

# NATURAL LIGHT

AND OUR HEALTH

# Natural Light and Our Health

by Jodie Walker

**“Modern designers filled the world with buildings and developments divorced from their context, existing as if in some alien realm disconnected from ecology ... and place.”**

**(Orr, 2006)**

Natural light in our homes connects us to nature. In our increasingly built up cities and suburbs, lack of natural light is becoming more of a problem. This is compounded by the fact that people generally spend more time indoors and less time in natural settings exposed to sunlight.

Light has many functions in the home. It obviously enables us to see and is an important element for creating spaces that appeal to us. It is a very different experience walking into a dark building compared to one that has lots of natural light. In our homes, light can add ambience and generally makes us feel good. Obviously, one of the other benefits of natural light is that it makes a home more energy efficient. This not only saves us money but also impacts the environment in a positive way.

Many apartments and houses built in the past decade have reduced the amount of natural light available to occupants. It may seem that this can be fixed with artificial lighting, however, not all light is created equally. Human biology desires natural light, and artificial means do not compare when it comes to the influence light has on us.

Natural light is superior for human health and wellbeing, as will be discussed in this issue of The Secret Agent Report.

## **NATURAL LIGHT VS ARTIFICIAL LIGHT**

Although natural light and artificial light both allow us to see, they are very different in terms of the impact they have on our physiology.

Natural light is produced from the sun and even though it looks white, it actually radiates a full spectrum of colours. Artificial light also looks white, however it does not produce a full spectrum of colours. Consequently, it's not enough to increase Vitamin D production in the body or allow plants



to grow. Given this, it would be expected that there would be further negative downstream effects for human health if natural light is not prioritised over artificial means. Daylight is vital in order to prevent physical and mental health issues. Further, more research is showing that artificial light, especially the blue light that is produced from LEDs and screens, is detrimental to our health because it disturbs our basic biological processes. (Zielinska, 2018)

#### **A PROBLEM IN OUR CITIES**

When it comes to building design, the natural light available to occupants in homes is dependent upon two things. Firstly the amount of windows in each room, and secondly the amount of light that can get through these windows. More apartment buildings and high rises are being built to deal with our increasing population. However this has created a new problem since many of these buildings block out previously existing natural light from entering neighbouring properties.

This effect of stolen light is not isolated to cities. More land in our suburbs is being subdivided and developed into apartments or multi-story townhouses. As this happens, neighbouring homes, especially single storey ones, are finding parts of the home that used to be well lit during the day are no longer.

The problem is compounded by technology. In the past, our homes were set up so that we had televisions so small that they sat in a corner of the room.

**Now we have televisions that are so big they can light up a room as well as a lamp does, simply by being switched on.**

**The artificial light we are being exposed to in addition to a lack of natural light is contributing to ill health in our population.**

Dense, vertical cities are here to stay, and so is technology. Awareness of how natural light and artificial light influence our health can help us make better choices when it comes to buying homes and how we spend our time in them.

#### **VISION**

We could soon live in a world where everyone needs glasses or contact lenses to see properly. The prevalence of myopia, or nearsightedness, across the world is increasing rapidly. It has been estimated that 30% of the world is currently myopic, and if the trend continues, 50% of the world will be myopic by 2050. (Holden et al, 2016)

Natural light lowers the risk of developing myopia. It makes sense then that the parts of the world where myopia is an even greater problem is in densely populated cities where access to natural light is poor. In east Asian countries such as China, Japan and South Korea, it is estimated that more than 80% of the population is myopic. (Zheng et al, 2004)

The prevalence is extremely high in Asia but Australia is catching up.

**A recent study in Sydney investigated the prevalence of myopia in 17 year olds. (French et al, 2013) It found that 31% were myopic, which is double what was found in a similar study conducted 10 years ago. (Attebo et al, 1999)**

In addition to lack of natural light, staring at computer screens and other sources of artificial light can further strain our eyes and exacerbate the problem. Myopia can lead to blindness but is preventable by simply ensuring our eyes have access to natural light and get enough rest from close up work.

#### **SLEEP**

Lack of quality sleep has many health implications on its own, not to mention the impact it has on our mood and productivity. Disregarding the importance of a proper sleep-wake cycle is easy to do in our busy lives. Sleep is something many people feel they can sacrifice however the consequences go far further than simply feeling tired.

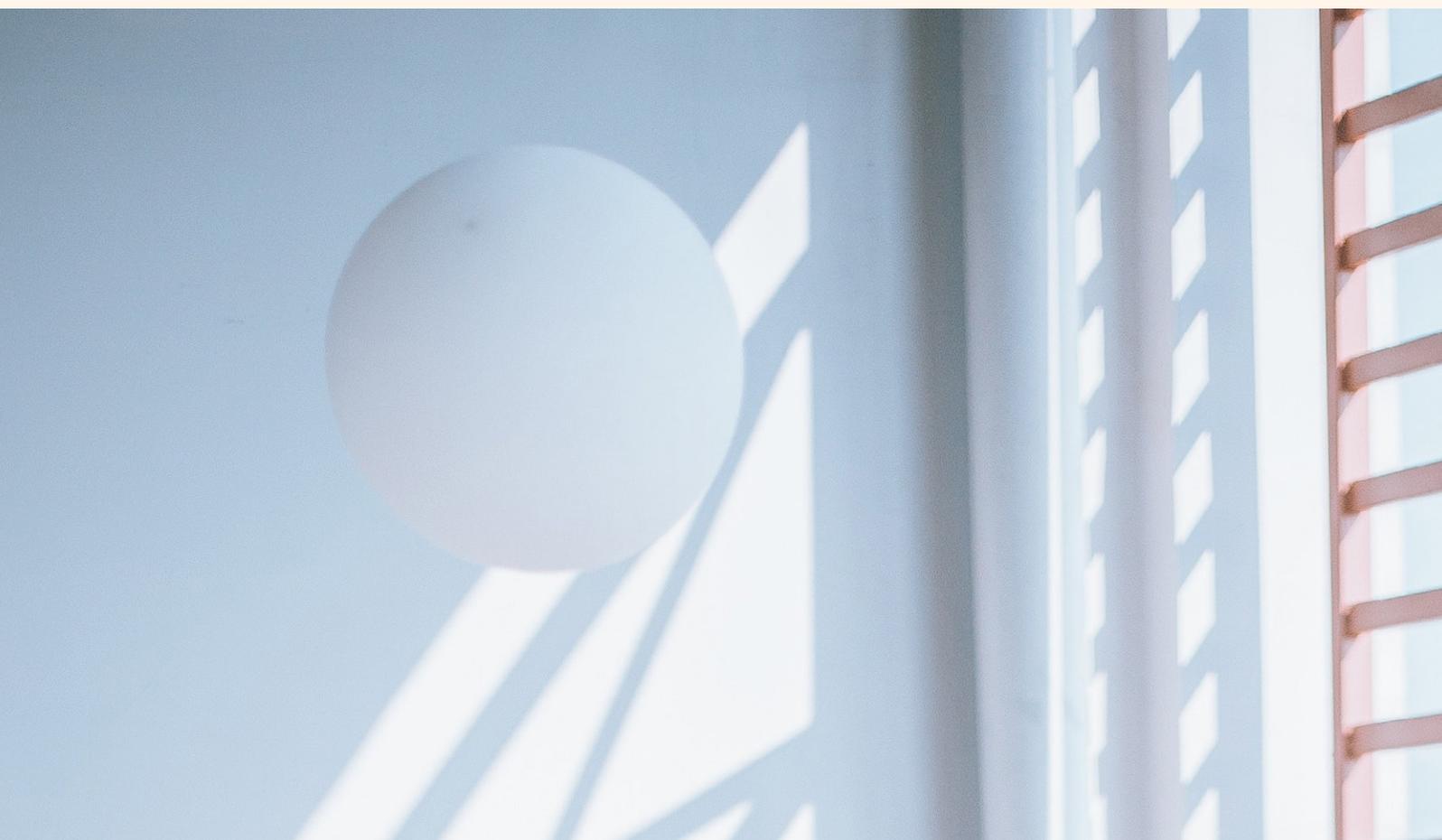
Our body's circadian clock is controlled by daily light dark cycles. It not only affects "our core body temperature, hormonal secretion, or the timing of sleep but also the homeostatic balance of nutrient intake, processing, and

energy expenditure. Indeed, most mammalian genes oscillate in cell-autonomous clocks that interact directly or indirectly with feeding-fasting cycles. This helps to keep daily rhythms in tissue functions, setting adequate timing for nutrient assimilation, mobilisation and distribution, and metabolic waste removal". (Plano et al, 2017)

Exposure to natural light early in the morning is the best way to wake up and boost our energy for the day. It also helps us fall asleep better at night by regulating our body clock. Exposure to artificial light, or natural light later in the day, does not have the same effect. (Wooten, 2007) Sleep disruption can be caused by both too much light at night time, or not enough sunlight during the day.

Lack of quality sleep has been linked to an increased risk of developing chronic diseases. There are many studies that have been carried out on night shift workers which show that they have an increased incidence of developing various forms of cancer including lung, breast, ovarian and colon cancers. It is unknown whether this is due to the light exposure at night, or disruption of the circadian cycle, or both. (Hunter, 2017)

Sleep disturbance has also been associated with increased inflammatory markers in the body. Chronic inflammation has many negative health outcomes including increased risk of cardiovascular disease, diabetes and all cause mortality. (Irwin, 2016)



In addition, regular, quality sleep is important for proper metabolic function. Disrupted sleep impacts appetite and glucose metabolism and may increase the risk for developing Type 2 Diabetes or Obesity. (Jennings, 2007) A review of several studies looking at the relationship between sleep and Type 2 Diabetes found that any disturbances in sleep patterns can increase the risk. These disturbances included short sleep duration, long sleep duration, difficulty initiating sleep and difficulty maintaining sleep. (Cappucio et al, 2010) In other words, both quality and quantity of sleep matter.

A recent study by the National Heart, Lung and Blood Institute supports this. (NHBLI, 2019) It found that irregular sleep (aka not going to bed and waking up the same time each day) is linked to a range of metabolic disorders including obesity, high cholesterol and high blood sugar. For every one hour, night to night difference in sleep time, there is an increased chance of adverse metabolic effects by up to 27%.

Many of us have trouble falling asleep or staying asleep at night. Of course there are other things that can contribute to this other than light. However, getting enough natural light has an important role to play in allowing us to sleep well, and therefore keeping us healthy.

### IMPACTS OF ARTIFICIAL LIGHT

It is clear that natural light is beneficial to human health. Whilst artificial light cannot compare to natural light, it does have some benefits in addition to its negative effects.

Artificial light, including LEDs and the light which comes from computer/ phone screens, emits light of mostly blue wavelengths. This wavelength is beneficial during the daytime as it boosts our attention, increases alertness so therefore decreases reaction times, and improves cognitive function. It can also help improve our mood during the day. (West et al, 2011)

### Prolonged exposure to blue light once the sun goes down is when it can become potentially harmful.

An experiment by Harvard found that circadian rhythms of participants were altered by 3 hours in those exposed to 6.5 hours of blue light. Cycles were shifted by 1.5 hours in those who were exposed to the same duration of green light. (HHP, 2018) Disrupted sleep and circadian cycles is a risk factor for many health issues as mentioned earlier.

### CONCLUSION

“More and more, so it seems to me, light is the beautifier of the building.”

-Frank Lloyd Wright

Natural light is an important element in architecture and can completely transform the feeling of a home. It creates a sense of harmony between the outside world and our internal environment.

Natural light impacts human biology far beyond what we see and feel. As our cities become denser, having access to natural light in the home will become increasingly important to ensure optimal health and wellbeing of its occupants. ♦

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# SECRET

INSIDE PERSPECTIVE

# AGENT



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