

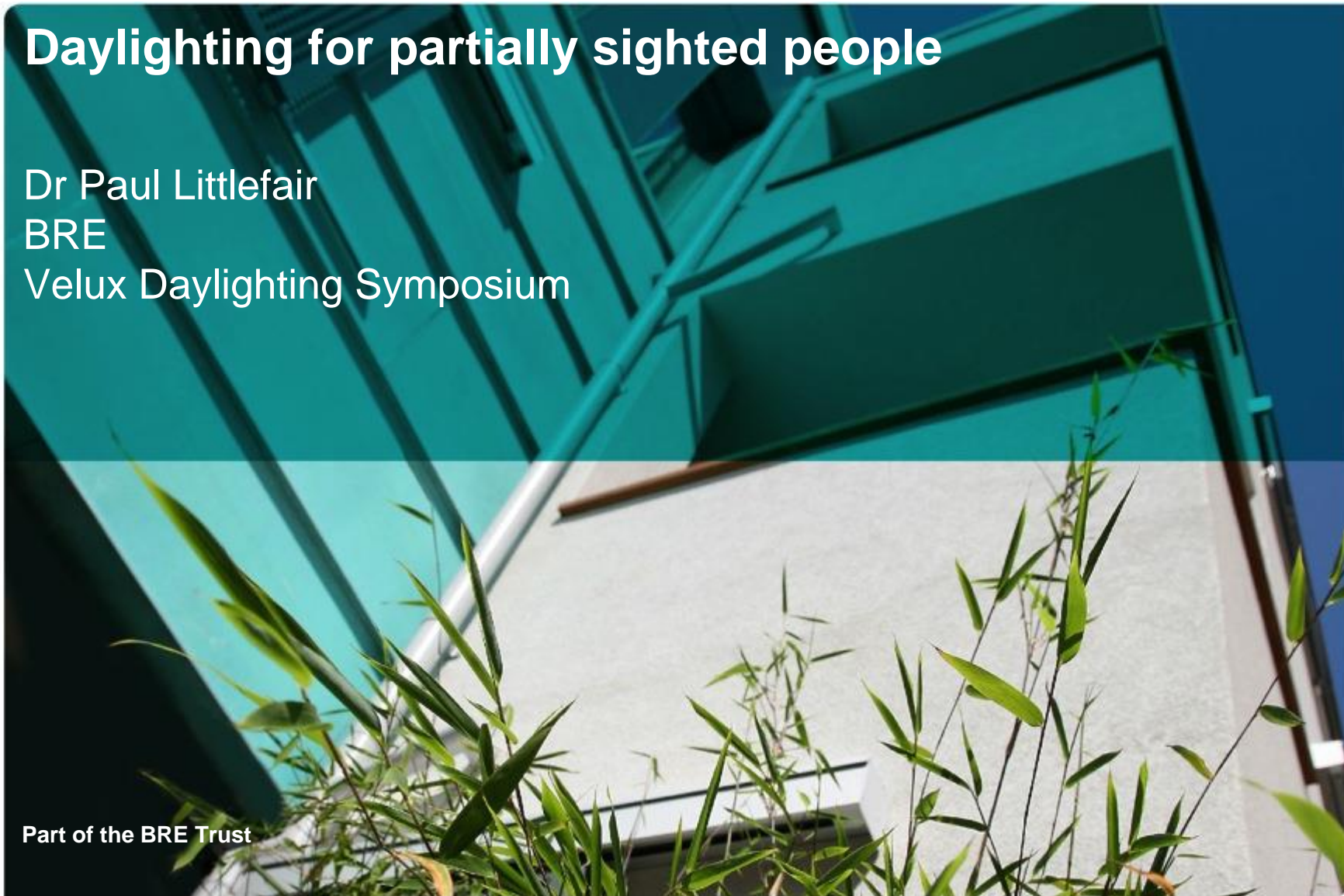
Daylighting for partially sighted people

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BRE

Velux Daylighting Symposium

Part of the BRE Trust



Sight loss: a range of conditions

- Cataract (opacity of the lens), reducing and scattering light in the eye
- Glaucoma, where pressure in the eye kills retinal cells, with loss of peripheral vision.
- Macular degeneration, with loss of central vision.
- Diabetic retinopathy, where areas of the visual field are lost. Usually this affects central vision.
- Retinal detachment, losing part or all of the visual field in one eye.
- Loss of sight due to stroke, typically half the visual field.

Difficult to give general guidance.

Illuminances

Preferred illuminances:

- 600-1000 lux (Julian 1983)
- 1200 lux (Silver 1978)
- 2000 lux (LaGrow 1986)
- **Actual illuminances from electric light:**
- 54 lux/183 lux (Bakker 2004)
- 70 lux (Simpson and Tarrant 1983)
- 180 lux (Silver 1978)
- **From daylight:** with 2% ADF, 100 lux exceeded for 48% of typical occupied hours. 200 lux is exceeded 38%, and 500 lux 19% of the time. Near window, can get three to five times these values.

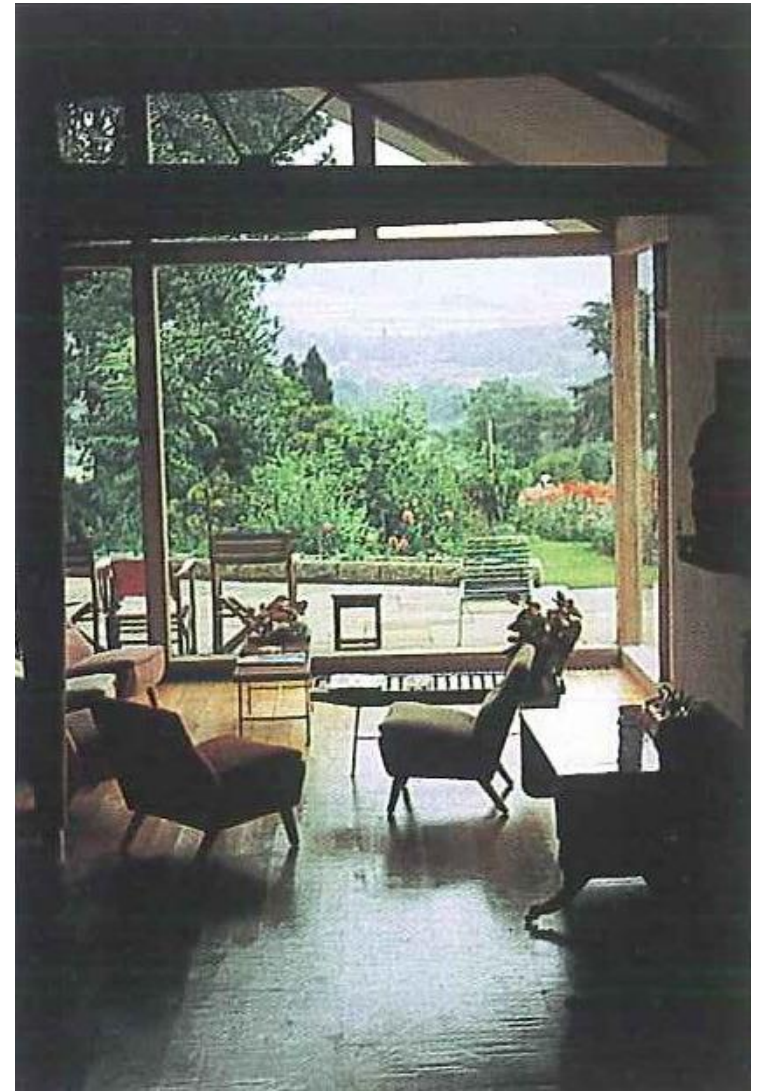
Improving daylight

- Higher average daylight factors (3-5%)
- Daylight in kitchens and, if possible, bathrooms
- Try to locate windows away from obstructions
- Avoid balconies and overhangs above windows



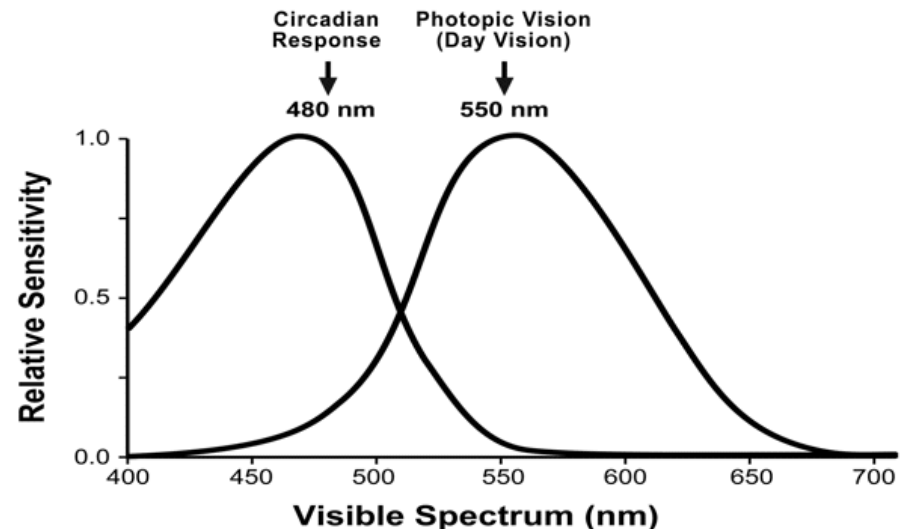
View out and contact with outside

- Appreciate view out eg trees
- Recommended sill height 800 mm
- Acoustic; hearing what is going out outside. 'Sound map' of room (Ryhl 2003, 2004) providing orientation
- Thermal asymmetry also helps orientation, provides information about outside (Wyon and Nilsson 1980)
- Conflict between view and privacy



Colour of light

- Daylight is bluer than tungsten light
- This may decrease contrast for those with cataracts (Rosenblum 2000), and increase it for those with macular degeneration (Haymes and Lee 2006).
- Blue light in daylight also helps reset circadian rhythms and suppress the hormone melatonin that causes sleepiness (Revell et al 2005)

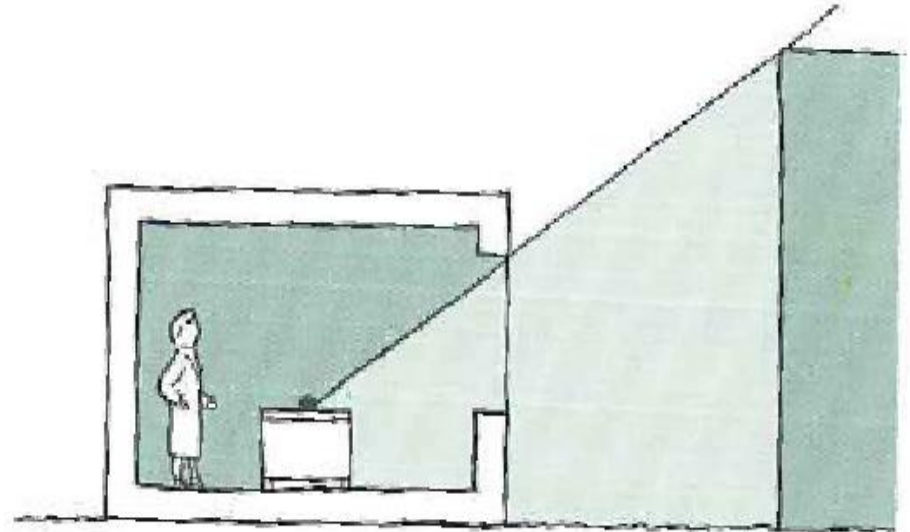


Circadian rhythms

- High illuminances from daylight ,and its variation during the day, help to maintain the body's rhythms of sleep and alertness.
- They stop the body producing melatonin, a hormone that causes sleepiness, and stimulate serotonin, which can reduce the symptoms of depression.
- For those with visual impairment, high illuminances are particularly needed, because their eyes are less effective at sending the required signals to the pineal gland, which controls these hormones.

Variation in daylight

- Adds interest to a space
- Spatial variation may be appreciated; people can take difficult visual tasks to the window, or relax in the more subdued areas of the room.
- Contrast between light and dark areas can be uncomfortable or disabling.



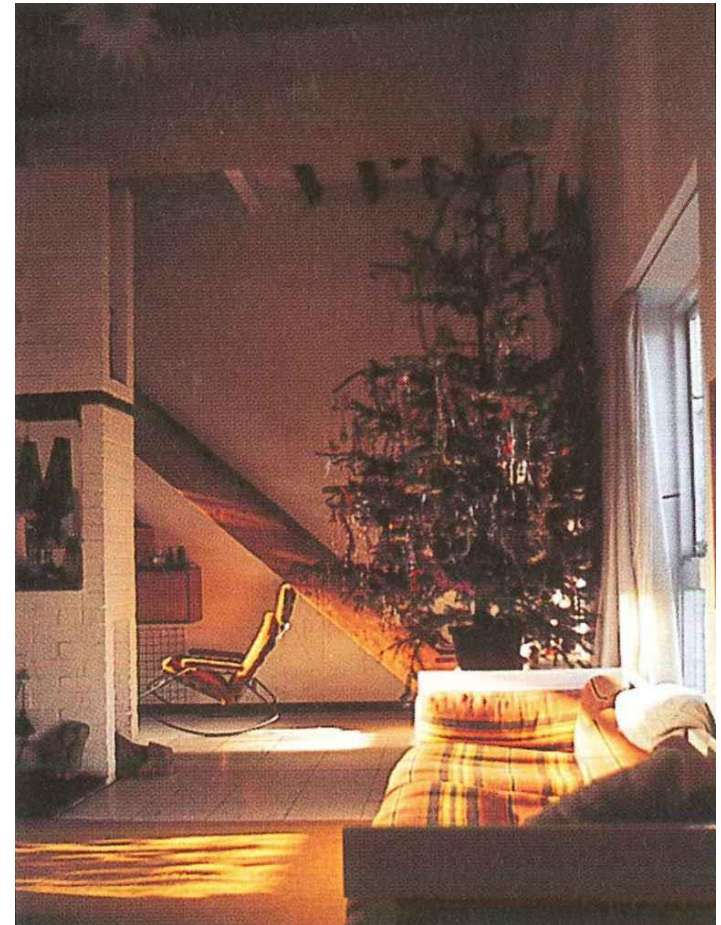
Sequences of spaces

- Some partially sighted people may have trouble adapting from bright outside to inside
- Use buffer spaces to help them adapt
- Avoid fully glazed streets



Glare

- Partially sighted people can be very susceptible to glare
- Essential to control incoming sunlight
- Use matt window sills and floor to avoid reflected glare
- Allow people to sit facing away from window
- Avoid windows in opposite walls
- Possible use of large computer screens



Blinds

- Opaque blinds are often more effective and flexible than curtains. Pull cords should be easy to find and use



Conclusions

- Needs of partially sighted people differ
- Daylight can give high light levels and an even spread of light which can be helpful to partially sighted people.
- The variation of daylight adds interest and enables people to maintain their daily rhythms of sleep and alertness.
- However daylight and sunlight can cause glare, which needs to be controlled by appropriate shading devices.

