fast asleep

How to get
a really good
night's rest

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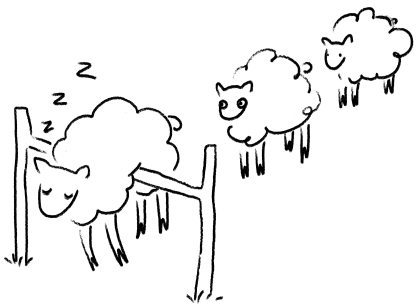
INTRODUCTION



Sleep is something we all do; in fact, we spend around a third of our lives in this strange, unconscious state. And yet until recently we understood very little about what sleep is for, how much we need, and the role that dreams play in improving our mental health.

The good news is that over the last 20 years there has been a revolution in our understanding of sleep and just how important it is. Not so long ago it was fashionable to brag that you hardly slept at all, and the mark of a successful business person or politician was their ability to get by on very little shut-eye. Former British Prime

Minister Margaret Thatcher was held up as a shining example of someone who could operate without much sleep (which turned out to be a carefully cultivated myth), while I remember being told by a grizzled medical consultant, when I complained about the impact that lack of sleep was having on my empathy and judgement, that "sleep is for wimps". Or, as another put it: "There's plenty of time to sleep when you are dead."

Our current attitudes to sleep are very different. Thanks to recent research, we know that too little sleep can devastate your body, brain and microbiome (gut bacteria), dramatically increasing your risk of developing a range of chronic conditions such as obesity, type 2 diabetes and dementia.

And, when it comes to sleep, it's not just about quantity, but about quality too. We have learned, through extensive sleep studies, that if you don't get enough of the right sort of sleep, you increase your risk of depression and memory problems. Which is all very worrying, particularly if, like a third of the adult population, you suffer from insomnia.

Fortunately, there are surprising and highly effective ways to improve your sleep quality, ensuring you fall asleep rapidly, get plenty of deep sleep and wake up feeling refreshed. This in turn should boost your happiness, creativity and even life expectancy.

The reason I particularly wanted to write this book is because I am obsessed by sleep and have been for

many years, not just from a science perspective, but also on a deeply personal level. For the last 20 years, I have suffered quite badly from intermittent insomnia, to the point where I was in real despair. I wanted to find out what I was doing wrong and, of course, I wanted to find out what I could do to make it better.

I wasn't always a poor sleeper. When I was a teenager, I could sleep any time, anywhere. I once slept in a photo booth (I had missed the last train home). Another time I slept in a telephone kiosk. I never worried about going to sleep or staying asleep, because that came naturally.

I didn't always get a good night's sleep, but that was my choice. Like most teenagers, I was keen to burn the candle at both ends. As a medical student, I often stayed up partying, then went straight into some feverish last-minute cramming. Which I now realise was wildly counterproductive. You need sleep to consolidate your memories, as I will explain in this book.

As my medical training progressed, sleep became ever more precious. I found I just couldn't function any longer on a few hours' sleep a night. I became intensely irritable and I'm sure that both my judgement and my empathy were impaired. But, even so, I could still go to sleep and stay deeply asleep for hours when I was given the chance. Despite the disruption to my sleep pattern caused by the irregular hours I had to work, I never had any problem drifting off.

Then, as I entered my late twenties, everything changed. By then I was married and I had started a new career in television. The hours were long and unpredictable, though nothing like as bad as in medicine. At this time my wife, Clare, was working as a junior doctor and regularly working 120 hours a week. It was not unusual for her to be on duty for three or four days with only a few hours of broken sleep a night, which blunted her thinking. She told me that after one particularly gruelling week, she briefly fell asleep standing, during an operation. Fortunately, she woke up before anyone noticed.

Not only did work absorb almost every waking hour, it also began to intrude on our sleep. On the occasions that Clare was actually sleeping at home, she would regularly wake me up in the middle of the night to help her look for patients, which in her sleep-deprived state she was convinced were lost in the cupboards or waiting for her downstairs. Clare has parasomnia, a quite common set of sometimes bizarre nocturnal behaviours, which include a tendency towards sleep-walking and sleep talking.

By the early 1990s, we had started to have children, and that, of course, resulted in many nights of disrupted sleep. In fact, we went on to have four children, which meant that a full decade was dominated by babies.

By the time we entered our forties, Clare was a GP and working more regular hours. Our children were

also sleeping through the night. But by then I had begun to show classic signs of insomnia. I had difficulty going to sleep and kept waking up at three in the morning with thoughts rushing through my head. I would lie there for what felt like hours, and going to bed, which was once a real pleasure, was something I began to approach with a sense of unease. Would this be a good night or a bad night? Would I get up feeling shattered or would this be one of those rare nights when I would sleep through until morning?

Naturally enough, I wanted to understand what was going on and what I could do to get back to the days of blissful, effortless sleep. I made what was to be the first of many popular television programmes examining the mystery of sleep. Making these programmes introduced me to lots of sleep scientists and a whole new, fascinating world of sleep research.

To try and understand the impact of severe sleep deprivation, I decided to see how long I could stay awake with a man who holds the unofficial world record. He can go days on end with no sleep without appearing to suffer. What was the secret to his success? Why could he just keep going, while I couldn't?

Since then I have spent many nights in sleep labs with electrodes attached to my head and body. I've taken drugs to put me to sleep and drugs to keep me awake. I have interviewed hundreds of people, ranging from firefighters to doctors, astronauts to police officers,

about their sleep. I have also begun to look at the impact of food on sleep and test out different ways to improve sleep quality.

The structure of the book

You may be someone who is desperate to get a good night's sleep. Or you may simply be interested in what happens to you when your eyes close and you drift off into the land of Nod.

The first part of this book is all about the science of sleep: the research that has led to our current knowledge and how this has given us rich insights into a previously undiscovered land. What are common sleep disorders and how do they arise? What really happens to your brain and body when they are chronically sleep deprived? Why are dreams so important and how can you make the most of them?

I will use my own sleep adventures to illuminate the journey and I will, of course, provide plenty of scientific studies to justify my more surprising claims.

All of this lays the groundwork for the second part of the book, which is primarily aimed at helping you sleep better. After all, I suspect that many of you are reading this book because you suffer from occasional insomnia, or you know someone who does.

I will take you through the best that modern science

can offer with a sleep programme that should, within a few weeks, set you on a better path.

One of my key goals is to help you improve your "sleep efficiency", which is a measure of how well you've slept. Your sleep efficiency represents the amount time you spend in bed fast asleep, as opposed to trying to get to sleep or lying in bed wide awake, fretting. You should be aiming for a sleep efficiency of 85%. More on that later.

As for the Fast Asleep programme, at its heart are two novel and surprising elements, both based on the latest scientific research.

The first thing that might surprise you is that the most effective way to cure insomnia is to reboot your brain by putting yourself through a short course of Sleep Restriction Therapy. It is called Sleep Restriction Therapy because, paradoxically, it demands that you cut back on your sleep. Yes, I am going to help you sleep better by asking you to cut the amount of time you spend in bed.

One of the classic mistakes people who have problems sleeping make is to try and spend *more* time in bed – when, for most people, lying in bed not sleeping isn't restful, it is very stressful. It also sets up a really bad behaviour pattern where your brain comes to associate being in bed with being awake, fretting.

Studies have shown that sleep restriction is more effective than anything else, including drugs, and that

the results last, long-term.

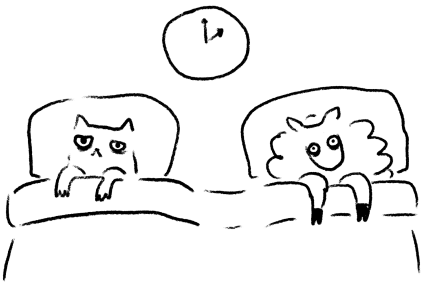
The second novel thing about my programme is the emphasis I place on food, particularly the sorts of foods that have been shown to improve the quality of sleep. Forget all those stories about turkey or cheese. It turns out that eating more legumes and fibre-rich foods, and fewer late-night sugary snacks, is one of the most effective ways to boost your levels of deep sleep and improve your mood.

That's, in part, because fibre-rich foods feed the trillions of "good" bacteria that live in your gut, which in turn produce chemicals that have been shown to reduce stress and anxiety. I will take you on a fascinating guided tour of the science.

On a more practical level, my wife Clare, along with food writer Justine Pattison, has created a range of tasty recipes that are packed with the sorts of ingredients that those good bacteria will really love, and that you will love too.

I do hope you enjoy this book and most of all I hope it puts you to sleep. Fast.

1. HOW WE WOKE UP TO SLEEP



As I pointed out in my introduction, it is astonishing that despite the fact that we spend up to a third of our lives – around 25 years – asleep, until relatively recently we knew very little about what went on during that time. A hundred years ago, most people thought that the brain simply switched off, like a light bulb, when you went to sleep.

The American inventor Thomas Edison, who manufactured the first light bulbs, and whose invention did more than any other to disrupt our sleeping patterns, thought that sleep was a waste of time. He claimed to need less than five hours' sleep a night and said that

having more was just greedy. As he put it: "Most people overeat 100%, and oversleep 100%, because they like it. That extra 100% makes them unhealthy and inefficient."

As we'll see, he couldn't have been more wrong. One reason we knew so little about sleep was that until the early 20th century we had no means to probe it. Scientists like being able to measure things, and sleep was all too intangible. It was like trying to make sense of the movements of the planets before we had the ability to properly study the heavens.

The man who made the first major breakthrough in the science of sleep was a peculiar German psychiatrist called Hans Berger.

Reading the sleeping mind

Hans Berger's contribution was the invention of electroencephalography (often abbreviated to EEG), the ability to record human "brainwaves" by attaching electrodes to a volunteer's skull.

He built the first working electroencephalograph in 1924, but for a long time his work was ignored. He was widely regarded as a crank. And that's not surprising because Berger believed passionately in telepathy. In fact, the main reason he had created his EEG machine was to prove that humans can communicate

with each other through psychic powers.

His obsession with telepathy began when he was a young cavalry officer. One day, while he was taking part in a military exercise, his horse suddenly reared and threw him into the path of a horse-drawn cannon. He wasn't seriously injured, but he was very shaken. He later discovered that his sister, who was at home at the time, had had a sudden premonition that he was in deadly danger and forced their father to send him a telegram to see if he was alright.

Berger was convinced that during the accident, he had sent out a powerful psychic distress message, which his sister had somehow picked up. He was so convinced of this that he decided to retrain as a doctor, and then as a psychiatrist, just to prove that telepathy exists.

I personally don't believe in telepathy, but Berger was absolutely right when he claimed that the human brain produces electrical signals that can be "read" by multiple electrodes placed on the scalp. Although modern versions of the EEG are far more sophisticated than Berger's invention, in essence they do the same thing.

Dream sleep

Berger had shown, in 1924, that his EEG machine could be used to study human brainwaves, but it would

be another 27 years before sleep researchers got round to using it in any meaningful way.

In December 1951, an impoverished student at the University of Chicago called Eugene Aserinsky decided to take his eight-year-old son, Armond, to his lab to take part in a novel sleep experiment. He scrubbed Armond's scalp, taped on the EEG electrodes and left him to fall asleep. Aserinsky then went next door to record what happened.

For Aserinsky this was a do-or-die moment. He was 30 years old and living with his newly pregnant wife in a converted army barracks. They were so poor he could barely afford the HP payments on his typewriter, let alone heat their home. He needed a breakthrough with his research, and soon.

Since no one else had yet bothered to use an EEG to study someone sleeping through an entire night, Aserinsky had decided he might as well begin with his young son.

Nothing very exciting happened for the first hour, but then he noticed that his machine had begun to record a sudden change in brain activity. On the machine, it looked as if his son Armond had woken up. But when Aserinsky went next door to check, Armond was clearly still deeply asleep. Nothing was moving except for his eyes, which were darting around under his eyelids.

Aserinsky woke the boy, who reported that he had

been having an intense dream. This was amazing, ground-breaking stuff. The next day Eugene repeated the experiment, with the same results. A few hours after Armond fell asleep, the EEG recorded a sudden change in his brain activity, which coincided with rapid eye movements. Studies done with other, adult, volunteers showed the same thing.

Eugene Aserinsky had done something that would transform our understanding of sleep. He had sent the first exploratory probes into Planet Sleep and discovered that, far from being a dull, barren world where not much happens, it is a place where the brain undergoes some remarkable changes. Sleep research was about to become sexy.

However, despite having made this amazing breakthrough, Aserinsky soon lost interest in sleep. After publishing his findings in 1954, he went off to study electrical brain activity in salmon and later died in a car crash, very possibly because he fell asleep at the wheel.

So what does happen when we sleep?

I've spent many nights both being observed in sleep labs and, more interestingly, observing other people while they sleep. If you have never seen someone else go to sleep, or had yourself filmed while falling asleep, then I would recommend you give it a go. It is very entertaining.

As I mentioned earlier, we used to think of going to sleep as being like switching off a light bulb. You were

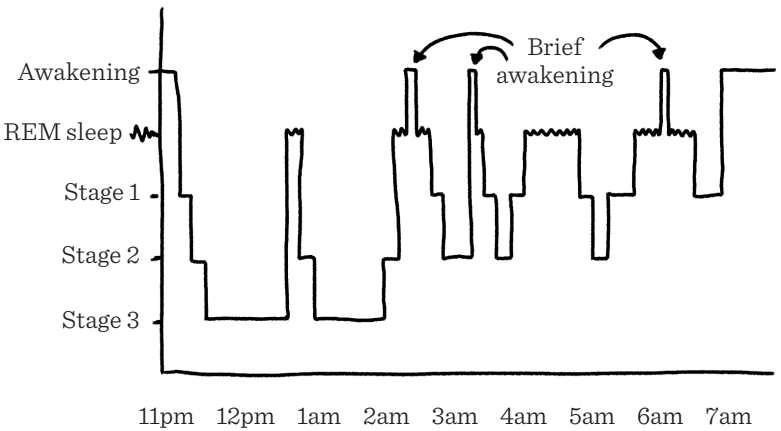
either awake or asleep. We now know it is much more complicated than that.

Sleep involves three distinct states: light sleep, deep sleep and REM (Rapid Eye Movement) sleep. We sleep in roughly 90-minute cycles throughout the night, flipping between one state and another.

As you can see from the diagram below, during the first part of the night you get most of your deep sleep, while the second half of the night is dominated by REM sleep. Most people wake two or three times a night. If you are lucky (like my wife Clare), you won't even be aware of it. If you are unlucky, you will wake up and stay awake.

When you go to bed and close your eyes, you should soon start to drift off into light sleep (Stage 1). At this

Hypnogram

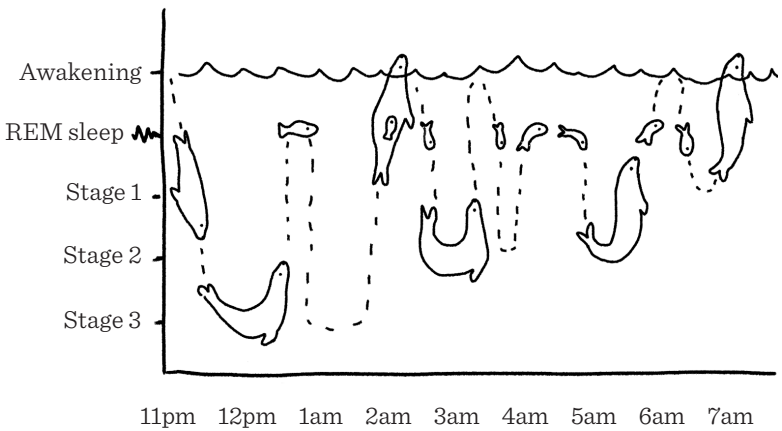


point you are drowsy, but easy to rouse. If the dog next door starts to bark or your partner starts to snore loudly, you might wake up.

After Stage 1 (which normally lasts around 10 minutes), you begin a deeper dive into sleep.

When it comes to sleep, I like to see myself as a seal, plunging joyfully into the depths of the night. Some years ago, I made a film about free divers, people who swim to great depths without the aid of oxygen tanks, and it looked just beautiful, as they headed away from the bright light of the surface towards the dark of the ocean floor. That said, for some people, the act of falling asleep is frustrating rather than joyful.

The next stage, Stage 2, also counts as "light sleep". As you enter it, your core body temperature (typically measured with a rectal thermometer), which began to fall even before you got into bed, drops even further.



Your heart rate slows down (I've recorded mine and it drops from its usual 60 beats a minute to about 55) and your breathing also slows and becomes steadier.

When you are entering Stage 2, you may well do what is known as a hypnagogic jerk or "sleep start". This is an involuntary twitch of the muscles as you go deeper into sleep. Most of us do it. Although it is normally no more than a little twitch, some people really lash out, which is no fun if you are sharing a bed with them. It is often a sign of stress, and if you follow the regime I'm going to outline in this book, you should not only sleep better but also be less likely to do this annoying little dance at night.

If all is going well, within an hour of beginning to nod off you will have entered Stage 3 – deep sleep. This is also known as slow-wave sleep because it is when an EEG would start recording slow, deep waves. Millions of neurons in your brain fire at once, then pause, before firing again. This activity creates great, crashing waves that travel through the brain, which are really hypnotic to watch on a screen.

In deep sleep you are at your most relaxed and difficult to rouse. But, while your brain rests, your body is hard at work because deep sleep is when a lot of vital repair work gets done. Your pituitary gland, for example, will start to secrete more growth hormone, which is vital for cell growth and repair. Deep sleep also boosts your immune system.

Without sufficient deep sleep, your body makes fewer cytokines, a type of protein that regulates your immune system. Cytokines are vital for helping you fight infections, which is why lack of sleep makes you more vulnerable to catching colds and also reduces the efficacy of vaccines against diseases such as the flu.

Despite the fact that deep sleep is supposed to be a time of deep relaxation, it is also the time when some people start to do strange things, like sleepwalking, sleep talking and even sleep eating. I will talk about these phenomena in more detail in Chapter 2.

Deep sleep and brain cleaning

When I was young, I loved reading stories from Greek mythology and one of my heroes was the super powerful Heracles (known as Hercules by the Romans). Heracles, who was the son of Zeus, was told he could be made immortal if he successfully carried out 12 apparently impossible tasks ("the labours of Heracles").

The least glamorous of these challenges was to clean out the Augean stables, in a single night. The Augean stables were notorious because they housed more than 3000 cattle and hadn't been cleaned for years. You can just imagine the stink. Yet Heracles succeeded in scouring the stables of decades of

accumulated dung, in a single night, by diverting two rivers through them.

The reason I bring up this story is that, overnight, something similar takes place inside your head. A network of channels in your brain, known as the glymphatic system, opens up and pumps cerebrospinal fluid through it while you are in deep sleep. Like the rivers in the Augean stables, this fluid flows through your brain tissue and washes away the toxic waste that has built up there during the day.

That's the good news. The bad news is that, as we get older, we tend to get less deep sleep, which means that our brains are not as good at washing away the toxins. Young people typically get a couple of hours of deep sleep a night. When you get to my age (63), you are lucky if you are getting 30 minutes.

This matters because it is the accumulation of toxic proteins in the brain, such as beta amyloid and tau, that appears to drive Alzheimer's disease, and in humans there is a very clear link between poor sleep and the development of dementia.

To maximise your chance of getting deep sleep, it is a good idea to go to bed before midnight, since your brain gets the most deep sleep during the first half of the night. Eating the right foods has also been shown to boost deep sleep, which I will discuss further in Chapter 5.

Deep sleep and memory

As well as giving your brain a good spring clean, deep sleep is when your brain sorts out your memories and shifts the useful ones into deep storage.

During an average waking day, an awful lot happens to you. You listen to the news, read a book, go to work, talk with friends, go on social media, listen to music. In other words, you load your brain with a myriad of potential memories. Some are useful, but others can be happily discarded. It is while you are asleep (particularly in deep sleep) that your brain decides which memories it wants to keep and which to discard.

It's a bit like sorting out photos and videos on your phone. Storing images requires a lot of memory, so when your phone starts to get full, you have to edit them. Removing dud videos and photos leaves space for new ones.

Even compared to a modern computer, your brain can store an extraordinary amount of data; a recent estimate puts its storage capacity at around 1000 terabytes, which is a billion megabytes. A computer with that capacity could store around 2 billion books or 500,000 films.

Yet while you have an awesome capacity to remember things, you don't want to store more junk up top than necessary. So, during the night, the memories that are considered important are shifted from the hippocampus

(the short-term storage area of the brain) to the safety of the prefrontal cortex (the long-term storage area of the brain – think of it as your hard drive). The memories left behind in short-term storage are gradually deleted.

That's why, if you are a student, getting a good night's sleep before an exam is so important. Staying up late and cramming is self-defeating because all those last-minute facts being madly forced in will soon be gone. You might think: "I'll cut back on sleep during the week and then make up for it at the weekend." Unfortunately, it doesn't work like that, because memories need to be consolidated within 24 hours of being formed.

A dramatic fall in the amount of deep sleep we typically get as we age may also explain why our ability to remember things gets worse as we get older.

In a recent study, researchers from the University of California, Berkeley,[1] asked 18 healthy young adults (mostly in their twenties) and 15 healthy older adults (who were mostly in their seventies) to come into the sleep lab to take part in a memory test. Before going to bed, they were asked to memorise pairs of words, and were tested to see how well they did.

They were then attached to an EEG machine, which measured their brainwave activity while they slept. The next morning, they were tested again to see how many of the word pairs they could recall.

The researchers found that the older participants got

75% less deep sleep than the younger participants, and their ability to remember word pairs was 55% worse.

Brain scans also showed that, overnight, the youngsters were much more efficient when it came to shifting memories from the short-term storage of the hippocampus to the long-term storage of the prefrontal cortex.

One encouraging finding was that applying "transcranial direct current stimulation" – a small electric buzz to the surface of the brain – enhanced deep sleep in the older participants and improved their ability to do well in the memory test. Even so, as you'll discover in Chapter 6, there are easier ways to enhance deep sleep than giving your brain electric shocks.

REM sleep and emotions

As we've seen, deep sleep is vital for cleaning out our brains and sorting our memories. REM sleep, which occurs later in the night, is also important for tidying and organising our memories; but it has the additional role of helping resolve our emotional issues.

Although we dream at other points in the night, REM sleep is when we have our most vivid dreams, and it is these dreams that help us process and deal with bad memories and experiences. All of which helps explain another very odd finding: during REM sleep

most of our muscles are paralysed. This is probably so that, while in the grips of an intense, dramatic dream, we don't thrash around and hurt ourselves. We do go on breathing, taking short, shallow breaths, but apart from that, the only part of us that is obviously moving is our eyes.

If you look at someone in REM sleep, you will see that, underneath their eyelids, their eyes are flicking madly to and fro. No one knows why this happens, but one theory is that it reflects the sort of eye movements you might make while watching a film. Dreams have been called the cinema of the mind, so perhaps the eye movements are simply a sign that you are following the action.

So how does REM sleep help us process our emotions? Well, it is all to do with the amygdalae, the two almond-shaped groups of cells located deep in the brain that play a key part in regulating emotions. Let's first look at how they work while we are awake.

I am mildly claustrophobic and, when I am in a confined space, I start to feel a sense of rising panic. That is because my amygdalae have triggered the release of "fight or flight" hormones, such as adrenaline, and this in turn makes my heart rate, blood pressure and breathing shoot up. I feel nervous, sweaty and sometimes nauseous. There is a part of me that knows nothing bad is going to happen, but most of me just wants to escape from the situation.

Since the release of "fight or flight" hormones plays such a big part in generating fear responses, I was fascinated to discover that REM sleep is the one time of day or night when links to these stress-inducing chemicals in the brain are switched off. This means that, while the dreams we have during REM sleep can be scary and disturbing, they are nothing like as bad as they would be if you were having them while you were awake.

Looked at this way, dreaming during REM sleep is a form of psychotherapy, where you revisit unpleasant memories and events but remain calm. This allows you to process your emotions and defuse them.

The Spider dream

While writing this book, I asked lots of people about their sleep and their dreams. The following story, which someone told me, is a great example of a therapeutic dream: "When I was young I had a fear of spiders; it wasn't terrible but I had to leave the room if I saw one. Then one night I had a dream in which I was sitting on a chair in a dark room. From the chair I could see a door. There was a light under the door and I noticed that small spiders were crawling through the gap under the door. Slowly the gap under the door got bigger and bigger and as it did larger and larger spiders started coming through. For some reason I wasn't scared, I was just curious to see how big they would get. Then I

woke up. The oddest thing is that after I had that dream, I wasn't scared of spiders anymore. In fact the next time I saw one I was able to pick it up without shrieking."

Sleep your way to the top

One other great thing about REM sleep is that it makes us more creative. It seems that the age-old advice about "sleeping on a problem" is spot on: research has shown that a good night's sleep, particularly one that is rich in REM, increases our ability to come up with novel solutions to problems.

When I am struggling with a problem, I often write it down in a notebook, put it aside and then go back to it the next morning. I find it really helps. Decisions made late at night, or after a bad night's sleep, are often the ones we regret.

There are lots of lovely stories about people who have had their eureka moments while they slept.

- The writer Mary Godwin (later Mary Shelley) came up with the idea of Frankenstein after having a dream about a scientist who created life and was horrified by what he had done.
- Paul McCartney says the tune for "Yesterday" came to him while he was asleep.
- Even more impressively, Keith Richards says

he not only dreamed the opening lines to what would become one of the Rolling Stones' greatest hits, but played the song in his sleep. The story goes that he often kept a guitar and tape recorder by his bed, and one morning in May 1965, while on tour in Florida, he woke to find that the recorder had been running during the night. When he played it back, he heard himself playing the opening verse to "Satisfaction".

- Since REM sleep is all about excitable neuron activity in the brain, it is appropriate that the scientist Otto Loewi, who first showed us how nerves communicate, made his remarkable breakthrough thanks to a dream. In the spring of 1920, Dr Loewi was a frustrated man. He was convinced that nerve messages were transmitted using chemical signals, but he had spent 17 years trying to prove this and failed. Then, during the night of Easter Sunday 1920, he had a dream. He woke and jotted down a few notes on a slip of paper, before falling asleep again. When he woke up the next morning, he remembered he had written down something important, but when he picked up the paper he couldn't read his own handwriting. Nor could he remember anything about the dream. Fortunately, the next night he had the same dream. This time he woke up properly and wrote the whole thing down. In

the dream he was performing an experiment on frogs that would allow him to test his theory. As he later wrote: "I got up immediately, went to the laboratory, and performed a simple experiment on a frog heart according to the nocturnal design." The experiment worked and later won him the Nobel Prize in Medicine.

Things that go wrong if you don't get a decent night's sleep

Why lack of sleep makes you fat

A bad night's sleep not only affects your brain, but also messes with your body, including its ability to control your blood sugar levels. In the long run, this can lead to obesity and diabetes.

A few years ago, to see what impact even a couple of nights of reduced sleep can have, I took part in an experiment with Dr Eleanor Scott, who works at the University of Leeds. We recruited a group of healthy volunteers and fitted them with activity monitors and continuous glucose monitors – devices that are strapped to the arm to measure blood sugar levels. In this way, we were able to constantly monitor what was happening to their blood sugar levels without having to prick their fingers repeatedly.

First, we asked our volunteers to sleep normally for two nights (so we had a baseline to work from), then go to bed three hours later than normal for two nights.

I felt I couldn't ask our volunteers to do this experiment unless I was ready to do it myself. I was also curious to see what effects it would have on my blood sugar levels. Back in 2012, I had discovered that I had type 2 diabetes, which I managed to get rid of by putting myself on the 5:2 diet and losing 20lb (9kg). Would a couple of nights' bad sleep set me back, even now?

After two nights of severe sleep deprivation, I went back up to Leeds, where I met up with Dr Scott and the other volunteers. Everyone complained about having the munchies.

As one of them put it: "I wanted lots of biscuits and I didn't just have one. I'd go for 10 custard creams."

"Is that unusual?" I asked him.

"Well, it's certainly unusual for breakfast!"

All of us, whether we had feasted on biscuits or managed to stick to our normal diet, saw marked increases in our blood sugar levels when we were badly sleep deprived, to the point where some of us (myself included), who had normal levels at the start of the experiment, now had those you would expect to see in a type 2 diabetic. Our blood sugars returned to normal after a good night's sleep.

As Dr Scott pointed out, there is now a lot of evidence

that people who sleep badly most nights are far more likely to become overweight or obese and develop type 2 diabetes than those who sleep really well.

So why does this happen? "We know that when you are sleep deprived," Dr Scott said, "this alters your appetite hormones, making you more likely to feel hungry and less likely to feel full. We also know that when people are sleep deprived, they often crave sweet foods, which could explain the custard cream cravings. Also, if you're awake when you're not meant to be, you produce more of the stress hormone cortisol, and that can influence your glucose level as well the next day."

Ours was quite a small experiment, but a recent meta-analysis, carried out by researchers at King's College London,[2] found that sleep-deprived people consume, on average, an extra 385 calories per day, which is equivalent to a large slice of cake.

It's not just that your blood sugar levels soar and your hunger hormones go into overdrive when you're tired; the areas of your brain associated with reward also become more active. In other words, you become much more motivated than normal to seek out unhealthy foods such as crisps and chocolate.

Another study[3] showed that children are affected in a similar way. Researchers took a group of children aged between three and four years, all regular afternoon nappers, and not only deprived them of their afternoon

nap but also kept them up for about two hours past their normal bedtime.

The following day, the children ate 21% more calories than usual, including 25% more sugary snacks. They were then allowed to sleep as much as they wanted. The next day, they still consumed 14% more calories than they had before being deprived of sleep.

The vicious circle

Lack of sleep makes you fatter, but piling on extra fat (particularly around the gut and neck) also means you sleep worse. It is a vicious circle. When I was an overweight diabetic, I slept badly, at least in part because I snored so much. Being overweight also greatly increases your risk of having sleep apnoea, a disorder that causes you to stop breathing hundreds of times a night. This will make you really tired and hungry and it is terrible for the brain.

A Swedish study[4] showed just how disruptive being overweight is when it comes to sleep. For the study, the researchers recruited 400 women with an average age of 50 from the town of Uppsala. Half the women were overweight and had "central obesity", meaning their waists measured more than 88cm (35in). The other half were slimmer, with a Body Mass Index (BMI) in the normal range. After being weighed and having their waists measured, the women were led away to the

sleeping area, where the team hooked them up to sleep recorders.

The women were then allowed to sleep for as long as they wanted. The differences in sleep quality and quantity were striking. The women with less belly fat slept, on average, 25 minutes more per night. They also got 20% more brain-restoring deep sleep and 22% more emotionally calming REM sleep.

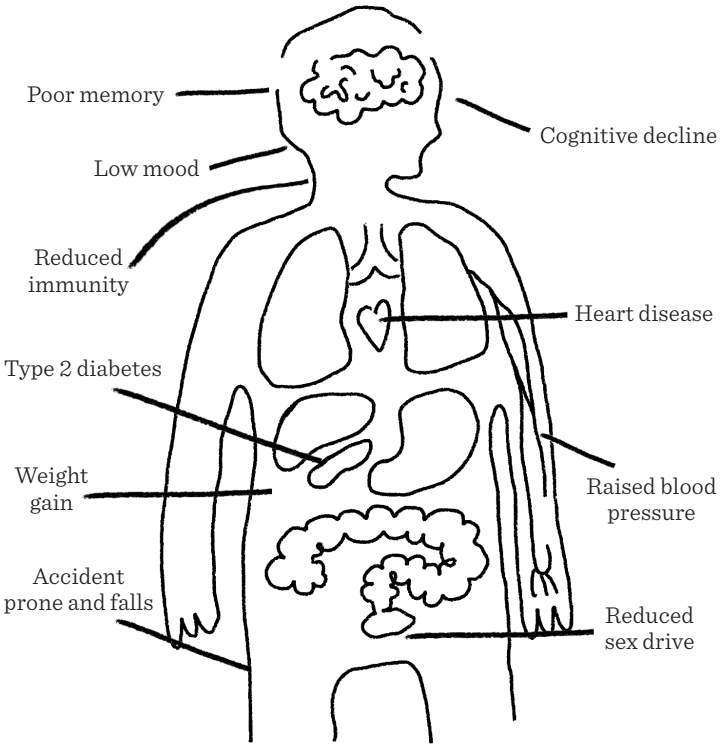
Metabolic syndrome

Lack of sleep also contributes to metabolic syndrome, which is the medical term for a cluster of conditions that includes too much body fat around the waist, raised blood pressure, blood sugar and cholesterol, which in turn lead to an increased risk of type 2 diabetes, stroke and heart disease. Metabolic syndrome, also known as Syndrome X, affects around 1 in 4 adults in the UK and has a major impact on future health, not only because it encourages further build-up of fat, particularly around your gut (visceral fat), but because it leads to increased insulin resistance. In other words, your body has to pump out ever increasing amounts of insulin to bring your blood sugars back to normal.

Low mood

Anyone who has been sleep deprived knows that it leads to anger and irritability, while at the same time

How lack of sleep impacts on your health



sucking the joy out of life. If you are feeling anxious and depressed this will, in turn, affect how well you sleep. Being agitated keeps your body and brain aroused, just when you want them to wind down. More on how to combat this in Chapter 4.

Sex drive

As well as making you feel simply "too tired for sex", being sleep deprived suppresses the production of the two main sex hormones, oestrogen and testosterone. This, in turn, has a devastating effect on sexual desire.

The good news is that getting more sleep should improve your sex drive. A two-week study[5] of 171 American women found that an extra hour of sleep increased the chance that they would want to have sex the following night by 14%.

But does it work the other way round? Will having more sex improve your sleep? In theory it should, as regular sex boosts levels of the hormone oxytocin (also known as the "love hormone" because it helps human bonding) while reducing levels of stress hormones like cortisol. But it seems to be a more effective sleep aid if you are male than if you are female.

In a recent survey[6] carried out by researchers from Central Queensland University, 68% of the male respondents said that having sex improved the quality of their sleep, compared to 59% of female respondents. Another enlightening finding was that 11% of women said that sex with their partner made their sleep worse, compared with just 4% of men.

The researchers thought this gender difference was probably because the men were more likely to report having had an orgasm during sex than the women. They added that, "while orgasms with a partner appear

to have the most benefit in terms of sleep outcomes, orgasms achieved through self-stimulation can also aid sleep quality". They called for further research...

Keeping track of your sleep

It's all very well being told that getting enough sleep is vital for your brain, you waist and your sex life, but how do you track how much you are getting? Most people don't have access to a sleep lab.

Without an EEG machine you won't get a very accurate picture of your sleep, but some of the more modern sleep trackers, which also measure your heart rate, do a reasonable job. I spent some time looking into trackers and in the end I went for the Fitbit Alta HR Activity Tracker with Heart Rate Monitor.

The Fitbit Alta HR has been the subject of proper clinical trials, including a recent study[7] where researchers from Monash University in Australia compared the accuracy of the tracker with the data collected from 49 people linked to machines in a sleep lab. The researchers

concluded that the watch was pretty good at telling when people were in deep sleep and REM sleep, but tended to overestimate how much sleep people got because it was not great at detecting when people were awake but not moving.

That said, I do think it is worth using a sleep tracker. And I recommend that you keep a sleep diary as well.

A sleep diary

I wore the tracker for several months, while keeping a detailed sleep diary, and the tracker did seem to reflect how much I had slept and how well I had slept. I have included a copy of a daily page from a sleep diary in Chapter 6, and you can download more copies at fast-asleep.com. If you are curious about your sleep, and certainly if you suffer from any form of insomnia, then keeping a sleep diary is an absolute must. I will go into the whys and wherefores later.

Sleep efficiency

One of the other things that a sleep tracker will allow you to do is calculate your sleep efficiency, which is a core part of the Fast Asleep programme. What is sleep efficiency? As I wrote earlier, it is a measure of the amount of time you spend in bed actually asleep.

Let me illustrate with my own example.

I try to be in bed by 11pm and get up at 7am most

days of the week, including weekends. Routine is hugely important if you want to sleep well, and I value my sleep.

My sleep tracker told me that over the course of a month I was in bed for an average of 7 hours and 50 minutes a night, but I was only asleep for 6 hours and 40 minutes. The rest of the time I was trying to sleep, roaming the house or reading.

If you translate that into minutes you can calculate my sleep efficiency:

$$(6 \times 60) + 40/(7 \times 60) + 50 = 400/470 = 85\%$$

85% is actually pretty good. In fact, anything between 85% and 90% is excellent, and very few people have a sleep efficiency that is over 90%. An insomniac will probably spend around 70% of the night asleep.

And what about the different stages of sleep? According to my tracker, of the 6 hours and 40 minutes that I was asleep, I was in deep sleep for 17% and in REM for 18% of the time. The rest of the time I was in light sleep.

Which isn't bad. According to a recent Fitbit study,[8] the average user lies awake for 55 minutes every night and sleeps for around 6 hours and 33 minutes. They are in deep sleep for 15% and in REM for about 20%.

Again, according to Fitbit, the older you are the less sleep you tend to get, down from 6 hours and 58

minutes for young adults, to 6 hours and 33 minutes for people aged 52 and older. The big drop was in the amount of deep sleep people got as they aged, down from 71 minutes a night to just 50 minutes for the over 50s.

In the Fitbit study, the women got slightly more sleep than the men, by about 25 minutes a night, and this is reflected in other studies of American adults.

It seems that women put a higher priority on sleep, perhaps because they are better at recognising the health benefits. There is also evidence that women are more vulnerable to the impact of sleep deprivation.

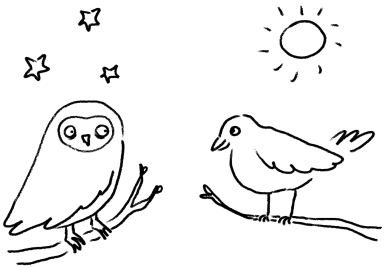
Summary

- There are three distinct states of sleep: light sleep, deep sleep and REM sleep.
- During the night we sleep in roughly 90-minute cycles, with most deep sleep happening in the early part of the night, and most REM sleep happening later on.
- Around half the night is spent in light sleep.
- Deep sleep is when your brain gets cleaned and your memories get sorted.
- REM sleep is when you have vivid dreams that help you process your emotions.
- Not getting enough sleep increases your risk of

obesity, type 2 diabetes, dementia, raised blood pressure and low mood. It also reduces your sex drive.

- The really important thing is not how long you spend in bed but how long you spend in bed ASLEEP. Being able to estimate your sleep efficiency is key to doing the Fast Asleep programme.

2. WHAT PUTS US TO SLEEP AND WHAT KEEPS US AWAKE



The urge to sleep begins early in the day, from the moment that you first wake up and get out of bed. Shortly before you wake, your body releases a surge of hormones, including the stress hormone cortisol, which prepares you for the day. But waking also triggers the release of a chemical in the brain called adenosine.

Adenosine binds to receptors in your brain, slowing down brain activity. This suppression of brain cell activity is what causes the feeling of drowsiness.

The longer you are awake, the higher your adenosine levels rise. The higher the adenosine levels, the sleepier

you get. Then, when you finally go to bed and sleep, the adenosine is broken up and disposed of.

If you are feeling sleepy and want to stay awake, you can, temporarily, block the effects of adenosine by consuming the world's most popular psychoactive drug, caffeine. Caffeine binds to sleep-inducing receptors in your brain that would otherwise be occupied by adenosine – that's why it wakes you up.

As you may have noticed, caffeine has very different effects on different people. There are some people, like my wife, who are really sensitive to caffeine. She only needs one cup to wake her up. Caffeine also hangs around in her system for much longer than it does in mine.

The reason you have to keep topping up your caffeine is that it is constantly being broken down by your liver. The average half-life of caffeine is around five hours, which means that, if you have a cup of coffee at 6pm, half is still running around your system at 11pm and a quarter is still there at 4am.

If you are sensitive to caffeine, you will still be feeling the effects of an afternoon cup of coffee in the middle of the night, lying awake and wondering why you can't sleep.

But quoting average figures is misleading because some people break down caffeine much faster than others. The "average" half-life of caffeine may be five hours, but the range is actually 1.5 hours to nine hours.

If you are someone whose body breaks down caffeine especially slowly, you will still be feeling the effects of your morning cup of tea or coffee in the middle of the night. But, if you are naturally able to break down caffeine rapidly, then you can drink coffee in the evening without it disturbing your sleep.

Various things affect the half-life of caffeine in your body, including your gender, age, weight and any medication you are on. Taking the oral contraceptive pill will dramatically slow your liver's ability to break it down.

The biggest factor, however, is your personal genetics. If you are interested, you can get yourself genetically tested by companies like 23andme.com. You order a test online, and a few days later they send you a plastic tube. You spit in the tube and send it back. A few weeks later, you log in and see what they have found.

I did this a few years ago and I found the results fascinating. According to 23andme, their test suggests that I am unlikely to have developed a bald spot (true) or get dandruff (true) but I can probably smell the asparagus odour in my urine (also true). As for caffeine, it turns out that I am more sensitive than most and I would be well advised to drink less of the stuff. These days, I have two to three more cups of coffee during the morning and rarely drink any after midday.

Your internal clocks

As well as the build-up of adenosine, the other major driver of sleep is your circadian clock. Deep in your brain there is a small group of cells called the suprachiasmatic nucleus (SCN). If I were to drill a hole between your eyebrows and carry on drilling into your brain until I hit the hypothalamus, and if I were then to stick an electrode down that hole, you would actually be able to hear the clock tick.

Oddly enough, your circadian clock doesn't follow a day that is exactly 24 hours long. Some people's clock runs fast, others' runs slow. If you have a fast clock then that means you are a lark – you like to get up early. If you have a slow clock then you are an owl, someone who likes to stay up late. The reason you don't go completely out of whack is that your internal clock is reset every day by light.

Rays of light from the sun hit receptors in the back of your eyes that have nothing to do with vision but instead are linked to the SCN. The SCN then sends out signals to other parts of your body, including your guts, letting them know that a new day has begun and it is time to get moving. It's a bit like shouting at the kids, "Wake up, breakfast will be on the table in 20 minutes."

Similarly, just as we like to have a warm house when we get up, the SCN raises your core body temperature

before you wake, so you are ready to get going.

It will also, in the early hours of the morning, switch off the production of melatonin – a hormone connected to your brain clock that is released when it gets dark to help tip you into sleep (more on that later) – and switch on the release of the stress hormone cortisol.

What makes things a bit more complicated is the fact that each of our organs has its own clock, which is linked to the main clock but not necessarily driven by it. The clock in your liver, for example, is not reset by light but by when you eat. This is important, because when your biological clocks get out of sync with the outside world, and with each other, you are in trouble. Not only will you struggle to sleep, but you will get hungry, have problems controlling your blood sugar levels, feel run down and tired, and find it hard to concentrate. It's called "social jet lag", because just like the jet lag you experience after travelling across multiple time zones, it leaves you feeling terrible.

Fortunately, you can retune your clocks and get your body back into sync with some relatively straight-forward tweaks. These involve making sure you eat the right food, at the right time, and that you get exposure to strong enough light, again at the right time. That is what this book will help you do. Fix the clocks. Fast.

Larks and owls

Some people leap out of bed in the morning, raring to go. Others need an alarm clock – preferably two – to get them off to work on time.

My wife will quite happily stay up working until the small hours, while I prefer to head for bed soon after 10pm. I'm a lark; Clare is an owl. I'm itching to leave a party by 11pm; she is just warming up. We have different chronotypes and there is good evidence that this is not just personal preference but has roots in our genes.

For a bit of insight into what mine say about my sleeping patterns, I dropped in on Dr Simon Archer, who is Professor of Molecular Biology of Sleep at the University of Surrey. Among other things, Simon has conducted studies looking at links between an individual's genetic markers and how vulnerable they are to sleep loss.

I had sent him the raw data from my 23andme gene test and he had taken a close look. What did his team make of it?

"Well," he said, "the first thing that stood out is you have three genetic markers that would predict you are a morning-type person." He then added, "We also found a marker for increased risk of insomnia and a marker which is associated with poor sleep efficiency in people who are exposed to high levels of work-related stress.

From what I've seen, I would predict that you often have disrupted, fragmented sleep during the night and that you need more sleep than most."

All of which is true. I get really grumpy and sleep badly when I am stressed.

So my genes test confirmed what I had long suspected: that I am one of those people whose circadian clock is a little fast, meaning that I like to get up early and go to bed early.

Can you tell if you are a lark or an owl without doing a genetic test? Try answering the following seven questions with a straightforward "yes" or "no".

1. Do you wake up bright and cheerful, without an alarm clock, by 7am?
2. If you go to bed at 10pm, do you swiftly fall asleep?
3. Do you always try to head to bed before midnight, even if you are on holiday?
4. Or do you have trouble falling asleep before midnight?
5. Do you need an alarm clock to drag you out of bed in the morning?
6. Do you find you don't need to eat until later in the day and are happy with just a coffee?
7. Given the chance, would you sleep in till 11am or later?

If you answered "yes" to the first three questions and "no" to the last four, you have strong larkish tendencies. If it was the other way around, you are more owlish.

Why larks turn into owls and back again

When it comes to your chronotype, it is not just about your genes. Both your age and gender also play a role.

A big study of 25,000 people of all ages who were asked to fill in a ChronoType Questionnaire[9] found that while most children are larks (early chronotypes), they become progressively more owlish through the teenage years, hitting maximum "owlishness" at around the age of 20. They try to sneak their phones up to their bedrooms, stay up late chatting to their friends on social media and are hard to rouse in the morning. They grunt at breakfast, refuse your healthy offerings and instead buy junk food and energy drinks on the way to school to wake themselves up.

Yes, this behaviour is really annoying but, to some extent, it's not their fault. When puberty comes along, it shifts the internal clock to a later setting, by an average of one to two hours. So an angelic child who was once quite happy to go to bed by 9.30pm and get up at 7am (getting the necessary 10 hours in bed) is now a stroppy teenager who resents being sent to bed at all and resents even more getting up at 7am, after having managed

less than seven hours' sleep.

And there are clear gender differences. Girls, who tend to hit puberty earlier than boys, also start turning owlish earlier, reaching "maximum owl" at the age of 19, before slowly becoming more larkish. Boys, on the other hand, have a body clock that tends to get them to bed later and later, until they hit the age of 21 and have to fit into the adult world. None the less, they tend to remain more owlish than women until they hit their fifties, when gender differences disappear.

This is a real pain for both parents and offspring, because it causes a lot of conflict, but that may actually be what Nature intended. When kids are young, it is vital that their parents nurture and look after them. But as they grow older, they need to start to assert their own identity, to prepare for life outside the parental home, where they will have to fend for themselves, just as our ancestors did when they left the safety of the tribe. Staying up late, with other teenagers, while the parents are all asleep, may be Nature's way of bonding the next generation together.

The trouble is, the modern world doesn't allow a lie-in. If you are a teenager, you may have an internal clock telling you to stay up late and get up late, but you also have parents who are shouting at you that it is time to get dressed and go to school. The result is that most teenagers burn the candle at both ends and fewer than 25% get the recommended nine to ten

hours during school time.

The obvious solution would be to start the school day later, and lots of schools have tried this. In 2016, the US city of Seattle announced that most of its middle school and all its high schools would start an hour later – putting arrival time back from 7.50am to 8.45am. Parents were not keen and all the extracurricular schedules had to be changed, so there was a lot of grumbling from the staff. But was it worth it?

Well, researchers asked 170 students from two of the schools who were about to make the change to wear activity monitors to track their sleep. They found that putting school time back by almost an hour did indeed have a big effect on the amount these students slept. It went up from an average of six hours and 50 minutes, before the change, to seven hours and 24 minutes afterwards, an added 34 minutes of sleep each night. Academic performance and school attendance also improved impressively, in line with getting more sleep.

Another study,[10] this time in Fairfax, Virginia, showed that delaying the start of the school day can cut car accidents. They found that students aged between 16 and 18 who drove themselves to school were nearly 9% less likely to have a crash if they went to a school where the day started later.

Turning an owl into a lark

Being a night owl leads to fights with your parents when you are a teenager and can be extremely inconvenient as you get older.

I recently met a night owl called Marie, who works full time and has two young children aged three and five. She has been a night owl since her teens and she told me that she would, given half a chance, stay up until two or three in the morning and wake up at around 11am.

Because she has young children she can't sleep in, and anyway, she has a job that involves a 9am start. So she goes to bed around 11pm most nights, but then lies there awake until 2am or later.

She is rudely awoken by her alarm clock at 7am, or by her children clamouring to be let into the bedroom. Her husband, who is also something of an owl, is able to function perfectly fine on five or six hours' sleep a night. But Marie can't. She told me that she wakes up most mornings feeling absolutely shattered.

She has tried all the obvious things such as exercise and not lying in at weekends, but nothing works, except for sleeping pills, and that is not a road she wants to go down in the long term.

The good news for people like Marie is that it is possible, in just three weeks, to turn yourself from an owl into a lark, and without drugs.

You do it by resetting your internal clocks. And you do that by controlling exposure to light and the timing of your meals.

To show it can be done, researchers from Monash University in Australia recruited 22 owls, men and women who normally go to bed around 2.30am and wake up at 10am.[11]

For three weeks they were asked to follow nine simple rules. These were:

1. To wake up at least two hours earlier than normal, which for this group meant getting up by 8am.
2. To get outside and expose themselves to plenty of outdoor light in the mornings.
3. To have breakfast as soon as convenient.
4. To only exercise in the morning.
5. To have lunch at the same time every day.
6. To avoid all caffeine after 4pm.
7. To avoid having a nap after 4pm.
8. To avoid bright lights during the evening and to head to bed a couple of hours earlier than normal – i.e. by about midnight.
9. To stick to this regime every day of the week, including weekends.

After three weeks, the owls had successfully shifted their body clocks forward by an impressive two hours. Not only were they going to sleep earlier, but

tests showed that their levels of melatonin, the sleep-inducing hormone, were peaking two hours earlier.

Having shifted their body clocks they felt far less sleepy during the day and were happier with their lives. Their depression and stress scores improved, as did their performance in cognitive tests. They even got physically stronger.

I'm pleased to say that Marie followed this advice and now finds going to sleep and getting up at a normal time very much easier.

Camping, anyone?

An even quicker way to convert yourself from an owl to a lark could be to go camping. A few years ago, Dr Kenneth Wright of the University of Boulder in Colorado sent eight people (six men and two women) on a camping trip to the Rocky Mountains.[12] He gave them wrist monitors to record how much light they were being exposed to, and activity monitors to measure how much sleep they were getting. During the week that they were away camping, they were not allowed torches or mobile phones, and the only light they saw at night was from candles or the campfire.

Their monitors showed that over the course of the week they were exposed to four times their normal levels of light. This had a big effect on their sleeping patterns.

Before they went camping, their average bedtime was 12.30am; by the time they got home it was more like 11pm. Their sleep was now much more in sync with sunrise and sunset.

When he tested their blood in the lab, Dr Wright found that the participants' bodies had started to release melatonin two hours earlier than they had before the trip. He had turned owls into larks in just one week. Who knows, it might even work on teenagers.

What keeps us awake?

My idea of a great night's sleep is to go to bed around 11pm, fall asleep within a few minutes and then wake up, refreshed, at about 7am, without the need for an alarm clock. That would be lovely. It is what used to happen. It hardly ever happens now.

I have no problem getting to bed and falling asleep, but I almost always wake up in the middle of the night, and sometimes find it hard to get back to sleep. In this respect, I am a classic insomniac.

There are other types of insomnia: not being able to get to sleep is quite common, as is waking up early in the morning. But the most common form is waking in the middle of the night, particularly as we get older. This is partly because our sleep gets lighter as we age, but also because of things like having a full bladder and

feeling the need to go to the toilet.

I used to get quite worked up about this. I resented the fact that no matter how tired I was, I'd wake up four and a half hours after going to sleep (normally around 3.30am). I would go to the loo, get back into bed and then just lie there, for what felt like hours, worrying about not being able to get back to sleep, and worrying about how tired I would feel in the morning. Finally, I'd drift off, only to be dragged awake again by the alarm clock at 7am.

Then, a few years ago, while researching a documentary about life in Victorian slums, I interviewed Roger Ekirch, a professor of history at Virginia Tech in the US. He told me that my pattern – falling asleep, waking for a while, then falling asleep again – was how many people slept in pre-industrial times. Apparently, people would go to bed around 9pm, sleep for about five hours, then get up at about 2am. They would do household chores, visit friends or "enjoy a bit of intimacy", before heading to bed again for a "second sleep".

Professor Ekirch believes that the pressures of the industrial age and the arrival of electric lights changed all that; sleeping continuously became the new normal. And, as the practice of sleeping continuously became more widespread, the idea of a "first" and "second" sleep faded from public consciousness. Even napping, which can be hugely beneficial (see page 131) and which used to be very common in hot

countries, has largely been abandoned.

To support his claims that biphasic sleeping (sleeping in two blocks) has deep roots, Professor Ekirch pointed me towards research done by Dr Thomas Wehr, a psychiatrist at the National Institute of Mental Health.[13]

In the early 1990s, Dr Wehr conducted an experiment in which he persuaded a group of healthy volunteers to spend a month in a lab, where it was pitch black for 14 hours of the day.

By the end of the experiment, the volunteers were sleeping an average of eight hours a night, but not in in one block. Instead, they slept for three to five hours, woke for an hour or two and then fell back asleep for a second block of three to five hours.

Carol Worthman, an anthropologist at Emory University in Atlanta, thinks there may be something in Professor Ekirch's claims. She has studied the sleep patterns of hunter-gatherers who follow a pre-industrial way of life. She says that interrupted or polyphasic sleep is quite normal among them. In many of the tribes she has studied, she has found around one in four people are up and active at any given point in the night. She thinks that there may be an evolutionary advantage to this, because when our remote ancestors lived out in the open it would have been important that at least some of the tribe were awake, alert and looking out for predators.

If, like me, you often find yourself awake in the

middle of the night, you can console yourself with the thought that humans have probably been doing this for thousands of years.

Buoyed by these discoveries, I decided that rather than fight my "old-fashioned" sleeping patterns, I'd work with them. So these days I accept that I will probably wake at about 3am and plan accordingly. If I have an early start, then I aim to be in bed by 10.30pm. This gives me a roughly four-and-a-half-hour "first sleep".

When I wake around 3am, rather than lie there fretting, I get up and go to another room, where I listen to music, meditate or read a really boring book. I keep a special collection of books for this purpose. When I start to feel sleepy, which is normally after around 40 minutes, I go back to bed for three or so hours of "second" sleep.

Between my first and second sleep, I take care to avoid doing anything exciting or stimulating. If you are awake in the night your goal should be to bore your brain into going back to sleep.

Since I have, slightly reluctantly, accepted that I am unlikely to return to sleeping for a whole night without a break, I've felt more rested, less stressed and much less likely to nod off during the day. Try it for yourself, and let me know how you get on.

Snoring

Along with having a full bladder, one of the main reasons why people sleep badly is that they or their partner snore. I come from a long line of snorers. My father used to snore really, really loudly, like someone sawing logs. It was loud enough to be heard on the other side of the house.

I also used to snore at an incredible volume; in fact, my wife said that when we lived in London, I snored so loudly that I drowned out the sound of the metal beer barrels being delivered to the pub opposite first thing in the morning.

Although the caricature of a snorer is a fat, middle-aged man, women also snore. A few years ago, British newspapers outed a grandmother of four as "one of Britain's loudest snorers". She was recorded snoring at a window-rattling 112 decibels, which meant her snoring was louder than the noise made by a low-flying jet. According to the papers, it was loud enough to drown out a "diesel truck, farm tractor or speeding express

train". Apparently, her husband coped by sleeping in the spare room and burying his head in a pillow.

I don't know if this was her problem, but the main reason most people snore is that they are overweight. If you are a woman with a neck size over 16 inches (41cm), or a man with a neck size over 17 inches (43cm), you are almost certainly a snorer.

As we get older and fatter, we snore more. That's because our throat gets narrower, our throat muscles get weaker and our uvula, which is that finger-like bit of tissue that hangs down at the back of our throat, gets floppier. All these changes mean that when we breathe in, the air can't move freely through our nose and throat and into our lungs. Instead, the incoming air makes the surrounding tissues vibrate, which produces that horrendous snoring noise.

Snoring and sleep apnoea

As well as being annoying, snoring can be a sign of Obstructive Sleep Apnoea (OSA), which is much more worrying. OSA occurs when muscles at the back of the throat relax and temporarily restrict or block airflow as you sleep, which leads to falling blood oxygen levels. This, combined with an increase in blood pressure, puts you at increased risk of having a heart attack.

It can kill you. The actress Carrie Fisher, famous as

Princess Leia in Star Wars, died from a heart attack at the age of 60 while on a plane. The coroner said that the main contributory factors were untreated sleep apnoea and a build-up of fatty tissue on the walls of her arteries.

An awful lot of people with sleep apnoea go untreated because they think it is just snoring and that snoring is harmless.

I was on a train recently when an overweight middle-aged man called George introduced himself. He knew I wrote diet books but was keen to point out that he didn't believe in them and he certainly didn't need to diet.

I asked George if he had any trouble sleeping, and he admitted that he felt tired all the time. He also said he snored loudly, particularly after a few drinks, and that his wife had told him that there were times during the night when he stopped breathing.

He said he wasn't worried by this, but I was, particularly when he told me that he was a long-distance lorry driver and kept himself awake with energy drinks. I suggested that he get his wife to stay up for an hour or two to count how many times he stopped breathing. "Stopping breathing" means not breathing for 10 seconds or longer. Other things to look out for in someone with sleep apnoea are regular gasping, snorting or choking noises, hypersomnia (excessive daytime sleepiness) and lack of interest in sex. If you

have these warning signs, do discuss with your doctor.

OSA affects around one in four men and one in ten women. Unfortunately, it is particularly common in lorry and truck drivers, who tend to be overweight because they spend a lot of their working lives sitting on their bottoms eating junk. A recent study[14] of 905 Italian truck drivers found that around half suffered from a sleep-related breathing problem, making them dangerously prone to falling asleep at the wheel.

I pointed out to George that having untreated OSA doubled his risk of sudden death. The fact that he was starving his brain of oxygen every night also increased his risk of Alzheimer's and dementia. He looked pensive.

I explained that the best way to cure his snoring and his sleep apnoea was to lose weight, fast. The reason I used to snore so loudly was because I used to have a 17-inch neck. When I put myself on the 5:2 diet, back in 2012, and lost 20lb (9kg), I also lost an inch of fat around my neck. I completely stopped snoring and our house was finally at peace.

I suggested to George that if he wanted to find out more about the advantages of rapid weight loss and how to do it safely, he should buy one of my books or visit thefast800.com. He said he would think about it. I like to think he followed through.

Rapid weight loss and sleep apnoea

Although slim people can develop OSA, it is far more common in people who store fat around the neck. As I told George, if you are overweight then rapid weight loss is the most effective way of curing snoring and OSA.

A study[15] carried out in Finland with overweight or obese patients diagnosed with mild OSA found that putting them on a rapid weight loss diet (800 calories a day for up to 12 weeks) cured more than half of them. They lost an average of 10.7kg, which dramatically improved their sleep as well as their hypertension, high cholesterol and raised blood sugar levels.

The greater the weight loss, the greater the improvement. Ninety per cent of those who lost more than 15kg were cured of OSA, but even if they lost and kept off just 3kg, their chance of a cure was still 38%.

If you have OSA, but are not overweight, or are not motivated to lose weight, you might benefit from a CPAP machine. CPAP stands for Continuous Positive Airway Pressure. It is a machine that sits beside your bed and pumps air into a mask covering your nose and sometimes your mouth while you are asleep. The idea is that the pressure of the air keeps your throat open so you don't stop breathing.

It can be a life saver. A woman I worked with discovered she had sleep apnoea and was prescribed a CPAP machine. Within a couple of weeks, she was transformed

from a shattered wreck into a bundle of happy energy. "I had no idea how awful I felt in the mornings until I stopped feeling awful," she told me.

Because she was feeling so much more energetic, she decided to follow my advice, did the Fast 800 diet, lost 15kg and was soon able to return her CPAP machine to the astonished sleep clinic.

You might expect the ferocity of snoring to gradually decrease as you lose weight. But this is very often not the case. There seems to be a critical tipping point. So don't be discouraged if, to start with, your snoring does not seem to be improving – get down to a healthy weight and it will get better. And remember that, even if it doesn't completely cure your snoring, you will get all those other health benefits of losing weight.

The only real alternative is a CPAP machine, which has significant downsides. There is the cost, the inconvenience of having to carry it around with you when you are travelling and the fact that you have to wear a mask in bed every night. A bit of a passion killer, I would have thought.

Anti-snoring devices

In addition to CPAP machines, there are lots of anti-snoring devices out there, ranging from nasal strips that keep your nose open to "mandibular advancement devices", which push your lower jaw and tongue forward, with the aim of opening up

your airway. Most of them work a bit, but none of them work as well as losing weight. If you get a referral to a sleep clinic, they may be able to offer you tailored advice; otherwise your best bet is to go to Amazon and see what your fellow snorers have bought and what they make of their purchases.

If you are really desperate, there is also uvulopalatopharyngoplasty. This is an operation where a surgeon burns or cuts away tissue in your throat to try and clear the obstruction. This has risks, recovery is painful and it is not always effective, particularly if the main reason you have sleep apnoea is because you are overweight. It can make the condition worse.

Things that go bump in the night

As you may have gathered by now, things can get quite eventful in the Mosley household at night. Not only do I regularly roam around at 3am, but Clare sometimes gets up in the night, while remaining firmly asleep. Recently, she climbed over me and started looking through the clothes cupboard. When I asked her what she was doing, she said she was looking for a missing hamster that needed feeding. We haven't had hamsters for years. I persuaded her to go back to bed and she immediately fell fast asleep and had no memory of any

of this the following morning.

Clare has "parasomnia", a common sleep disorder which includes a range of weird and wonderful things that can happen to people while they are asleep: sleep-walking, sleep talking, nightmares, sleep eating, sleep paralysis, sleep aggression and even sexsomnia (having sex when you are asleep), are all forms of parasomnia.

About 10% of the population have a parasomnia of some sort and though they can affect people at any age, they are more common in children, probably because children have immature brains.

Parasomnias also run in families, which could explain why two of my sons were sleepwalkers when they were young. We would often find them walking the corridors in the middle of the night. One of them managed to walk out of the front door, while fast asleep, and lock himself out. He spent half an hour banging on the door until one of us woke and let him in.

Sleepwalking can, of course, be extremely dangerous. When he was 10 years old, our oldest son managed to sleepwalk his way out of the first-floor bedroom window of a cottage where we were staying. He fell 15 feet onto the flagstones below. We were unbelievably lucky that a neighbour, Russell, who happened to be wandering around outside at 3am, heard him cry out, investigated, found him unconscious and woke us. We wrapped his head in ice (I had recently made a documentary about how cooling can reduce the risk of brain injury) and he

was rushed by ambulance to the local hospital, where an MRI scan revealed he had a fractured skull. To our huge relief he made a full recovery.

After that, we made sure that all the upstairs windows at home were secure. Fortunately, both boys stopped sleepwalking in their early teens.

Q&A

Should you try to wake someone who is sleepwalking, sleep eating or having some other parasomnia episode?
It is not a good idea to shake or shout at a person who is in the grip of parasomnia, as that may trigger an irritable, aggressive or even violent reaction. It is much better to mutter "time for bed" and gently guide them back to their bedroom.

At what time of night does it happen?
It can happen at any time of the night, but it typically occurs when the person is coming out of deep sleep. One part of their brain is still in deep sleep, so they are unconscious, but other parts of their brain are awake enough that they can walk, talk, even drive. I met a woman who used to drive to work during the middle of the night, waking up in the company car park with no idea of how she had got there. She solved this problem by locking her car keys in the safe every evening.

Apparently, her unconscious mind could drive but couldn't remember the safe's combination.

Can you prevent parasomnia?
If your child or partner sleepwalks at the same time every night, you could try gently waking them about half an hour before they would normally sleepwalk. By doing this, you disrupt their sleep cycle and in some cases that is enough to stop their parasomnia. You will need to do this every evening for at least a week to break the cycle.

If they are at serious risk of hurting themselves or someone else they should see their doctor – they may be offered CBT (Cognitive Behavioural Therapy) or medication.

Summary

- The two main drivers of your wake-sleep cycle are adenosine (a chemical that puts you to sleep) and your circadian clock.
- Your primary circadian clock, the one in your head, follows a roughly 24-hour day. In some people it runs fast (larks), in others it runs slow (owls).
- The clock is reset every day by bright morning light.
- When children become teenagers they switch

from being larks to becoming owls, which explains why so many prefer to stay up late and get up late. There are evolutionary reasons for this.

- Owls can become more larky by following a number of simple rules.
- One of the main reasons we sleep badly is because of snoring and sleep apnoea. This is caused by too much fat around the neck and the best cure is rapid weight loss.

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