



BRAIN WAVES WRITE THEIR RECORD

On this massive rotating drum, at the Loomis Laboratory, Tuxedo Park, N. Y., the minute fluctuating electric currents from the brain write their own record, after suitable amplification. Inset: parts of two brain-wave records; left, subject awake, right, subject sleeping.

PHYSIOLOGY

Brain Waves Observed Better During Sleep of Subject

BRAIN WAVES, those recurring fluctuations in the minute electric currents that flow from the brain, can be studied to better advantage upon a sleeping than on a waking subject. The brain of the sleeper responds more readily and more certainly to such stimuli as the rustling of paper or the slamming of a door in another part of the house, even though there is no consciousness of their having occurred.

These are among the facts discovered in the course of a series of experiments at the Loomis Laboratory, conducted by Alfred L. Loomis, Prof. E. Newton Harvey of Princeton University, and Garret Hobart. (*Science*, June 14).

There is no doubt, the experimenters state, that these waves originate in the brain, and that they are distinct from muscle potentials and the results of movements. Different persons show quite different brain-wave records.

Records taken at night on sleeping persons show many spontaneous bursts of waves at certain hours, relatively few at other times. These often bunch themselves into "trains" lasting from five to twelve seconds, at intervals of from one-half minute to two minutes.

On an average, brain waves have a frequency of about ten per second, though this is somewhat irregular. Sev-

eral different patterns of brain-wave groups are shown by the records.

Regular snoring does not necessarily start the brain rhythms, but an occasional isolated snore may start a train of them.

During sleep, trains of waves appear which cannot be correlated with any detectable external stimulus, but which may be connected with internal disturbances of unknown origin.

Mr. Loomis and his associates have constructed a recording apparatus of a unique type, for use in these brain wave experiments. Formerly records were made on paper tape, but by the end of a "run" lasting several hours there would be a half-mile of the stuff, as tangled as a fishline. So they built a cylinder eight feet long and 44 inches in circumference, driven by a synchronous motor so that it acts as its own clock. It rotates once in a minute.

On the paper stretched on this huge drum two pens trace parallel lines. One line, in green, records the brain waves, as amplified in an elaborate vacuum-tube hook-up. Each wave makes its appropriate "wiggle," and a whole set of them looks not unlike the record of an earthquake on a seismogram. The second line, in red, records all extraneous occurrences, such as movements in bed, loud noises in the room, etc. Either line

can be examined or photographed separately by using an appropriate light filter.

As the drum revolves, a worm gear moves the pens slowly along, so that they travel one foot an hour. On one "run" of the drum, therefore, all the brain waves arising during a whole night's sleep can be recorded if desired. And when the paper is removed, it provides a chart, eight feet wide by 44 inches high, of all occurrences, minute by minute. Each minute is represented by lines 44 inches long, each second by about half an inch of such line.

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PHYSIOLOGY

Offensive Odor on Breath May Now Be Overcome

YOUR best friend can now tell you! A lasting remedy for offensive breath odors seems at hand. Even the long-lingering odor of garlic yields to treatment devised by Drs. Howard W. Haggard and Leon H. Greenberg, of Yale's laboratory of applied physiology. (*Journal, American Medical Association*, June 15).

"The breath can be immediately and completely rid of the odor (garlic) by washing the teeth and tongue and rinsing the mouth with a solution of chloramine," the Yale physicians state. "The chlorine liberated in the mouth reacts chemically with the essential oils and deodorizes them. It is probable that many cases of foul breath from other causes would be amenable to the same method of treatment."

The solution of chloramine was made by dissolving one 4.6 grain tablet in a small amount of water. Chloramine is a well-known chemical available at drug-stores which is used in the treatment of wounds and for sterilizing drinking water.

In the Yale treatment particular attention was paid to the brushing of the tongue, for the papillae at the base of the tongue have long been under suspicion as the source of odor from retained food particles.

In their experiments Drs. Haggard and Greenberg first proved that the source of most obnoxious breath is not systemic but local. It arises, at least in the case of onions and garlic, solely from particles retained in and about the structures of the mouth. Air in the lungs does not taint the blood; the stomach is not at fault, nor is the saliva.

Having determined this, the physi-