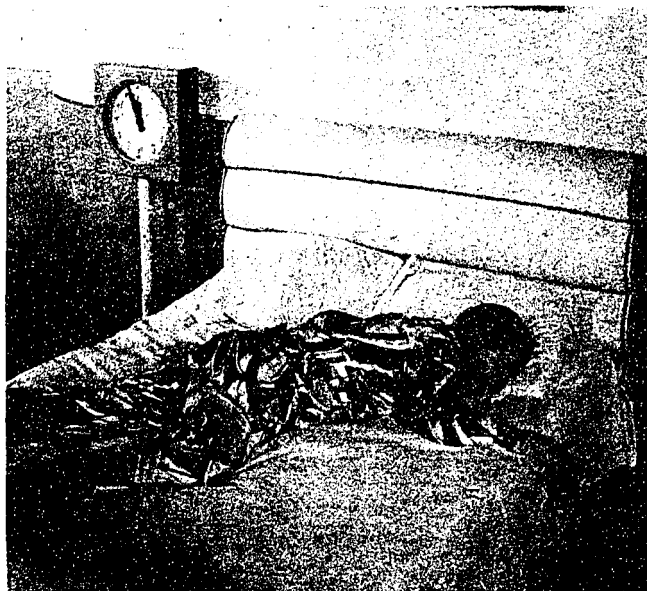
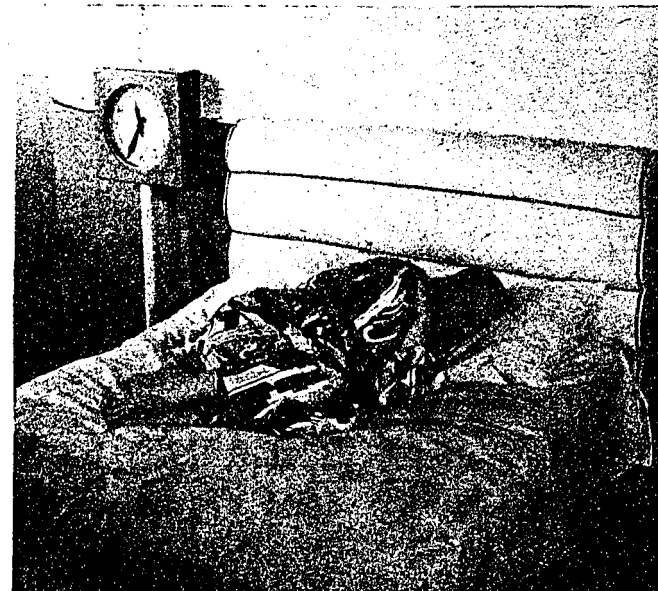


Oh, for a decent night's sleep!

By Maggie Scarf
New York Times

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A clinic for insomniacs

Oh, for a decent night's sleep!

By Maggie Scarf

It was 11:15 P.M. Most of the electrodes had already been pasted into place. One was behind each of the patient's ears and one above each eye; two were on her chin and three on her forehead—these five were for measuring muscular tension. There was also a single electrode to the right of her nostrils, for measuring the rate of breathing. Now, Dr. Peter Hauri, director of the Dartmouth Sleep Laboratory at Hanover, N. H., was positioning two more electrodes on the very top of the patient's head, just over the parietal lobes of the brain; these were for picking up and recording her brain waves. "You know," said the woman apprehensively, "I have an awful time getting to sleep ordinarily. I don't see how I'm ever going to sleep with all these wires coming out of my head."

"Oh, don't worry about trying too hard to sleep," Dr. Hauri said cheerfully. "You'll get off eventually; everybody does. Everybody sleeps in my lab." He placed an electrode under the patient's armpit and anchored it firmly with a strip of translucent tape; this one was for monitoring body temperature. A final electrode went on the middle of her back—for measuring heart rate. "O.K.," he said, "now you're all ready for sleep."

Lifting the trail of wires like a bridal train, Dr. Hauri walked behind her, directing her out and into the hallway, then into the small, comfortable-looking sleeping room next door. There, helping her as she settled herself in the bed, he assured her that he would be available, via the intercom system, throughout the night: He would come to her immediately should she summon him. As he talked, he was carefully plugging the wires into jacks in a small panel just over the bed.

"Doctor, that big machine in your laboratory—I guess these wires here must connect up with it. And I was wondering—if one of the fuses shorted out or something like that, the electricity—it couldn't go into my head, could it?" She laughed slightly, as if embarrassed.

"You're not the only person who's been worried about that," he replied, his German-accented voice courteous and full of sympathy. "But I assure you that it is really completely safe. Hundreds of sleep subjects have been tested on these machines and no one—not one single person—has ever been harmed in even the slightest way."

Back in the laboratory, Dr. Hauri began checking the polygraph recordings as they started to emerge from the electroencephalograph, or brain-wave recording machine. He was also monitoring heart-rate variability, body temperature, breathing rate and muscle tension as well. The patient was, at the moment, still tossing and turning; the needles tracing muscular tension were fluctuating wildly.

As he began to calibrate several of the dials, Dr. Hauri told me something about this woman's sleep history. She had had severe and chronic insomnia for 30 years. Now in her early 50's, she managed only about three hours of sleep a night—and only with the aid of heavy dosages of pills.

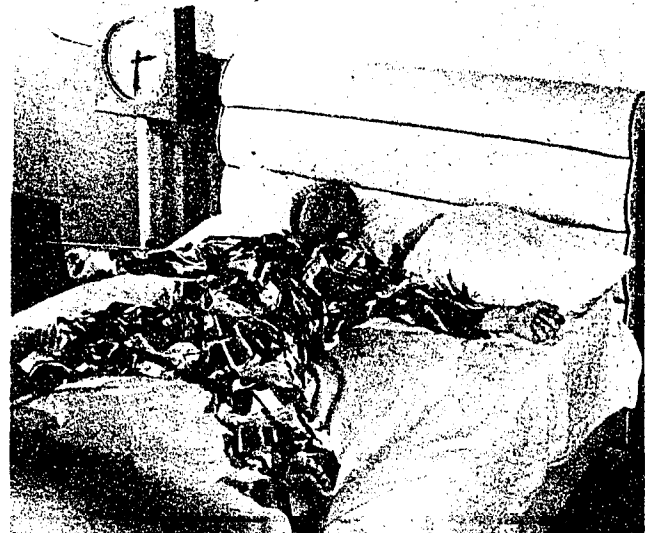
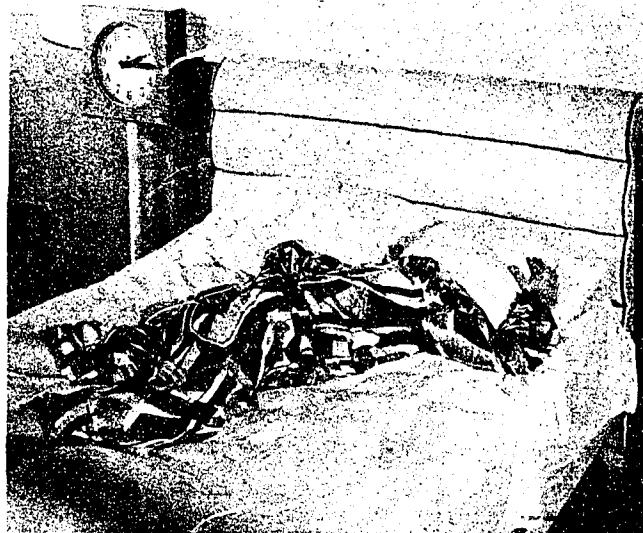
"At least," said Dr. Hauri, "she thinks the sleeping drug is the only thing that will get her any respite at all. The fact is, however, that if the medication has any effect in inducing sleep in this patient, it is at this point a purely psychological one. For, as has been shown in sleep study after sleep study, the hypnotics—I mean all sleeping pills—become ineffective after two or three, or at the very outside, four weeks of steady use. After that period of time, they simply don't work.

"You know, there is a very familiar pattern to all this, we see it time after time. An individual starts out by taking one of these sleep medications; he takes a single pill at night, and that's just fine. Then, perhaps after a week or two, he needs a couple of those pills to get the same results. And then, after a while, that doesn't have the same effect either—but he keeps on with the pills because, without them, he sleeps even worse. Well,



An insomniac patient at the Dartmouth Sleep Laboratory. Electrodes pasted to her head are wired to equipment that monitors her brain-wave patterns during sleep.

Maggie Scarf, a freelance, frequently contributes articles on scientific subjects to the Magazine.



Robert Benchley in the 1935 film-short classic, "How to Sleep."

what has happened in this situation is really quite commonplace: The person is not being helped by the pills at all anymore; meanwhile, he's gotten himself hooked on the drug.

"I'm not saying that the sleeping pills won't continue to have a psychological effect long after they've ceased to have a physiological one. In other words the individual may, because he believes the drug is putting him to sleep, actually be able to relax enough so that he can doze off. . . . But the pill itself isn't doing a thing. On the contrary, the pills are most probably going to disturb the pattern of his sleep, and his sleep is certainly going to be far more rotten because he's taken them."

As he spoke to me, Dr. Hauri was keeping an eye on the lines of data steadily being recorded on the machine. He pointed out the one denoting the patient's muscle tension: It had changed dramatically, and now looked smaller and as evenly drawn as a design. The patient's heart rate was steady, her breathing deep and uniform. The brain waves were in the alpha—"awake but resting"—phase. If her sleep pattern ran true to her descriptions of it, she would now, Dr. Hauri told me, lie awake for several hours doing something which she called "fidgeting." Then, toward 2 or 3 in the morning, she would resort to two capsules of her sleep medication. After that she would doze off for perhaps three to three-and-half hours, then lie awake again. "One thing that we do see all the time with insomniacs, is that they stay in bed without being asleep much more than other people do—much too long. They are there for hours before falling asleep; and the same thing happens when they awake in the morning as well."

MUCH to my surprise, however, before even so much as an hour passed, the patient began the slow descent into sleep. Muscular tension had diminished again: The "design" looked even more regular, the waves lower in amplitude. Her brain-wave pattern was showing the mixed-frequency, "half-awake, half-asleep," somewhat slower configuration of stage one, the lightest phase of sleep. A normal sleeper would have stayed at this level for no more than a few minutes. But in the patient's case it persisted for over half an hour.

Then she shuttled downward into stage two, the next level of sleep. Her brain-wave pattern altered

again, and was punctuated with the characteristic "sleep spindles" of this phase—small bursts of electrical activity that look, on the recording paper, like tightly coiled little bedsprings. She was now, by all objective standards, definitely asleep.

The stage two level is considered a "medium" kind of sleep: Some researchers consider it no more than the prelude, the gateway, to the more profound—the restorative, recuperative—phases of sleep represented by stages three and four. These deeper stages are characterized by the appearance of "delta" waves on the E.E.G. recording: large, slow, rolling waves that are sometimes about five times the amplitude of the waking alpha rhythm. Delta waves have a satisfying appearance: They look like brain waves of deep slumber ought to look—lazy and easy and wide. The only real differentiation between stages three and four is that recordings made during the latter stage show a higher percentage of delta waves.

In this particular instance, however, the patient was unlikely to exhibit any of the deep-sleep pattern at all: "The sleeping pills have, most likely, knocked out all of her delta sleep," said Dr. Hauri. "And even though she hasn't had the pills so far this evening, the fact that she's been on them so long will mean that this kind of sleep is being pretty much obliterated."

In fact, she never did descend into the lower stages of healthy slumber, as a normal sleeper would have done. An individual with no sleep pathology would have gone downward to the stage three and four levels, then returned slowly upward, to enter into a first REM—or "rapid eye movement" period, when the eyeballs dart vigorously under closed eyelids—some 90 minutes after the onset of sleep. This patient, however, went directly from stage two sleep into REM.

REM sleep, sometimes called "paradoxical sleep"—because breathing becomes irregular, heart rate is elevated and brain-wave patterns resemble those of waking life—is that phase of sleep which has been shown to be correlated with dreaming activity. Roughly speaking, some 80 per cent of sleepers—four out of five—will report a dream if they are awakened during a REM period. REM sleep is characterized by a rise in the amount of adrenal hormones circulating in the bloodstream. For males of every age, there is some degree of penile erection during REM sleep (and if there is none, or

very little, the sleep volunteer almost invariably reports an anxiety dream). There is a comparable reaction in female erectile tissue as well. Everyone, during a normal six to eight hours of healthy sleep, will have four or five REM periods, occurring some 90 minutes apart. The first REM, or "dreaming-phase," of the night—the one which completes the first sleep cycle—generally lasts some five minutes.

Dr. Hauri's patient, however, displayed a very lengthy REM period. Her elevated heart rate, irregular breathing and "wakeful" brain-wave pattern continued for almost half an hour. Then, abruptly, she woke up.

Nocturnal awakenings, Dr. Hauri told me, are nothing out of the ordinary even for normal sleepers; adults generally awaken some three to five times during a healthy night's sleep. Most people, however, return to sleep at once and retain no memory of these brief awakenings. The individual with a sleep disorder, on the other hand, tends to wake up more frequently; and, once awake, finds getting back to sleep either difficult or impossible.

This was indeed what happened. The patient lay in her bed, tossing and "fidgeting," until close to 3 in the morning; then she took two sleeping capsules. Shortly afterward, she fell into a long stage one sleep, and then spent a briefer time in stage two. This time she returned to stage one without having any REM period at all. The medication, now metabolizing through her system, was suppressing the dream phase of normal sleep. All sleeping pills, including even the mild, over-the-counter antihistamines, affect REM sleep profoundly; so do anti-anxiety drugs such as tranquilizers, and so do alcohol and amphetamines. Antidepressant drugs also act to inhibit or erase dreaming sleep.

One fascinating clue which did emerge from the night's sleep-recording session was the curious fact that the patient believed she had not slept until she took her pills at 3 A.M. In an interview with Dr. Hauri the following morning, she said that up until 3 o'clock she had lain awake "fidgeting." And yet, according to objective standards—the recorded E.E.G. readings—she had actually fallen asleep within an hour of retiring.

"Her own subjective experience is that she didn't sleep until she took the pills," Dr. Hauri told me, after he had spoken with her. "And this makes me suspect that she may be, in part, suffering from a

(Continued on Page 67)

Insomnia

(Continued from Page 37)

condition called 'pseudo insomnia' — she's actually sleeping, but dreaming that she's awake. I've had such cases before: The worst was a student here at Dartmouth who used to get a full eight hours' sleep every night, but spent all his REM periods dreaming that he was awake. He was exhausted by morning."

As he talked, Dr. Hauri was beginning to write out instructions for the sleep technician who would be monitoring the same patient the following night. He planned to have the assistant speak to the woman during the time of night when the E.E.G. readings indicated that she was asleep, although she believed herself to be awake. "I'll have the technician simply talk to her, ask her if she thinks she's sleeping or not. And then, when we see what she answers, we'll know better what has been going on in her mind.

"We won't, by the way," he added, "come up with any magical solutions; not in the 'Eureka!' sense of the word. What we will come up with is, very likely, a reasonable hypothesis about what might be causing the sleep disturbance. . . . I mean, whether it is neurological in origin, or secondary to some medical or psychological problem, or something else. And this educated guess will be followed by a list of several recommendations about what that person then might do. Usually—in about 75 to 80 per cent of our cases—one of these recommendations will work well, and we'll get a cure: The person will be able to sleep much better."

INFORMAL estimates indicate that some 20 million Americans probably suffer from some form of sleep disturbance. A Department of Health, Education and Welfare report, covering the years 1952-63, stated that while sales of all drugs had increased 6.5 per cent during this period, retail sales of hypnotics and tranquilizers had increased 535 per cent. One can only imagine what the rise may have been in the decade just past — no hard statistics are available. And yet, despite the fact that a large untreated "sleep-patient" population patently does exist, there are only three formal sleep clinics—

laboratories whose main function is to treat patients rather than to carry out sleep experiments (although some laboratories primarily oriented toward research do occasionally take a few private patients) — in the entire nation. One is, of course, the Dartmouth Laboratory. Another is located at Hershey, Pa. The third, and by far the largest, is in California at the Stanford University School of Medicine complex.

The Dartmouth Sleep Laboratory, although part of the Dartmouth-Hitchcock Medical Center, is very small. It is the Swiss-born Peter Hauri's own baby. A clinical psychologist with a Ph.D. from the University of Chicago, Dr. Hauri is assisted by a group of trained sleep technicians; he also works in close consultation with the varied medical specialists and psychiatric experts connected with the Dartmouth-Hitchcock Center.

If sleep clinics are few in number, and all fairly new, it is because the entire field of sleep research has just begun to consolidate—and to try to apply—what has been a virtual explosion of new information. Obviously, if sleep specialists were to offer counseling on specific disorders, they needed to have some basic understanding of the normal patterns of human sleep—otherwise, what was the standard against which they could make comparisons? How could one help a person with a problem unless one were fully aware of what constituted a normal night's sleep?

Such fundamental information has become available only recently. Indeed, more has been learned about sleep in the past decade and a half than during the rest of human history. We know now that sleep is not a period of brain inactivity, illuminated from time to time by the brief flash of a random dream. To the contrary, it is a structured experience, following an orderly progression from phase to phase, as mentioned earlier.

Studies have demonstrated that normal sleepers, within roughly similar age-ranges, will show a remarkable consistency in the course and pattern of their sleep. Healthy sleepers are pretty much alike. For the sleep clinician it is the particular infra-

(Continued on Page 70)

(Continued from Page 67)

structure, the form and shape of a patient's sleep (as it is recorded by sophisticated laboratory instrumentation) that is far more important than the length of that sleep. Indeed, analysis of the sleep of individuals with very long or short sleeping periods will sometimes reassure the patient with a "sleep problem" that there is, in fact, no problem at all.

"We had a 70-year-old woman in here recently," remarked Dr. Hauri, "whose husband sent her because he thought she had a sleep disorder; she only slept four hours a night. She told me that she hadn't ever slept much more than four hours a night in her whole life — she thought it was peculiar, too.

"Well, we tested her in the laboratory, and there was nothing at all wrong. What she did have was a remarkably efficient sleep. She went very quickly into deep delta slumber, the stage three and four phases. And then, after about an hour-and-a-half of that, up she came: She went directly into a little REM dream period. After that, back down she went, came out once more: Then it was all over. And if she didn't have more than a tiny bit of the stage one or stage two intermediate stuff, it was because she didn't actually need more than the four hours of sleep. She was as sound as a bell."

Another patient, a physics professor in his early 50's, came to the sleep laboratory with the reverse problem: He needed 14 hours of sleep a night. "We had him spend two nights here in the clinic; and we didn't find any disorder in his sleeping at all," says Dr. Hauri. "His pattern was perfectly normal; and it was right for him. He simply had to have that 14 hours. If he only got 12 hours of sleep he was exhausted the whole next day."

SLEEP disturbances fall into one of three broad categories: Problems relating to too little sleep (insomnia); to too much sleep (hypersomnia), and another, more or less wastebasket category which includes all the other disorders (dyssomnia). Included in this last group are such things as persistent nightmares, sleepwalking or sleeptalking.

Walking or talking in one's sleep are usually not related, as is commonly believed, to the "acting out" of the sleeper's dreams. Actually, it would be impossible for an individual

to move around or to communicate during the REM, or dream phase, of sleeping. Despite the fact that the sleeper's body is in a physiological state comparable to fright or excitement in waking, and the brain is hyperalert—the sleeper's body musculature is flaccid. Indeed, many postural muscles are paralyzed during this episode of sleep. Some sleep scientists believe that our brains are behaving as if awake during REM, and giving commands to our muscles as usual, but that our bodies cannot respond to these messages, having become temporarily limp.

Although patients with every kind of sleep complaint turn up at the Dartmouth Clinic, the largest group Dr. Hauri sees are those with problems of insomnia. Among the chronic insomniacs, there are distinct subgroups. "We differentiate," Dr. Hauri says, "between the person with a sleep onset problem, and the guy who can get to sleep but has frequent awakenings during the night, and the person who does get to sleep all right, but then snaps wide awake in the early morning hours. This last pattern is, we find, often not primarily a sleep problem; it is frequently secondary to depression. You clear up the depression, and the sleep disturbance disappears."

In treating the three different kinds of insomniacs, Dr. Hauri says, his greatest successes are with the first group, the ones who have chronic difficulties getting to sleep.

"There might be one of a hundred things wrong with a person who can't fall asleep," Dr. Hauri says. "An individual might have some difficulty in metabolizing the serotonin in his brain. Serotonin is the 'sleep juice,' the brain chemical which is believed to be related to sleep. Or, perhaps the patient suffers from some chemical difficulty in making the serotonin out of tryptophane, a precursor to serotonin; tryptophane is in foods like milk, cheese and meat. The tryptophane goes from the food into the blood, and then to the brain, where it's converted into serotonin. You know how you sometimes feel very groggy after a heavy meal? That's because you have, in a sense, eaten a sleeping pill. There's about a gram of tryptophane in an ordinary sized steak; and that's enough to make a person quite drowsy."

This extraordinary piece of
(Continued on Page 77)

(Continued from Page 72)

information prompted me to confess, on the spot, that every night just before going to bed I myself have a cup of hot milk, usually mixed with Ovaltine. He laughed: "Ovaltine has, in fact, been shown to be helpful in inducing sleep. A 1937 study, done by Nathaniel Kleitman—a distinguished sleep researcher who was one of the co-discoverers of REM sleep—demonstrated this." Another study, Dr. Hauri told me, which was more recent but equally respectable, demonstrated that the bedtime milk and cereal drink called Horlick's was also a "natural" hypnotic. "Warm milk at night is good, too, and not only because it smells like mother, but because there is tryptophane in the stuff. But the effects of these things are not, of course, all that strong. If we have somebody who is a real insomniac, neither of these warm-milk drinks is going to overcome that."

TREATMENT, for two patients presenting themselves at the sleep clinic with seemingly identical problems—for instance, an inability to fall asleep—may be radically different. This is because the therapy a person receives will always depend on an analysis of his sleeping pattern, and the clues that turn up regarding the possible causes of the disorder. The same kind of symptom—for example, sleep-onset disturbance—may stem from any one of a variety of conditions. The problem may be neurological in origin, and related to degeneration of nerve cells deep in the brain. Or it may be genetic, or may be caused by myoclonic seizures—those strange muscular jerks that most of us have experienced while falling asleep—which go on and on, waking the individual every time he is about to fall asleep. Or the disorder may be secondary to some organic difficulty—a persistent low-grade headache or minor pain which can be pushed from awareness during the day's activity, but which becomes more insistent during the stillness of the night. Or the problem may be psychological in origin.

Sometimes a sleep disturbance is even related to a difficulty long since worked through and solved. "This is something which we call a 'functionally autonomous' onset problem," says Dr. Hauri. "It's a situation in which there was, at one time, a reason why a person couldn't sleep. Maybe the reason was even medical; most likely, it was psychological. And so, for

a period of time—maybe a month, maybe more—the individual was not able to fall asleep easily. After that, the person got himself into a cycle where he hated the night because he dreaded not being able to sleep, but he couldn't sleep because that dread got him too tensed up. In this kind of case the individual has, somewhere along the line, become conditioned to his bedtime environment. The pillow, the bed, the lamp, etc., are not cues for drowsiness but for increased alertness and arousal. And so he starts tossing and turning."

Even though the initial problem which originally caused such a person to lose sleep may be solved—indeed, may have been solved 20 years earlier—he is left with the sleep disturbance which began at that time. These people often sleep much better in very dissimilar kinds of environments; not infrequently, they go right off to sleep in the laboratory.

Patients treated for this kind of sleep-onset disorder may follow a regime (first developed by psychologist Richard R. Bootzin) that attempts to recondition them to the bedtime stimuli that have been serving as signals for tension and wakefulness. The patient is told that if he is not sleeping when he is in bed, then he is misusing the bed. The bed is only for sleeping. And he is forbidden to lie in it, tossing and turning—for that, as he is informed in no uncertain terms, is counterproductive.

The patient is enjoined not to lie in bed awake for more than about 10 minutes; if he has not fallen asleep within this period, he must get up and leave the room. He is to do all his worrying, all his thinking about his shortcomings, away from the bedroom situation.

If after an hour, three hours (or sometimes 12 hours or more) the patient feels ready to sleep, he may return to the bed, hit the pillow and fall asleep. If, however, he fails to do so in the five to 10 minutes allotted, he has to get up and go out again—he is misusing the bed. He must follow this regimen even if it means staying up throughout the entire night. There is one final admonition for the patient: He must not sleep late, even if he manages to fall asleep a mere five minutes before the time he should be awakening for the next day.

"On the first night of this treatment the patient usually

won't sleep at all; he'll feel miserable the whole day after. But the following night, being tired, he'll get off to sleep somewhere about 3 or 4 in the morning. The night after that he stays awake for something like three hours. The next night, it might be two. And then the individual gets happy, because he sees that it's going to work. Within about two to three weeks, many chronic insomniacs can be retrained in this way so that they can just hit the pillow and fall asleep.

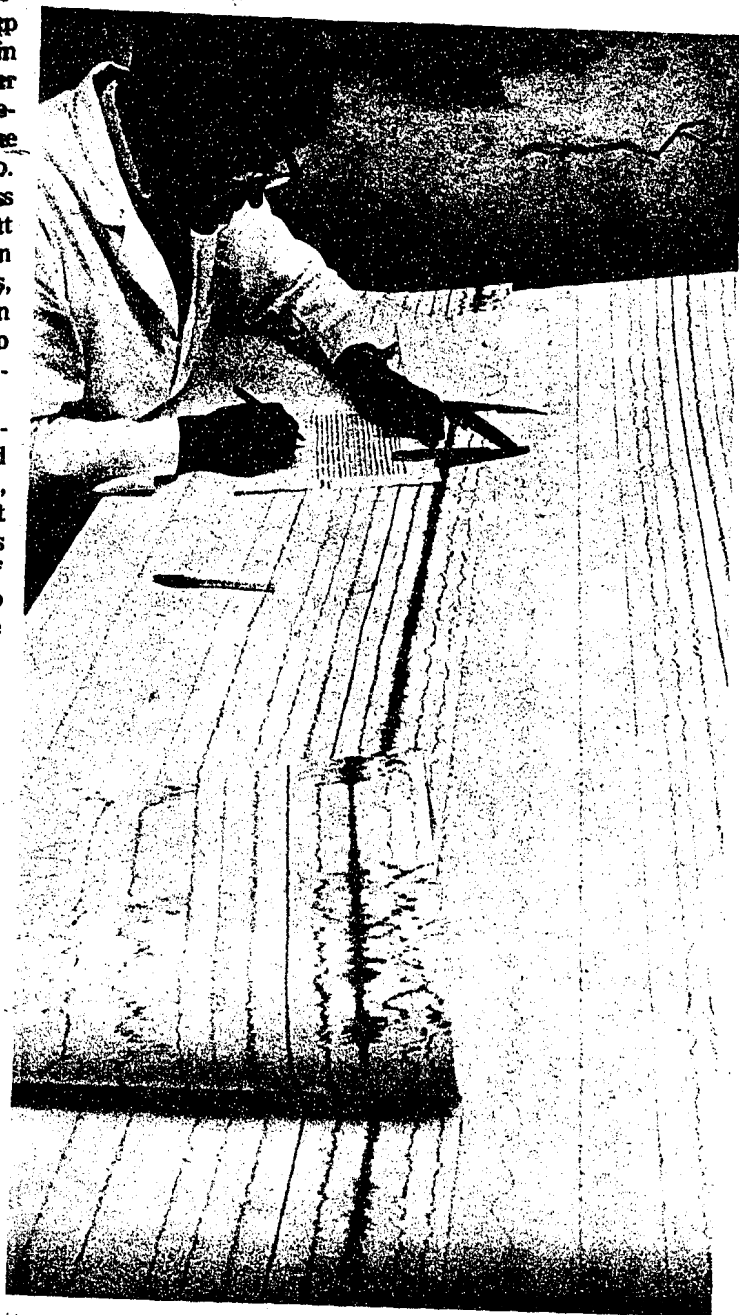
"But it does," Dr. Hauri acknowledges, "take a good deal of fortitude: At 5 A.M., say, when a person still isn't sleeping, and he knows there's a full day's work ahead of him. And once again he has to get out of that bed because he is misusing it. Most often a patient will need someone behind him, some sleep or behavioral therapist, to hold his hand and tell him that he's doing fine and that things are sure to get better."

SEROTONIN is the neurochemical in the brain which is related, it appears, not only to falling asleep but to that profound delta sleep of the stage four phase. Another chemical in the brain, norepinephrine, is believed to mediate the REM or dreaming phases of our sleep. Any substance which affects delicate brain chemistry—most specifically, the norepinephrine and serotonin levels—will influence both our sleeping and dreaming patterns. Unfortunately, all known sleeping drugs do affect brain neurochemicals, and all distort or suppress one phase or another of normal sleep.

"I am not," Dr. Hauri assured me, "against sleeping pills for the guy or the woman with an occasional sleep problem. We all, in the course of events, get into some situation or another where we cannot sleep at night; I do too. The main thing is not to exaggerate the importance of losing a night's sleep. It might make a person feel bad but, as a number of studies have shown, it will have practically no effect upon his objective efficiency. It would take three or four nights of no sleep at all before his ability to perform actually went down.

"But if an individual is getting himself all uptight and into some sort of a bind about his inability to sleep; and if this should continue for a few nights running, then he might be moving into a vicious cycle

The morning after



Sleep therapist Dr. Peter Hauri examines polygraph records of a patient's body functions.

—that 'functionally autonomous' sleep-onset problem. So for myself, if I start getting miserable, I'll take a sleeping pill and that will knock me out. I know, however, that the pill-induced sleep will be lousy, because hypnotic drugs suppress the dreaming phase of sleep. And then, the following night, I would expect something which is called the 'REM rebound': That is, in that next sleep period I'd be making up for the dreams that were suppressed the night before."

The "dream rebound" is what makes it so hard for people who are hooked on sleeping drugs to get off them. "The first night they try to make it without the pills they get this horrible sleep—it's virtually all REM, and full of anxiety dreams and nightmares," explained Dr. Hauri. "That's why you can't take people off the sleeping drugs

'cold turkey'; REM rebound hits them, and they become terrified." Withdrawal from the chronic use of sleep medications must always, he cautions, be done very gradually—and if at all possible, under the supervision of a doctor. If a habitual user suddenly ceases taking his sleeping pills, he may suffer such serious effects as convulsions, delirium, hallucinations, hypertension.

"To get a patient off drugs, I try to give him something else. Something like progressive relaxation exercises that he can do by himself, to relax his body muscles—and which will keep him from feeling so utterly helpless. Or I may start him out with some form of biofeedback: We've been trying that out recently, with good success. Biofeedback involves, very simply, taking some parameter of the patient's body—his brain waves or his muscle tension, some-

thing not usually under his control—and measuring those brain waves or the tension in those muscles, and then displaying that measure to the person himself. When a patient can observe, say, his muscle tension, he can begin to learn what it is that he unconsciously does that tends to increase or decrease it. In this way he can eventually learn to control it.”

The same relaxed state which is related to decreased muscle tension is associated with “letting go,” to deca-thesis from the environment—to falling asleep. When a person has managed to get himself hooked on sleeping medications, he has to start out by becoming adept either at the relaxation exercises, or at some sort of biofeedback. Only then can he begin cutting down on the pills.

“We literally do just that,” Dr. Hauri explained, “cut off pieces of the pill. We chisel off a very little bit at a time. Meanwhile, we are doing our best to control the REM rebound, to reintroduce the dreaming sleep in such a way that it won’t get him too anxious or upset.”

That long history of sleeping-drug involvement was going to be a major stumbling block in treatment of the woman patient whose sleep Dr. Hauri had monitored last night; that case would be, he said, “a toughie.” She was to sleep in the laboratory for another two nights; in the meanwhile, she was undergoing extensive psychological and medical testing. “Our work here is really a sophisticated diagnostic process, which can often reveal quite a lot about the specific factors contributing to a person’s sleep problem,” Dr. Hauri said.

If, for example, the disorder were related to neurological difficulties, treatment—with appropriate drugs—would be worked out in close consultation with a neurologist. Or if the insomnia appeared to stem from an imbalance of brain chemicals such as serotonin and norepinephrine, drugs that act to inhibit destruction of these substances might be recommended. If the problem seemed connected to some minor medical disorder, careful attention to the medical condition itself would be warranted. Or, if a sleep problem seemed to be caused by a depression which was psychological in origin, a regime of psychotherapy would be prescribed.

Treatments are, obviously, as varied as the sleep disorders themselves are. The best that one can say about “cures” in the sleep clinic is

that they appear to be roughly similar to "cures" in medical and psychiatric practice: A few people get dramatically better, most are helped somewhat (and therefore feel and sleep better), and a percentage are not helped in the slightest. These latter patients, according to Dr. Hauri, comprise some 25 per cent of his practice: "But many are still not sorry they came. Very often they arrive here believing they've got a condition far more serious than they actually have. And so they do find some comfort in knowing something more specific about what's really going on."

BECAUSE so many of the substances which depress REM sleep — like alcohol, tranquilizers and sleeping pills—are in common use, many sleep scientists and clinicians have puzzled over just why we seem to need the REM phase of sleep so urgently. What necessitates that striving to recoup lost dreaming time? During the first spate of dream research in the nineteen-fifties, some experiments carried out by Dr. William Dement (now director of the sleep clinic at the Stanford Medical Center) suggested that dreams, in some inexplicable way, served to maintain the individual's psychological equilibrium — and that loss of dreaming time led to personality disturbances. This is not, it now appears, invariably the case: For example, people suffering from psychological depressions often seem to do better without their REM sleep. And many individuals seem to function adequately over extended periods of time, even though tranquilizers and/or antidepressant medications are suppressing all or much of their REM sleep.

One current theory about REM sleep is that it may be related to the integration of new information into the mass of old information already stored in the brain. This notion seems to have been borne out by a number of recent studies, both with animals and human subjects. "The function of dreaming is, in a loose sense, I believe," said Dr. Hauri, "that of going over what happened during the day, especially those things we weren't able to make sense of, and those things we couldn't pay attention to. And then, we incorporate whatever has been acquired into the old stores of information, while throwing out the 'garbage,' getting rid

(Continued on Page 84)

(Continued from Page 81)

of those things we don't really need to retain."

Another function of the REM phase of sleep appears to be the regulation of some generalized sort of impulse-control mechanism. This might explain why subjects in the Dement study—as well as people taking part in later dream-deprivation experiments — showed increased irritability and aggressiveness. Sometimes they experienced weight gains resulting from a sudden inability to control food intake.

The notion that REM sleep is somehow related to impulse control might also explain why depressives often appear to do better without it. The depressed individual frequently has problems connected to harsh overcontrol of his instinctual urges, thoughts and feelings.

ALTHOUGH these theories have done much to explain the function of REM sleep, the need for sleep itself seems puzzling. Why do people and animals sleep at all? Why is sleeping any different, for example, from simply closing one's eyes and resting?

"There is actually a great controversy going on at this moment among sleep scientists about this very problem," said Dr. Hauri when I asked him. "The fact is that nobody has been able to prove that anything basic happens during sleeping, anything which is that different from what happens when we merely lie down and relax. From a strictly neurological and physiological viewpoint, there is no objective proof that any restorative or recuperative processes get under way. And yet we all know, subjectively, that sleep makes us feel better—that we feel refreshed by a good night's sleep and feel miserable when we're sleepless."

At the present time, there appear to be two opposing theoretical camps among sleep researchers. One group believes that restorative physiological processes get underway during sleep—that there is resynthesis of brain tissue, for example.

The other side maintains that our need for sleep is no more than a behavioral adaptation — that the recurrent state of inertia and unresponsiveness which we call sleep has been programmed into us specifically because it promotes survival. They argue that if we take our own species as an example, then it is clear that early man would have been ill-adapted to pro-

protecting himself while foraging for food during the dark hours of the night. If he had attempted to function during the darkness, he would have wasted energy uselessly and exposed himself to danger from night predators as well. Therefore, goes the theory, it was necessary for our early ancestors not to respond during certain hours of darkness. Sleep is, in this view, essentially a behavior-control mechanism. Dr. Wilse Webb of the University of Florida, the most eloquent spokesman for this theory, points out that the various sleeping patterns of different animal species do not seem to be linked to physiological processes such as the need to synthesize brain protein. There do seem to be, however, curious ties between the sleep and the safety needs of a species. Predators sleep much more than prey; they can afford to relax. The hare and the gazelle sleep little and lightly; the lion may spend up to 16 hours a day in deep and heavy sleep.

"And yet," I protested to Hauri, "we all make so many distinctions between the qualities of our sleep—whether it's been good or bad, or light or heavy, or too short or long or full of dreams. We all feel so refreshed after a good night, and so destroyed after a night of wakefulness. It seems almost ridiculous to think that, possibly, nothing restorative is going on—that, from a physiological point of view, nothing at all may be happening."

"I know," he said. "It goes against all our common sense. And I, personally, don't believe it myself. But if you asked me to disprove that theory—to offer one shred of evidence to the contrary—I couldn't possibly do it."

"Isn't there some minimum amount of sleep that is necessary simply from the point of view of survival?"

Dr. Hauri shook his head. "There are two cases in the literature — well-documented — of people who just don't sleep at all. One is an Italian farmer; the other is a guy from Australia. These people have been tested in sleep labs, and it is true: They don't sleep. Now, if you compare sleeping to something like fluid intake, you see that there is a real difference—there is a minimum amount of liquid that is necessary for life; without it, a person will dry up and die. But there are individuals who can, apparently, make do without any sleep whatsoever. And they survive." ■