THE SECRETS OF SLEEP

By Jerome Groopman

This is the second half of an informational essay about the science and history of sleep. The author summarizes a book on the subject focusing on how culture, need and technology have affected the way humans sleep. Read the article and think about how sleep might change for us in coming years based on modern technology and culture. Read the full prompt at mrswansonrhs.weebly.com in the honors blog and respond by the deadline.

When I trained to be a doctor, some four decades ago, everyone neglected sleep. "On call" duty for hospital interns began at 6 a.m. and lasted twenty-four hours; I often kept on working until early evening the next day, after which I would stumble back to my apartment and fall asleep in my clothes. The ethic was not to complain. You were being toughened up—"iron man" was the term we all used—to deal with the demands of doctoring, which did not respect the clock. But that wasn't the only way in which sleep was disregarded. In medical school, the subject had been covered in only the most cursory way. In a class on the brain, an instructor mentioned a neural pathway, the reticular activating system, that was associated with wakefulness. In passing, he also told us about narcolepsy, a rare condition that could cause people to sink into slumber at any moment and that had other fascinating features, such as vivid hallucinations and abrupt loss of muscle control. That was it. Ordinary sleep, it seemed, was not a subject that medicine concerned itself with.

Today, interns still work difficult hours, but the medical world's opinions on sleep have changed. There's a field of sleep science dedicated to the biology of repose. Sleep medicine has become a specialty, with fellowship training programs and clinics devoted to caring for those suffering from sleep disorders. And these disorders are not rare. Some forty-seven million adults, according to the National Sleep Foundation, do not get a restorative night's sleep. In the workplace, sleep deprivation results in injuries and decreased productivity, which is thought to cost the U.S. eighteen billion dollars each year. As many as 1.2 million car crashes—twenty per cent of the annual total—can be attributed to tired drivers, so it could be said that lack of sleep causes thousands of deaths and injuries every year.

These numbers have not escaped the notice of the business world, and there is now a thriving sleep industry. Pharmaceutical companies ply us with Ambien and Lunesta, and entrepreneurs have devised any number of outlandish gadgets to foster slumber. In January, merchants at the Consumer Electronics Show unveiled "smart pajamas," containing a "bioceramics gel," which purportedly cool off "the body's infrared heat emissions" to foster longer, sounder sleep. There was also a respiration sensor that straps to one's chest and features an app, which synchronizes breathing with tonal music to help lower anxiety. Gadgets that pipe relaxing "neuroacoustic sounds" into earbuds are marketed as triggering brain waves that erase the sense of time. "Smart pillows" are programmed to record the quality of the previous night's rest and then offer tips on improvements through an app. And, if you have three thousand dollars to spare, there's the Magnesphere, a pod, six feet in circumference, which envelops the body in allegedly restorative electromagnetic fields. Less expensive sleep aids include weighted blankets, which confer the sensation of being swaddled; customized goggles, which aim to set your circadian rhythm by shining light at various wavelengths; and mattresses that mold to your body.

Sleep, according to the Sunday Style section of the Times, is a new status symbol, a sign of prosperity and control in a frenetic world. And, as if to confirm that sleep science is an important, even trendy field, this year's Nobel Prize in Medicine went to three researchers who deciphered the genes responsible for regulating our circadian rhythms. Still, although we may know more about sleep than ever before, it remains one of the most enigmatic phenomena in our daily lives. "Why do all forms of life, from plants, insects, sea creatures, amphibians and birds to mammals, need rest or sleep?" Meir Kryger asks in his new book, "The Mystery of Sleep" (Yale). Kryger, a professor at Yale Medical School, is a leader in the field of sleep medicine, and has treated more than thirty thousand patients with sleep problems during a career that spans four decades. He draws on this voluminous clinical experience in his book, which is an authoritative and accessible survey of what is known, what is believed, and what is still obscure about normal patterns of sleep and the conditions that disrupt it. As he readily admits, "No one has been able to declare with certainty why all life forms need sleep."

The mysteries that surround sleep are not merely scientific and clinical but also cultural. In "Wild Nights," Benjamin Reiss, a professor of English at Emory University, writes:

Sleep is both a universal need and a freely available resource for all societies and even species. So why is it the source of frustration for so many people today? Why do we spend so much time trying to manage it and medicate it, and training ourselves—and our children—how to do it correctly? And why do so many of us feel that, despite all our efforts to tame our sleep, it's fundamentally beyond our control?

The fault, he believes, lies with our fixation on sleeping "in one straight shot through the night," a schedule that conflicts with the natural sleep rhythms of many people. This fixation leads to "worry and micromanagement," paradoxically worsening insomnia[1]. Sleep aids end up causing more problems than they solve, making us "more intolerant of small changes to routine and environment, creating a society of fussy, stressed-out sleepers."

[1] insomnia- The inability to sleep

But what is "natural" when it comes to sleep? Reiss looks to the historian A. Roger Ekirch, who, in 2001, documented that in early-modern Europe and North America the standard pattern for nighttime sleep was "segmented." There were two periods, sometimes termed "dead sleep" and "morning sleep," with intervals of an hour or more when the person was awake, sometimes called "the watching," during which people might pray or read or have sex. In some indigenous societies in Nigeria, Central America, and Brazil, segmented sleep persisted into the twentieth century. Ekirch hypothesized that segmented sleep was our natural, evolutionary heritage, and that it had been disrupted in the West by the demands of industrialization[2], and by electricity, which made artificial lighting ubiquitous. Reiss cites Ekirch, who asserted that the fact that many people experience insomnia in the middle of the night, after a few hours of sleep, indicates that our ancestral rhythms have been disrupted by modernization.

However, other studies cited by Reiss challenge the idea of a universal model of sleep across millennia. Jerome Siegel, a neuroscientist at U.C.L.A., studied three contemporary hunter-gatherer societies in Tanzania, Namibia, and Bolivia. All of them lacked electricity and, he posited, occupied environments like those inhabited by early humans, so their sleep patterns most likely "represented the truly natural way to sleep." None of the tribes experienced segmented sleep, but daytime naps were important, especially during the summer months. Reiss emphasizes that these tribes showed "none of the adverse health effects—including obesity, diabetes and mood disorders—that authorities so often link to sleep deprivation."

It seems questionable that humans have so changed psychologically and physically over the millennia that what keeps us awake today didn't exist in the past. Reiss, a professor of English, is doubtless familiar with the many reflections on sleeplessness found in Shakespeare, whose Henry IV, conscience-stricken after seizing the throne, laments, "O sleep, O gentle sleep, Nature's soft nurse, how have I frightened thee, that thou no more will weigh my eyelids down, and steep my senses in forgetfulness?"

Reiss himself details insomnia remedies in the ancient world that included crisp lettuce leaves, nutmeg, dandelion, and onions. Restless nights existed, but, instead of swallowing Ambien or melatonin, people ingested soporific foods, following an Aristotelian belief that "warm vapors of digested food reach the brain." Going back even further, undoubtedly the slumber of hunter-gatherers was sometimes disrupted by worry about access to food during dry seasons, say, or by envy of more successful tribe members.

Before industrialization, sleep patterns were based largely on seasonal daylight. But the idea that modern industrial society alone is responsible for our discordant forms of sleep is belied by the taxing rhythms of agrarian life. Harvests required long days and late nights; cows would have been milked in the very early mornings, and shepherds, as

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[2] demands of industrialization- Industrialization is the time period that started in the mid 1800's and refers to the growing need for people to work in factories and other businesses. In this case, the "demands" refer to the fact that people had to report to work at a certain time (for example, because everyone be at work for a factory to function properly. Of course, if everyone has to show up at work at the same time, they probably have to wake up and go to sleep at similar times, like school today.

the hymn says, watched their flocks by night, to save them from predators. Speaking of hymns, Reiss also ignores the demands that religious rituals have long made on daily schedules. In Judaism, there are three services for prayer: morning, afternoon, and night. (A famous passage in the Passover Haggadah has a student barging in on five rabbis who were up all night discussing the Exodus, telling them that the time had come for the morning Shema.) In Islam, the muezzin calls the faithful to prayer five times a day, beginning at dawn. And among monks, nuns, and devoted Catholic laity the "liturgy of the hours" specifies prayers every three hours, from Lauds, at 3 a.m., through to Vigils, at midnight.

Reiss writes that his book's "guiding spirit and lead witness" is Henry David Thoreau[3]. Thoreau suffered from insomnia, and his retreat, in 1845, to a simple cabin at Walden Pond was, in part, driven by a desperate need for rest. Thoreau attributed his nightly struggles to the fact that railroads and other industrial changes had disturbed the natural environment around Concord. Reiss believes that we are victims of "the same environmentally devastating mind-set that Thoreau decried: an attitude of dominion over nature (including our own bodies) through technology and consumerism." As the opposite of Thoreau, emblematic of everything he was reacting against, Reiss gives us Honoré de Balzac[4], who, while Thoreau was in Walden, was fuelling his writing with twenty to fifty cups of coffee a day, often on an empty stomach. Balzac believed that, with caffeine, "sparks shoot all the way to the brain," and "forms and shapes and characters rear up; the paper is spread with ink." Balzac typically wrote between fourteen and sixteen hours a day for two decades, producing sixteen volumes of "La Comédie Humaine" within six years. Thoreau rejected coffee as an artificial stimulant and suggested that communion with nature offered a superior high: "Who does not prefer to be intoxicated by the air he breathes?"

At the heart of "Wild Nights" is the tension between the stimulation of intense productivity and a longing for a lost Eden of relaxation. But did Eden ever really exist? The history of blaming modernity for lost sleep runs long. Where Thoreau once held railroads responsible for his insomnia, we now obsess over e-mail and social media and the glowing screens of our computers and smartphones. Societies have been looking for ways of forcing people to rest since at least the Iron Age, when the Sabbath tradition emerged in Judaism. As Kryger shows, sleep is utterly essential to life, organically speaking, but the act of living our lives to the fullest, with all the attendant toils, responsibilities, and worries, has probably always been the enemy of sleep. Even God needed a seventh day to rest from all that he created.

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[3] Henry David Thoreau is an American philsopher who famously left his hometown and built a cabin in the woods near Walden pond; he lived there over two years. He wrote about it in a book called *Walden*. Swanson is a big fan.

[4] Honore de Balzac is a French writer.