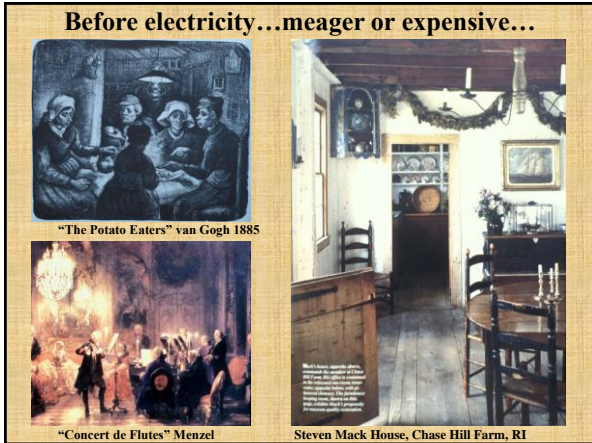
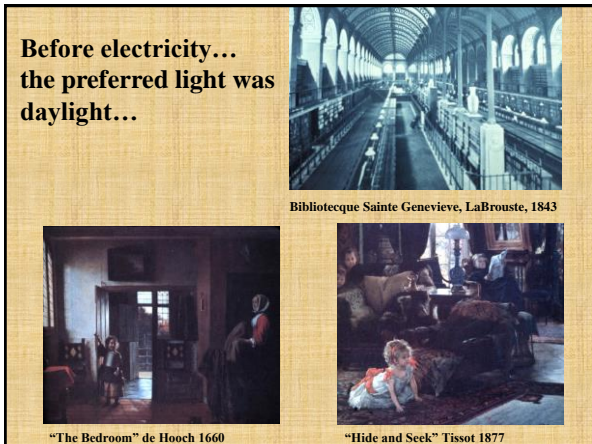


1



2



3



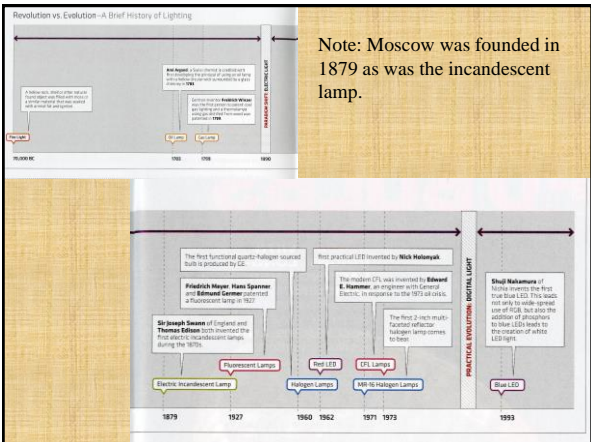
Newcastle Central Station

4



We'll start with incandescents

5



Note: Moscow was founded in 1879 as was the incandescent lamp.

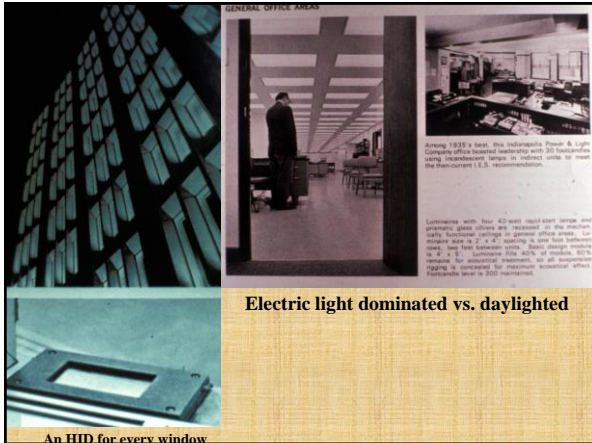
6

Indianapolis Power & Light



...before and after 1960s remodel...

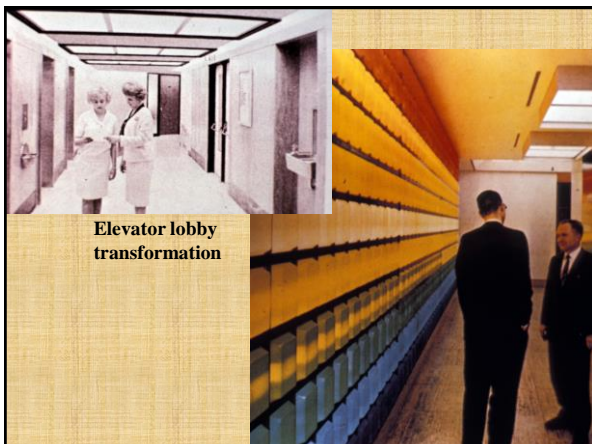
13



Electric light dominated vs. daylighted

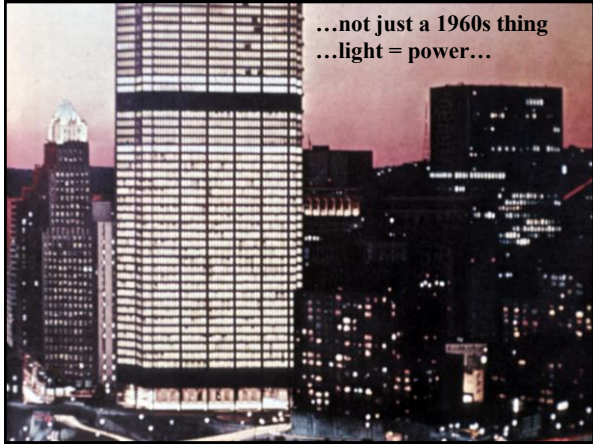
An HID for every window

14



Elevator lobby transformation

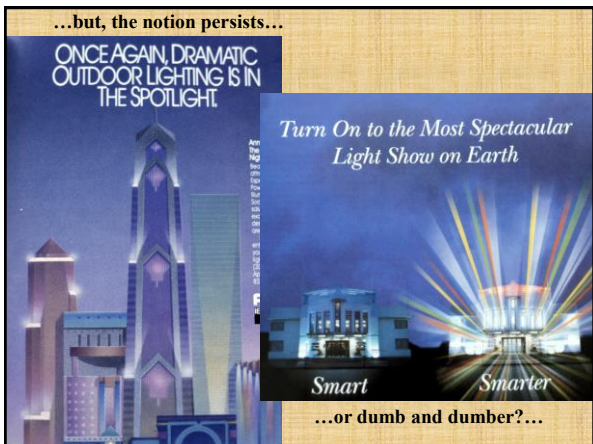
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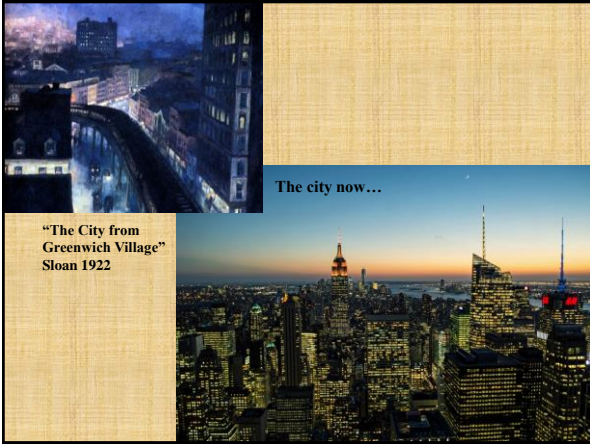
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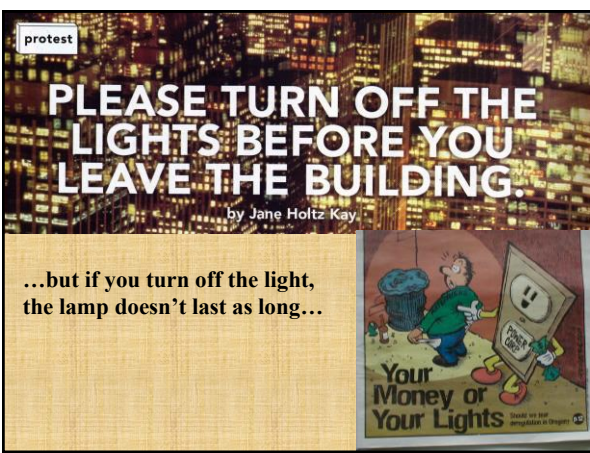
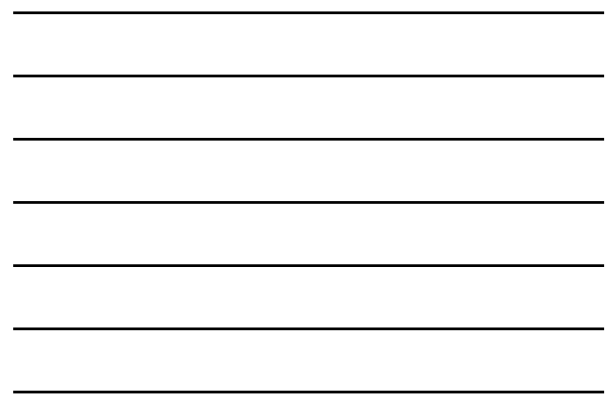
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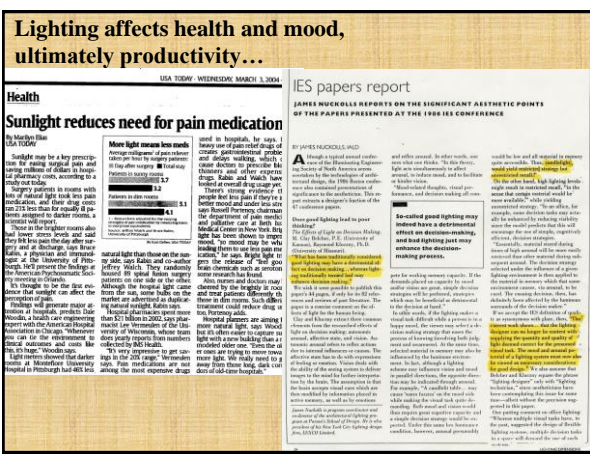
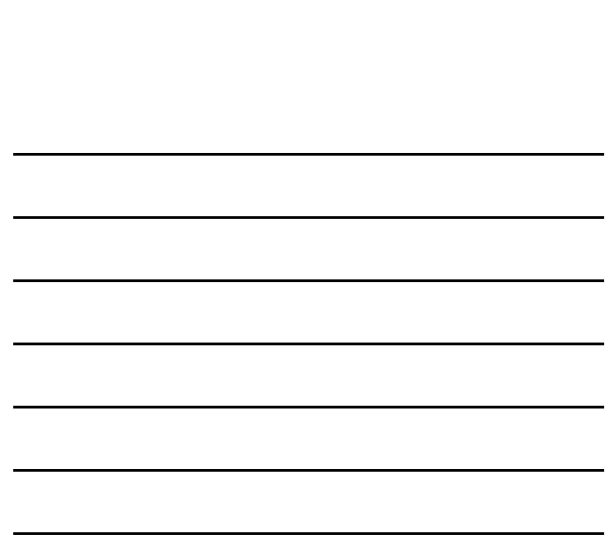
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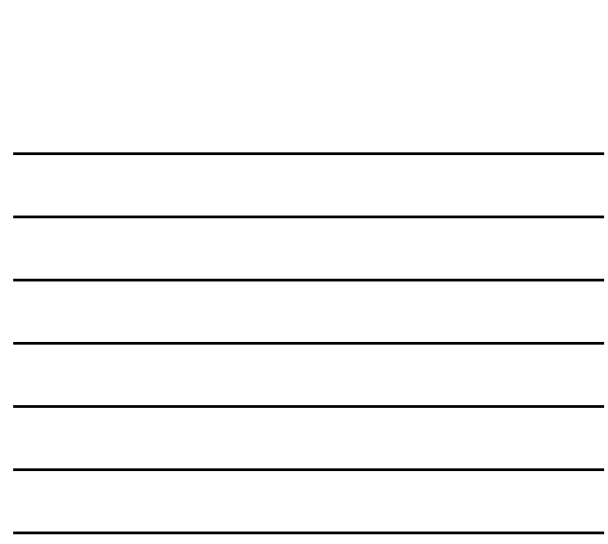
19



20



21



Light and Performance

--Gerard Kerkhof

"In addition to its effect on the timing of circadian rhythms...blue light exposure can result in melatonin suppression, elevation of body temperature, and also increases in alertness and improvements in night performance." *However, if you want to sleep at night, avoid blue light...*

Light & Health 2002
Eindhoven University
20 November 2002

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High alertness 10:00
Best coordination 14:30
Fastest reaction time 15:30
Greatest cardiovascular efficiency and muscle strength 17:00
Highest blood pressure 18:30
Highest body temperature 19:00
Melatonin secretion starts 21:00
Bowel movements suppressed 22:30
Midnight 00:00
Deepest sleep 02:00
Lowest body temperature 04:30
Sharpest rise in blood pressure 06:45
Melatonin secretion stops 07:30
Bowel movement likely 08:30
Highest testosterone secretion 09:00


23

Why light therapy offers an opportunity to cope with the problems of a modern, 24-hour society.

--S.H.A. Begemann

- Breakthrough
 - Separate non-visual detection of light
- Curative Applications
 - Winter depression and blues
 - Treat jet lag and shift work symptoms
- Preventative Applications
 - Reduce absenteeism & increase productivity
 - Treat symptoms in home-bound elderly
- Disclaimer
 - Most promising for office and elderly

24


Lighting Research Center  **Rensselaer**

News from the Lighting Research Center

LRC Research Collaboration With GSA Finds Morning Blue Light and Afternoon Red Light Promote Entrainment and Increase Alertness in Office Workers

Researchers from the Lighting Research Center (LRC) at Rensselaer Polytechnic Institute and the U.S. General Services Administration (GSA) have just published the latest in a series of studies exploring how light impacts alertness during the day and sleep quality at night in daytime office workers.

The study field tested a novel luminaire developed by the LRC to promote circadian entrainment and alertness in the office environment. Nineteen participants from three U.S. Department of State office buildings in Washington, D.C., completed the 3-week study. The luminaires, mounted near the participants' computer monitors provided: (1) morning saturated blue light, delivering a circadian stimulus (CS) of 0.4, (2) midday polychromatic white light, delivering a CS of 0.3, and (3) afternoon saturated red light, delivering a CS close to zero. Objective and subjective measures of rest-activity, sleep, vitality, and alertness were used to evaluate the lighting interventions.




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Richard Rogers fully subscribes to LRC's findings.

Left: Pompidou Center Below:
RSH Office in London's
Leadenhall Bldg (Cheese Grater)

[cool-warm-neutral]





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In the daytime, performance and well-being
--Marc Fontoyneout

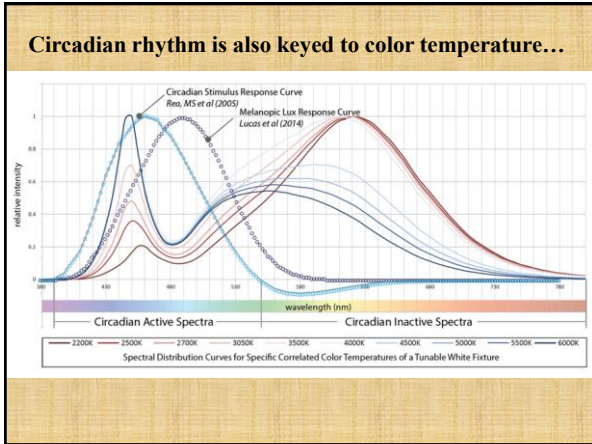
Daytime daylight is the economical light source that offer illuminances above 2000 lux with ideal spectral distribution

- Preferred light at work
 - Survey respondents' choice
- For human health more than energy savings
 - Cost equal to 1 hour's work/person/year



Light & Health 2002
Eindhoven University
20 November 2002

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Cleared for takeoff: the first United Boeing 787 Dreamliner.

Introducing a remarkable new aircraft that redefines air travel. Our United Boeing 787 Dreamliner uses breakthrough technologies to give you an unparalleled flight experience:

- With cabin pressure at 6,000 feet, you'll absorb more oxygen — as well as higher cabin humidity so you'll feel more refreshed with you arrive
- Dynamic mood lighting will add to the experience, along with the largest windows of any commercial jet which have an adjustable tint

33

Discover CIRCADIAN technology!

- it's the technology that best imitates sunlight
- it affects the suppression and stimulation of melatonin release
- It eliminates the negative effects of continuous exposure to artificial lighting, such as drowsiness, fatigue, and apathy
- its flexible lighting control is made possible using a mobile app

ENERGY FOR MORNING → HAPPY FOR MIDDAY → RELAX FOR EVENING

4000 K + BLUE
-enriched white light
= approx. 5000 K

WHITE 4000 K

4000 K + RED
-enriched white light
= approx. 3000 K

34

Examples of luminaires featuring CIRCADIAN technology:

INA

TRANSPARENT

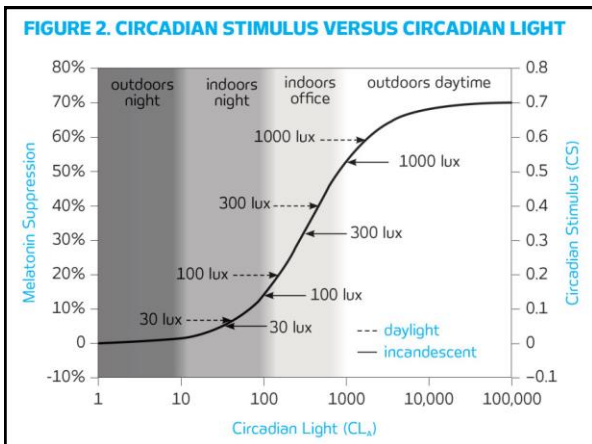
DSMO FX

BRACKET C

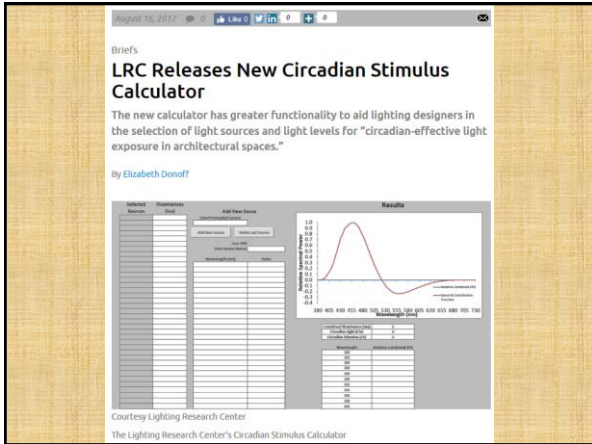
POSITE

SYSTEM 6000

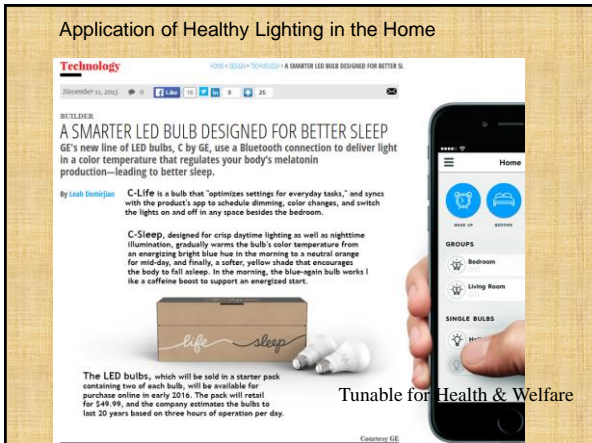
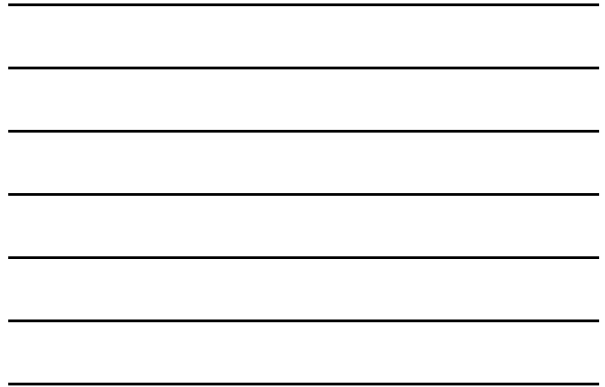
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36



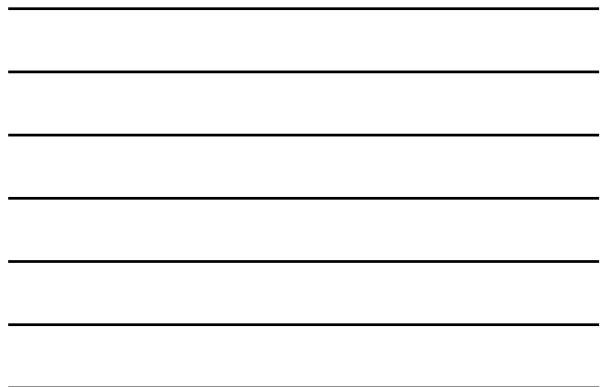
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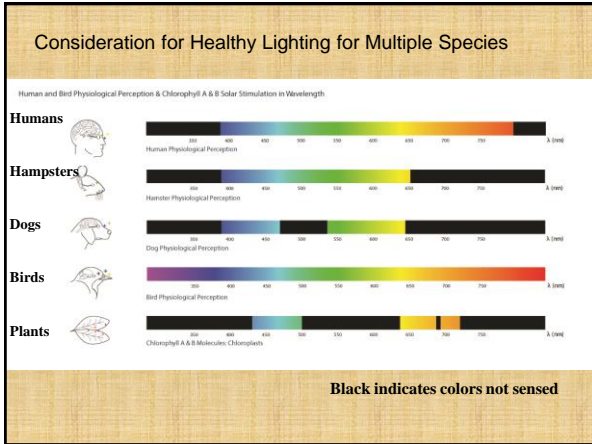


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