A LINE ON LIFE

2/6/85, Updated 11/5/01

Sleep — Gateway to Dreaming

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This column was originally printed, because a reader requested information on dreaming. However, before we can understand dreaming, we have to have some understanding about the process of **sleep**.

Sleep occurs in stages that are indicated by an electroencephalogram (EEG) — a record of electric brain activity taken from electrodes attached to various points on the scalp. When you are awake and *thinking*, a **beta wave** is produced. This is a low amplitude, but relatively fast rhythm. If you *relax* while you are awake, allowing your thoughts to drift, an alpha wave occurs. The **alpha wave** is somewhat larger, but slower (about 8-12 cycles per seconds). Alpha waves also occur immediately before drifting asleep.

Each stage of sleep is indicated by different brain waves. Although it is a little oversimplified, the brain waves slow down and become larger as you go deeper into sleep. In the deepest levels of sleep, delta waves predominate. **Delta waves** are large waves of about 1-2 cycles per second.

The night's sleep is divided into at least three stages. These stages cycle about 4-6 times each night.

In the first stage of sleep, sleepers typically have **rapid eye movements (REMs)**. These REMs are strongly associated with dreaming. When awakened during sleep, about 85% of sleepers report that they have been dreaming. Except for the initial period as you are falling asleep, REMs and dreaming occur in stage 1 sleep.

The deepest levels of sleep, indicated by delta waves, predominate in the first half of the sleep period. In contrast, REM sleep and dreaming (colored portions) occur more frequently and longer near the end. **Non-REM sleep**, at levels below stage1, is only rarely associated with any dreams.

The cycles of REM sleep typically start about 90 minutes after falling asleep. The first one usually only lasts about 5-10 minutes. The following periods of REM sleep get longer, with the last one ranging from a half hour to an hour and a half. Since REM sleep indicates dreaming, this means your dreams become longer, as the night progresses.

Why do we sleep? Although information is not completely clear, evidence supports at least two reasons. First, although we don't know exactly how it works, sleep serves a **restorative function**. It allows the body to recover from the physical and mental exertion of the day's activities. This restoration seems to occur primarily in the delta (deep) sleep. A psychological experiment demonstrated that, following extreme exercise like a marathon, the total sleep time increases for the next two nights. However, even though delta sleep time increases, REM sleep time decreases.

Second, there is evidence that delta sleep is the time when endocrine glands are releasing some of their most important **hormones**. For example, delta sleep is the only time when the pituitary gland releases the **growth hormone**. Other hormones such as **prolactin** -- which prepares the breasts to give milk during pregnancy -- and **lutenizing hormone** — which is linked to ovulation in women — are also secreted primarily during sleep.

In addition to this Non-REM sleep, we also need REM sleep and dreaming. However, dreaming will be discussed in another article.

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* Adapted from Bourne and Elkstrand's *Psychology: Its Principles and Meanings*, Holt, Rinehart & Winston, 1985, pages 527-534.