

# A natural choice

As with other modern inventions, most of us would find it hard to imagine life without an alarm clock. But it hasn't always been this way. Until relatively recently, humans depended solely on the rising sun – and the natural light it produced – to wake up each morning. >





So what happened? Our modern-day lifestyles often demand that we start our days before sunrise, especially during winter. Although it was deemed one of the most hated inventions in a 2004 MIT survey, the alarm clock is still the wake-up method of choice for most. As natural as this may seem today, biologically it's clearly an unnatural choice.

### In the genes

Waking up to gradual light, as with the sunrise, is not only a more gentle way to start the day, it's actually deep-rooted in the brain via a biological 'wake-up process' that our bodies go through each morning – naturally initiated by light not sound.

The process kicks off as our early-morning, light-sensitive retinas detect the first hint of light. This activates our internal biological 'body clock' located in the hypothalamus region of the brain. This body clock uses light and dark to regulate our daily wake-sleep patterns – a cycle known as the circadian rhythm – through the production of certain hormones and neurotransmitters that tell our bodies when to wake up and when to sleep.

### A hardwired response

Studies suggest that the hormone melatonin, released in response to darkness, plays a key role in preparing our bodies for sleep. Conversely, increasing light levels trigger the production of 'wake-up' chemicals such as cortisol, which is heavily involved in helping the body become alert and energized after a night of sleep. As the main signal for our bodies to switch from producing melatonin to releasing cortisol, light is clearly an important aspect in our biological wake-up process.

"Morning light is the most important light for synchronizing our circadian rhythms," explains Dr David

Avery, a specialist on the connection between light and sleep from the University of Washington, USA. "It's not natural to wake up in the dark. Our ancestors woke up at dawn, whenever dawn came. It's hardwired into our brains and this doesn't change just because we decide to use an alarm clock."

### Fight or flight

While waking up to natural light is clearly best, it's not always easy to adjust your daily schedule according to sunrise and sunset, especially in winter. Given many of us have to wake up well before the sun, an alarm clock is the most obvious solution. But when the alarm goes off suddenly, sometimes at a near-deafening volume, we jump from sound sleep to consciousness without giving our bodies the time, or light, needed to stimulate the natural wake-up cycle. Studies suggest this can cause us to feel drowsy and less alert during the day.

There's also evidence that waking up to the harsh and sudden sound of the alarm can throw our bodies into fight-or-flight mode, pumping our barely awake bodies full of adrenaline – also known as the stress chemical. While this may help you get to the office on time, it's certainly not the best way to start the day.

### A more natural approach

So if the loud alarm clock we typically wake up to isn't such a good thing, what options are there? Other than teaching yourself to wake up without stimulus, the most talked about alternative is dawn simulation. It's a relatively new technique that involves a device much like an alarm clock that uses gradually increasing light instead of sound to wake you up. Mimicking a natural sunrise, dawn simulation tricks the body into initiating the wake-



up process in a more natural way. Typically, light intensity will slowly increase for 30 minutes before the scheduled alarm goes off – often with a choice of sounds such as ocean waves, birds or the traditional beep.

Recent studies show that participants using dawn simulation reported feeling more alert and less tired, which could be related to the proven increase in serotonin levels after light exposure. Serotonin has long been linked to improved moods and increased energy levels.

Another factor in feeling energized after waking is cortisol release. Professor Angela Clow, from the University of Westminster (UK), explains, “Waking up with light helps the cortisol cycle efficiently regulate other bodily systems, which could explain why people find waking up with dawn simulation beneficial to how they feel during the day.”

### In sync

Dawn simulation has also been shown to help keep our internal body clocks in sync. “All living organisms operate on night and day cycles and these physiological processes can become delayed, particularly in winter, meaning it takes longer for our bodies to switch from nighttime to daytime activities,” Clow says. “But dawn simulation helps trigger and regulate these cycles while slowly waking you up.”

New evidence reveals that dawn simulation can also positively affect sleep, according to a recent study conducted at the University Medical Center Groningen in the Netherlands. Dr Ybe Meesters who headed the study notes, “The benefits of dawn simulation in a normal healthy population are easier awakening and an improvement in sleep quality, therefore improving quality of life, especially in the winter.”

### Putting experience into creation

Although research on dawn simulation is a relatively new field of study, so far all studies show a beneficial correlation between dawn simulation and how users feel upon waking up. This was enough to inspire Philips to leverage more than 100 years of experience in lighting technology to develop a ‘Wake-up Light’ more advanced than all others in terms of light intensity (lux), a key factor in how well the wake-up process goes.

As Dennis Schuilenburg, a business manager in Philips’ Consumer Lifestyle Sector, points out, “During development, we focused on real consumers in real-life situations. Through this we found that although everyone is different, many people need around 250-300 lux to awaken fully in the morning. But this lux level is difficult to achieve in a small unit because of heat-dispersion issues.”

He adds, “For this reason most companies still produce an alarm clock with a small light of around 50 lux. We focused instead on developing an alarm clock that is a lamp first and foremost, therefore overcoming the heat-dispersion problem. It was only through intensive research that we discovered this was the best way forward.”

Schuilenburg also explains that when determining the light curve, only the best prototype would do. “It’s important that light intensity increases very gradually, so users don’t wake up too early,” he says. “So we developed the light curve for the Wake-up Light to match the light curve of the rising sun.”

The next best thing to a natural sunrise, the Philips Wake-up Light has become so popular, the biggest challenge is keeping up with strong demand. All we need now is someone to make breakfast. ☒