square foot per year
- Net Present Value of a ten year measure at 14% interest = \$6.78



Financing Productivity Improvements

- assume a 1% gain in productivity = \$1.30 per square foot per year
- Net Present Value of a ten year measure at 14% interest = \$6.78
- so you should be willing to pay \$6 per square foot in additional costs to capture just a 1% gain in productivity



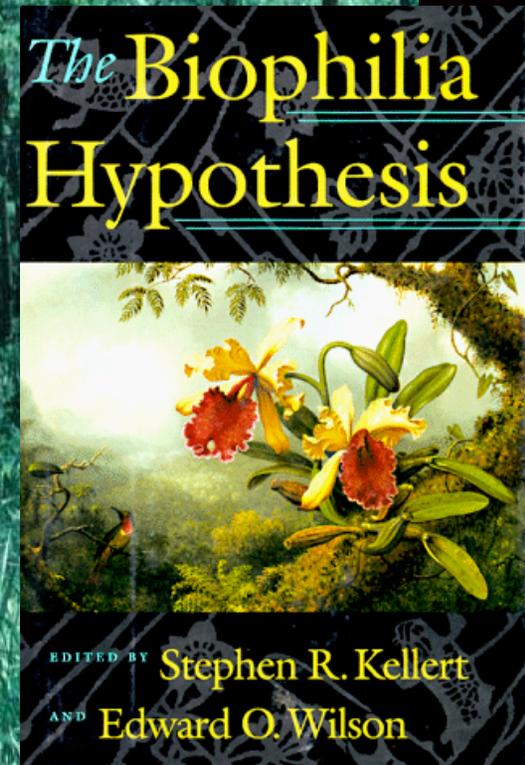
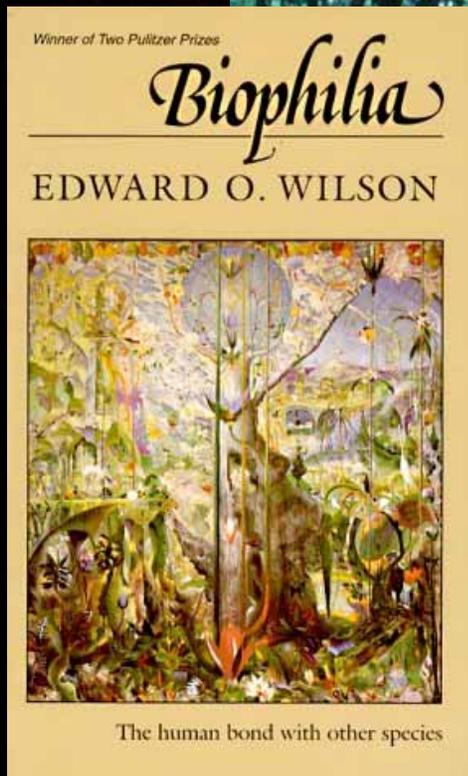
Herman Miller, Greenhouse

Holland, Michigan



Biophilia

The connection of People to Nature



Definition – Biophilia

“The biophilia hypothesis boldly asserts the existence of a biologically based, inherent human need to **affiliate with life and lifelike processes.**”

– Stephen R. Kellert, *The Biophilia Hypothesis*



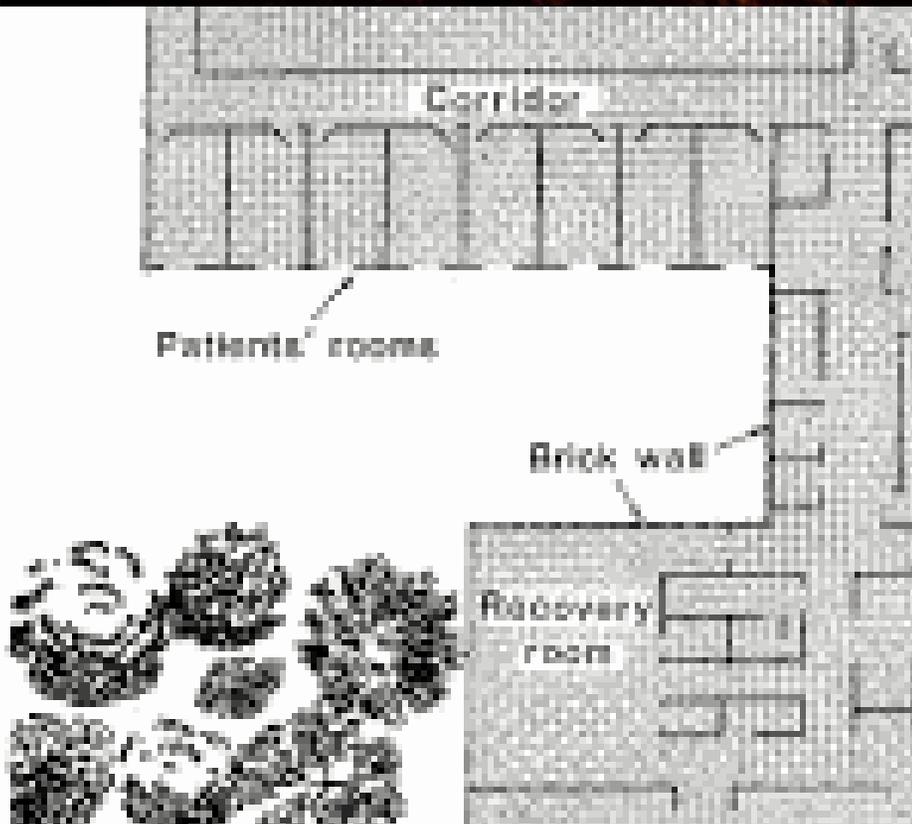
Biophilia



View Through a Window May Influence Recovery from Surgery

Ulrich 1984

n = 46



- shorter hospital stays
- fewer negative comments
- fewer strong analgesics



Nature and Health: The Relation Between Health And Green Space in People's Living Environment

Vries *et al.* 2001

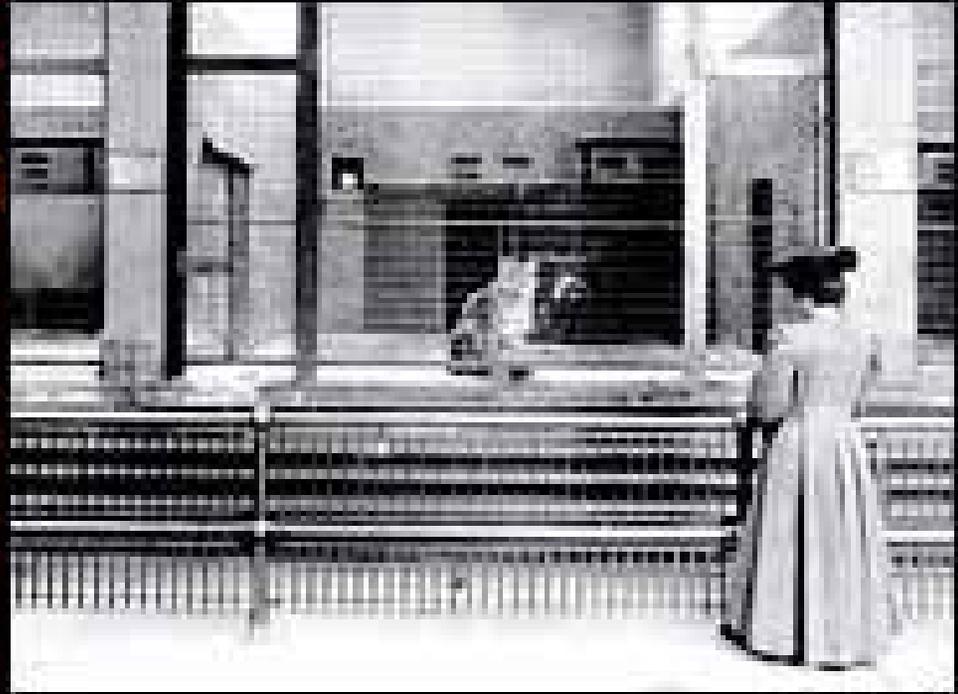


n = 11,296 (!)

The results showed that the amount of green space in the living environment was indeed positively related to the experienced health condition."



How did we design zoos in the past?

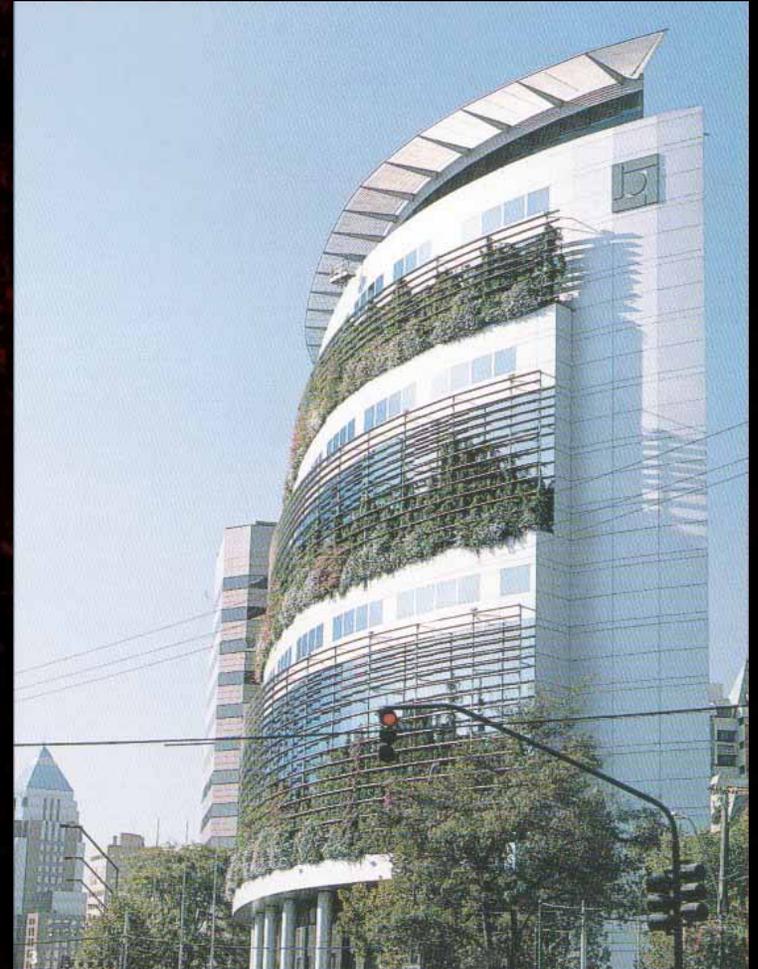


How do we design our buildings today?



A Biophilic Building?

A biophilic building maximizes the occupant's connection to the natural environment in order to create a more habitable, productive and healthy indoor environment.



Commerzbank

Frankfurt, Germany



Sky Gardens enable workers to never be more than two floors away from green space





**Swiss Re
London, UK**



Contacts

Literature database

246 references

1 in RMI library

Microsoft Excel - contacts

	A	B	C	D	E
1	first name	last name	titel	organisation	research
2	Heiko	Bartels	Prof.	Bauhaus Universität Weimar, Produktdesign	only German could find, in design area
3	Margareta	Blennow	MD PhD	Södersjukhuset Hospital Stockholm	children's hospital nature
4	Ahmet	Cakir		ERGONOMIC Institute	large study lighting in German offices

Microsoft Excel - Literature

	A	B
1	order?	Title
		Abstract or description
3	received	Ulrich, R.S. 1984. "View Through a Window May Influence Recovery from Surgery." Science 224:420-421.
4		Verderber, S. 1986. "Dimensions of Person-Window Transactions in the Hospital Environment." Environment and Behavior 18:450-466.

Ulrich, R.S., and O. Lunden. 1990. "Effects of Nature and the International Congress of Behavioral Medicine, 27-30 June 1990, Stockholm, Sweden." *Journal of Environmental Psychology* 10: 1-12.

A study examined patients recovering evaluate whether assignment to a room with therapeutic influences (Ulrich 1984). I closely matched for variables that could be controlled and previous hospitalization. The patients were identical except for window view: one had a view of trees; the other had a view of a brown postoperative hospital stays, had few complications such as persistent headache, and more frequently received weak oral analgesics.

...findings from a questionnaire study conducted in a hospital ward (and hence were presumably stressed). Hospital window views included scenes of nature (Ulrich and Lunden 1990) investigated

Literature

Microsoft Excel - Literature

File Edit View Insert Format Tools Data Window Help

B5 = Ulrich, R.S., and O. Lunden. 1990. "Effects of Nature and Abstract Pictures on Patients Recovering from Open Heart Surgery." Paper presented at the International Congress of Behavioral Medicine, 27-30 June, Uppsala, Sweden.

1	order?	Title	Abstract or description	Location at RMI	Qualiti
3	received	Ulrich, R.S. 1984. "View Through a Window May Influence Recovery from Surgery." <i>Science</i> 224:420-421.	A study examined patients recovering from gall bladder surgery in a Pennsylvania hospital to evaluate whether assignment to a room with a window view of a natural setting might have therapeutic influences (Ulrich 1984). Recovery data were compared for pairs of patients who were closely matched for variables that could influence recovery such as age, sex, weight, tobacco use, and previous hospitalization. The patients were assigned essentially randomly to rooms that were identical except for window view: one member of each pair overlooked a small stand of deciduous trees; the other had a view of a brown brick wall. Patients with the natural window view had shorter postoperative hospital stays, had fewer negative comments in nurses' notes (patient is upset, "needs much encouragement"), and tended to have lower scores for minor postsurgical complications such as persistent headache or nausea requiring medication. Moreover, the wall-view patients required many more injects of potent painkillers, whereas the tree-view patients more frequently received weak oral analgesics such as actaminophen."	Digital Biophilia Library and Biophilia Binder	Visual nature
4		Verderber, S. 1986. "Dimensions of Person-Window Transactions in the Hospital Environment." <i>Environment and Behavior</i> 18:450-466.	...findings from a questionnaire study of patients who were severely disabled by accidents or illness (and hence were presumably stressed) suggest than an especially highly preferred category of hospital window views included scenes dominated by natural content (Verderber 1986).	Need to find this source	Visual nature
5		Ulrich, R.S., and O. Lunden. 1990. "Effects of Nature and Abstract Pictures on Patients Recovering from Open Heart Surgery." Paper presented at the International Congress of Behavioral Medicine, 27-30 June, Uppsala, Sweden.	...Outi Lunden and I (1990) investigated whether exposure to visual stimulation in hospital intensive care units, including simulated natural views, promotes wellness with respect to the postoperative courses of open-heart surgery patients. At Uppsala University Hospital in Sweden, 166 patients who had undergone open-heart surgery involving a heart pump were randomly assigned to a visual stimulation condition consisting of a nature picture (either an open view with water or a moderately enclosed forest scene), an abstract picture dominated by either curvilinear or rectilinear forms, or a control condition consisting of either a white panel or no picture at all. Our findings suggest that the patients exposed to the open view of water experience much less postoperative anxiety than the control groups and the groups exposed to the other types of pictures. The comparatively enclosed forest setting with shadowed areas did not reduce anxiety significantly compared to the control conditions. The rectilinear abstract picture was associated	Need to find this source	Visual nature
			Hartig and his associates have reported the restorative effects of experiencing a parklike nature area while controlling for certain stress-reducing variables such as physical exercise (Hartig, Mang, and Evans 1991). They first produced stress in individuals with a demanding cognitive task and then measured recovery effects of either (1) a forty-minute walk in an urban fringe nature area		

Qualities of Biophilic Buildings

1. Peril

2. Enticement

3. Access to Water

4. Natural Ventilation

5. Prospect and Refuge

6. Complexity and Order

7. Local, Natural Materials

8. *Dynamic and Diffuse Daylight*

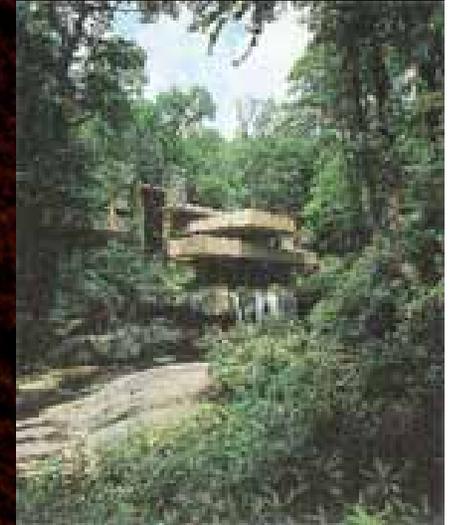
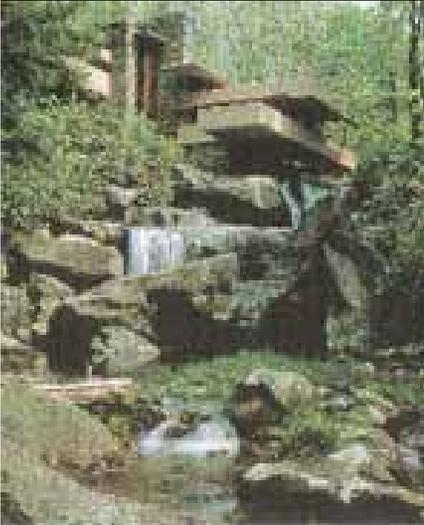
9. *Educational about Biophilic Aspects*

10. *Visual Connection between Interior and Nature*

11. *Physical Connection between Interior and Nature*

12. *Material Connection between Interior and Exterior*

13. *Frequent, Repeated Spontaneous Contact with Nature*

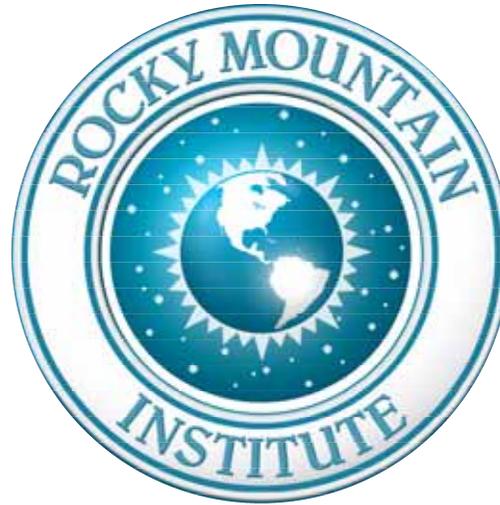




The Importance of Design

Frank Lloyd Wright once said "he could **DESIGN** a house for a newlywed couple that could cause them to divorce in a few, short weeks."





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