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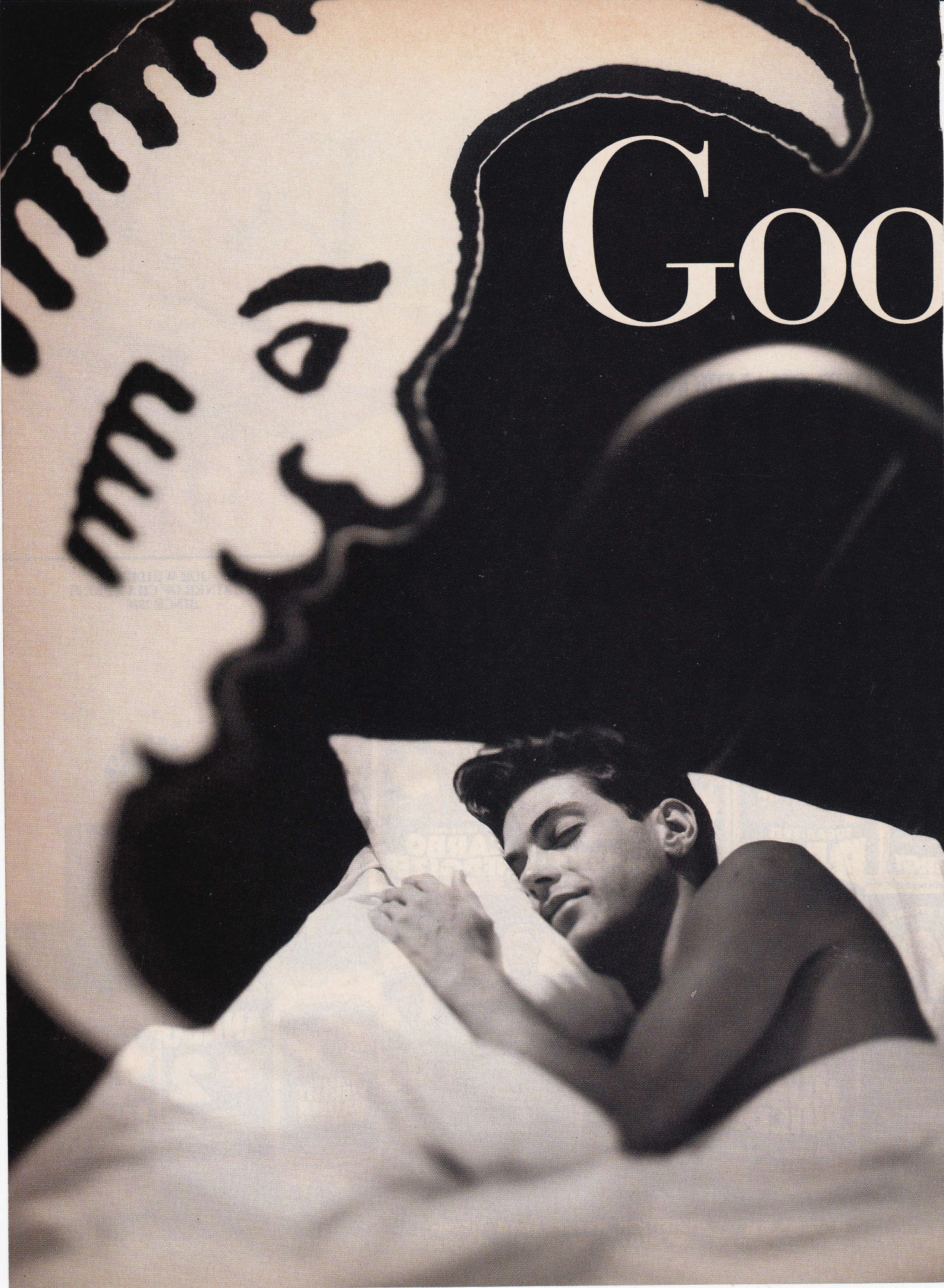
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Goo



d Night

Tonight as you entreat Hypnos, god of slumber, to grant you a good night's sleep, think a moment about this state in which we spend one-third of our lives.

Consider the fact that though we now know a great deal about what our bodies are doing during sleep, we have no idea *why* we sleep in the first place.

Some theorists suggest that sleep originated long ago in the evolutionary process. In particular, they speculate that the REM, or rapid eye movement, stage didn't occur simply to provide the entertainment of dreams. The extraordinary internal excitement that distinguishes the REM phase, theorizes Dr. Frederick Snyder of the National Institute of Mental Health, kept prehistoric man primed for danger even during sleep. The high level of brain activity prompted Snyder to describe REM as a "third state of earthly existence," on a par with waking and sleeping.

Unlike the appendix and the tail, evolutionary anomalies that we've apparently outgrown, sleep not only remains useful but in fact seems to be essential. According to a spokesman for the United States' oldest sleep research center, located at Stanford University, "The prevailing notion here is that sleep is a sort of refueling—as if the body were a jet refueling between missions. Without that process the actual mission could not take place."

It wasn't until the 1950s that researchers made two important discoveries about the science of shut-eye. First, two distinct stages exist: REM and non-REM, or orthodox, sleep. Second, the brain is kind of a mini New York: It never sleeps. Long after you've checked out for the night and are strolling the lanes of slumberland, your brain is still firing up a storm—sometimes producing waves on the electroencephalogram (EEG) greater than those that occur when you're wide awake.

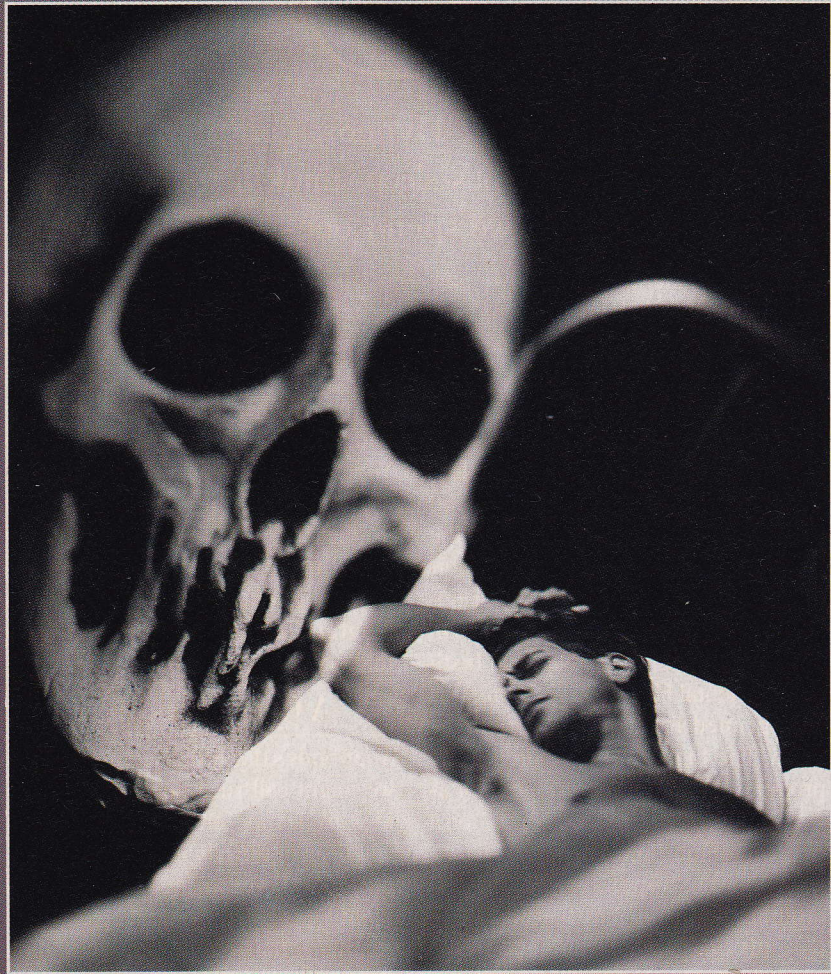
A Clockwork Body

Your body's day is divided into periods we might call rush hour, the workday, kick-back time and the wee hours—when, as in the city itself, street traffic has slowed even as the subway runs all night long. By studying people in environments that offered no clues about the passage of time, scientists learned that, when left to its own devices, the body's typical sleep/wake cycle is about 25 hours—an example of the circadian (Latin for "about a day") rhythms that regulate the whole body. Body temperature and metabolism are other circadian rhythms, and they also fluctuate around-the-clock. The rhythms are

BY JOHN-MANUEL ANDRIOTE

PHOTOGRAPHY BY CATANZARO & MAHDESSIAN

Nightmares rarely haunt people



who have a clear sense of identity.

synchronized to the sun's 24-hour cycle by *zeitgebers* (indicators of time), such as clocks, mealtimes or the sun's own positions.

Your day typically begins about 6 AM, when the level of stress hormone peaks in your body and you're getting ready to wake up. The best time of day to exercise is around 9 AM, when your body's oxygen use is most efficient. You can be most productive at noon, when your brain is most active. Around 3 PM, though, your body temperature drops and, no matter how much sleep you got the night before, your alertness flags. Scientists describe it as a midafternoon "trough." Statistics show an increase in the number of car accidents due to sleepiness in the midafternoon. It's siesta time—and studies indicate that a 40-minute midafternoon nap is healthy and natural.

A little later, when you're settling down to that well-deserved moment of reflection about 6 PM, you'll be happy to know your alertness level has been restored. Come 9 PM, though, it'll wane again, the level of stress hormone will drop, and old Hypnos will start to whisper your name. After you doze off, you begin your passage through the various stages and cycles of sleep, which researchers call "sleep architecture" because of their resemblance to parts of a building. Throughout the night you'll alternate between non-REM and REM sleep.

When you first fall asleep, your heart and respiratory rates slow and muscles relax as you pass through the first of non-REM's three stages. Normally this

stage lasts from half a minute to seven minutes. Peter Hauri, PhD, former director of Dartmouth Medical School's sleep disorders center, explains that during this stage your reactivity to outside stimuli diminishes, and your mental processes aren't oriented to reality. In stage two, the first true sleep stage, an EEG test would reveal bursts of brain-wave activity, which are called "sleep spindles." Thirty to 45 minutes after falling asleep, you probably enter the third and deepest stage, delta sleep, distinguished by slow delta brain waves.

Then something odd happens. Your muscles are more relaxed than ever, but your eyeballs dart back and forth under closed eyelids, your heart and breathing rates quicken, your metabolism increases, you're likely to get an erection, and you begin to dream. The first round of REM, or "paradoxical" (because, paradoxically, your body is very relaxed even as your brain puts on an EEG fireworks display), sleep lasts a mere 5 or 10 minutes. For the rest of the night you alternate four to six times between REM, which can last up to an hour in the latter stages, and stage two non-REM.

How Much Is Enough?

Certainly the quality, and apparently the length, of our lives is affected to an extent by the length and quality of our nap time. In sleep studies, an average seven to eight hours a night tends to correlate with a longer, healthier life. Those who sleep less seem to be more prone to developing angina, or heart pains, while those who spend unusually long periods with the Sandman

are more susceptible to heart attacks.

Our sleep patterns change over the course of our lives. Babies spend as much as 50 percent of their slumber time in REM, while the elderly may spend as little as 20 percent. Charles Herrera, MD, director of the Sleep Disorders Program for the Middle-Aged and Older Adult at New York's Mount Sinai Medical Center, notes that not only does the total time spent in deep sleep diminish, but so does the ability to cope with jet lag and shift work. That may change as Harvard's Charles Czeisler, MD, and others explore the possibilities of resetting the body clock.

The required quantity of shut-eye varies from person to person. Some people need no more than three hours. Winston Churchill reportedly slept less than five hours a night. Typically, though, adults need a "sleep budget" of seven to eight hours a night. But Stanford University researchers say that 9½ to 10 hours of sleep is best from childhood and into one's 30s, pointing out that 100 years ago or more people routinely slept that long. They didn't have to deal with such nighttime diversions as Ted Koppel and Johnny Carson. There are no good data on the sleep needs of 40 and 50 year olds. We do know that older people sleep less, not because they need less sleep but because they're less able to sleep all night.

A study last year suggested that virtually all of us could use a little more shut-eye. Timothy Roehrs, PhD, at Henry Ford Hospital's center in Detroit, found that when healthy 21- to 35-year-old men spent 10 hours in bed, they were more alert during the day.

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John-Manuel Andriote is a journalist based in Washington, DC.

GOOD NIGHT

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"Most people will benefit from spending more time in bed," Roehrs says. "Ideally, you should sleep until you're slept out."

Some of us habitually stay up late, even on work nights, and look forward to sleeping in Saturday morning. Does that compensate for lost snooze time? No, says Daniel Wagner, MD, a neurologist at New York Hospital-Cornell Medical Center's Sleep-Wake Disorders Center in White Plains, New York. Staying out late, then sleeping in on weekends, knocks your body's clock out of sync—to the point that come Monday morning, you may nod off.

A minor sleep loss now and then won't kill you, but studies show that getting fewer than three hours of sleep likely will leave you feeling irritable and unable to concentrate. A study by British researcher James Horne of Loughborough University in Leicestershire, England, found that otherwise healthy male college students who missed a night's sleep scored lower on their ability to generate ideas, the originality of their ideas, their ability to embellish their ideas and the actual number of ideas produced. Given the implications for professionals whose livelihoods depend on their ideas, it's no wonder this bit of sleep research was reported in *Business Week*.

Oddly enough, the loss of a night's sleep can do some people some good, at least temporarily. The *American Journal of Psychiatry* reported earlier this year that missing a single night's sleep halted depression for 59 percent of 1,700 patients who were studied over the past 21 years. For many, the depression resumed after even a short nap—prompting researchers to look for a biochemical produced in the brain during sleep that may trigger depression.

To Toss and Turn

Inadequate slumber isn't always the result of being a night owl. More than a hundred sleep and waking disorders afflict millions of Americans, and some prey mainly on men. Fortunately, the greatest strides in the sleep research field have been in the treatment of sleep disorders, which fall into four main categories: (1) problems falling asleep, (2) problems staying awake, (3) problems adhering to a consistent sleep/wake cycle and (4) problems with sleep-disruptive behaviors.

Insomnias, in the first category, by far are the most widespread sleep disorder, afflicting one in three American adults, and they can range from a single night to a chronic condition that may be due to physical or psychological factors, a poor sleeping environment or one's life-style. Usually insomnia is treated by addressing what may be the underlying cause or, failing that, with some form of sleep medication. Good

mann says those with "soft" boundaries—who have difficulty separating fantasy from reality, who easily drift into daydreams and who do not have a clear sense of personal identity—may experience frequent nightmares, which can take several forms.

There's the "standard" nightmare—often a long, complicated, detailed dream in which the prevailing feeling is fright and helplessness, one which Hartmann believes is rooted in early childhood. Then there's the "night terror," from which the sleeper awakens scared to death. Stress, drugs or alcohol can bring on a flare-up of night terrors in adolescents and adults. The posttraumatic nightmare is the result of a specific event too terrible for the mind to accept. Fortunately, nighttime horror shows tend to become rarer as we age and our minds apparently become capable of absorbing memories once too painful to face.

Will rich food cause nightmares? Eunsook Koh, PhD, professor of clinical dietetics at the University of Oklahoma, says there's "no truth to the old wives' tale that mixing foods or eating spicy foods will give you nightmares.

But often those two things will result in indigestion, which can definitely spoil a good night's sleep."

Sleep Insurance

To increase your likelihood of a good night's sleep, Koh recommends avoiding caffeine and cold drinks before bedtime. Warm milk or cocoa are soothing. For light sleepers, she suggests a bedtime snack high in carbohydrates, low in protein. Rice, potatoes, bread, breakfast cereals and fruits are possibilities—all help speed the amino acid tryptophan to the brain, where it's converted to serotonin, a sleep-inducing neurotransmitter. "Eating these types of foods may help," says Koh, "and it's a good alternative to taking strong drugs."

If you require something stronger—and as many as 1 in 10 American adults occasionally use some kind of sleeping drug to make it through the night—your doctor is likely to prescribe the drug Halcion, which accounts for half of all sleep medication prescriptions. But be advised, says Bruce Dobkin, MD, a clinical neurologist at UCLA,

that up to 10 percent of those who use Halcion report daytime drowsiness, nervousness, lightheadedness, nausea, incoordination and memory problems. As Dobkin puts it, "A halcyon day might not follow a Halcion night."

Before you rush off to the pharmacist, consider the fact that regular exercise—especially aerobic conditioning—improves the quality of sleep. Working with Olympic athletes, Richard Coleman, PhD, former codirector of the Stanford University sleep disorders clinic and author of the book *Wide Awake at 3:00 A.M.*, noted that Olympians were generally better sleepers than most young adults. In fact, athletes who exercise regularly have more deep sleep than do sedentary people. And lest a couch potato think he can knock himself out at the gym once in a while and get all the benefits of exercise, think again. Occasional exercise won't do the trick, and the pain of sore, long-neglected muscles may have an effect opposite from the one he seeks.

Along with regular exercise, make sure your sleep environment is conducive to sleep—a comfortable bed and pillow, dark, reasonably cool room, as little noise as possible, little if any alcohol in the evening, no caffeine and possibly a light carbohydrate snack. If these sleep hygiene steps fail, it may be time to march yourself into a sleep disorders clinic, where an overnight visit may be in order so your sleep can be monitored and evaluated by a polysomnographer.

At least fifty-thousand people have called the American Sleep Disorders Association over the past three years for information about sleep disorders. Federal funding for sleep research has jumped nearly 8 percent in the past few years, to about \$17 million. In 1988, Congress passed legislation to create a National Commission on Sleep Disorders Research. The Department of Transportation is funding an investigation into the way sleep habits affect transportation safety.

The discovery that we don't have to be satisfied with a poor night's sleep has made clear at least one fact: We are no longer dozing in the Dark Ages of shut-eye. ■