

## PSYCHOLOGY

# No Learning While Asleep

Scientists also find an objective way of determining whether and when a resting person is actually asleep. Seven levels of sleepiness are noted.

► **SCIENTIFIC EVIDENCE** that it is not possible to learn during sleep is reported in *Science* (Nov. 30).

Experiments on 21 men of average or better IQ were made by Dr. Charles W. Simon of the Hughes Weapon Systems Development Laboratories, Culver City, Calif., and William H. Emmons of the Rand Corporation, Santa Monica, Calif.

In addition to demonstrating that the men did not learn while they were asleep, the scientists also found an objective way of determining whether and when a resting person is actually asleep. This will be useful in medical and psychological research on problems of sleep.

Seven levels of sleepiness were noted. They ranged from a light drowsy state to very deep sleep. Each level is distinguished by a characteristic pattern of brain waves.

When you lie down and close your eyes, at first your brain broadcasts a continuous pattern of electric signals known to scientists as "alpha rhythm."

As you gradually drift off to sleep, you go through a light drowsy state, drowsy state, deep drowsy state and then you approach the line between awake and asleep before you enter first a light sleep, then a deep sleep and finally a very deep sleep.

Each of these stages is marked by a different pattern of brain waves.

First, in the light drowsy state, the alpha waves are interrupted or "blocked" as the scientists say. Playing questions and answers to you on a phonograph will restore the alpha pattern—that is, they serve to rouse you. Later the alpha pattern drops out more of the time and it slows down.

In the transition state a new pattern, called by the scientists "delta rhythm," is broadcast, mixed at first with the alpha pattern. When you are in a very deep sleep, your brain broadcasts only the delta pattern with the waves of maximum amplitude.

Learning during sleep was tested in this way. Before they went to bed, the men were pretested on 96 factual questions on history, sports, science and the like. Then they retired to sound-proof, air-conditioned booths for an eight-hour night's sleep.

During the night the same questions and the correct answers were played to the men at five-minute intervals. Then in the morning, the test was repeated to see which of the answers not known the night before could now be given.

It was found that during the first four levels, the men could hear the questions and recall the answers. During these levels the alpha rhythm predominated.

As soon as the alpha rhythm dropped out

and the delta pattern took over, then the ability to hear or recall what is said or played ends. If anyone wants to teach you then, he must first wake you up.

These findings add a new dimension to our measures of sleep. Researchers can now measure not only the length of sleep but also how deep the sleep.

Science News Letter, December 15, 1956

## PHYSICS

## Physics Institute Plans New Building

► **A NEW HEADQUARTERS** building is planned for the American Institute of Physics, an association of five scientific societies with 17,000 members throughout the country.

The Institute has launched a drive to raise half a million dollars, half for financing the building, and \$200,000 for speeding the flow of research information through new and improved technical journals.

The remaining \$50,000 of funds to be pledged from industry and Institute members is earmarked for attracting and training more young people to become physicists.

Expansion of the number and activities of physicists during and after World War II has made the Institute's present building inadequate.

Science News Letter, December 15, 1956

## NUTRITION

## Dietitians on Diet Show Potato's Value

► **THE POTATO** has high quality protein, important for tissue building, it appears from diet studies made on student dietitians.

The young women studied were students in a hospital in Lima, Peru. The findings, by Harvard University scientists, are reported in the *Journal of Nutrition*.

Not only the potato, but other vegetables and fruits supply protein although in relatively minor amounts. These amounts, however, may be more important than has been realized to supplement the protein of cereal diets eaten by large parts of the world's population.

In the studies, the usual diet of the young women, consisting of vegetables and other foods of plant origin, was found to contain the minimum or more of all the essential protein-building amino acids with one exception. The exception was methionine.

Science News Letter, December 15, 1956



**CHECKING DIODES**—Completed germanium diodes at a Hughes Aircraft Company's plant in Los Angeles are checked by operator of a diode orientor that signals, both audibly and visually, if the germanium crystal is in the proper position with regard to the lined color codes indicating which way current flows.

## HORTICULTURE

## Weed Killers Dangerous May Hurt Ornamentals

► **WHEN USING WEED KILLING** chemical sprays, be careful not to damage nearby turf grass or ornamental plants is the advice of Marston H. Kimball, ornamental horticulturist at the University of California at Los Angeles.

"A large number of chemical weed killers are commercially available," he said. "These include soil sterilants, fumigants, contact sprays and certain herbicides which release material toxic to germinating seeds but are not toxic to most mature plants."

"When properly applied to flowerbeds, flagstone walks or patios, soil sterilants are not hazardous to nearby turf grass. Leaching by rain or irrigation carries the chemical predominantly downward with little lateral movement."

"The principal hazard is to trees and shrubs having roots extending under treated areas. The roots may pick up toxic materials and transport them to trees or shrubs where systemic damage may occur."

Fumigants may often be used to control perennial weeds near turf plantings, Mr. Kimball said. They are only temporary as no toxic materials remain in the soil. Contact weed killers kill only parts of the plants actually sprayed.

Science News Letter, December 15, 1956