



SPINAL LEARNING

With this elaborate apparatus, Dr. P. S. Shurrager (who holds the switch) and Dr. E. A. Culler of the University of Illinois have demonstrated to the A.A.A.S. that the higher centers of the brain are not essential to learning. So long as a dog has the use of three or four inches of his spine, he can learn without use of brain or the senses of vision, hearing, smell or taste. An animal whose nervous system was severed under anesthetic at the neck and in the middle of the back was kept breathing in a respirator and was able to learn in each part separately.

CHEMISTRY

Vitamin B₁ May be Fundamental Component in Evolution

Chemical Society Hears of Experiments With Thiamin Which May Be Synthesized in Bacteria and Plants

VITAMIN B₁, whose lack in human diet causes the dread disease beriberi found mostly in Oriental countries, appears to have a fundamental place in the chemical chain which brings about the process of evolution in both plants and animals. Vitamin B₁ is now being prepared synthetically in the laboratory and is now known as thiamin.

The basic role of thiamin was traced at the opening session of the 7th National Organic Symposium of the American Chemical Society in Richmond, Va. Dr. R. R. Williams, chemist of the Bell Telephone Laboratories, New York City, discussed the nature of thiamin. Dr. Williams isolated vitamin B₁ and by studying its structure has been able to make it synthetically.

As vitamin B₁ or thiamin became

available in quantities sufficient to supply other workers in many fields it became apparent that the chemical was a fundamental substance, not only in the welfare of man, but also in all varieties of living matter, including higher animals, in insects, bacteria, fungi and higher plants.

Many bacteria and plants, declared Dr. Williams, seem able to synthesize within their bodies this essential vitamin in quite the same way that man is able to make his own adrenalin and other hormones. Plants, however, make the vitamin as part of their normal physiological processes. Man does not.

"Evidently the processes for which the vitamin is used by plants and microorganisms are closely akin to those which employ thiamin in the animal

body," said Dr. Williams. "Thiamin, therefore, appears to have to do with a very primitive and elemental function of living matter, presumably devised by nature during early stages of the evolutionary process.

"Plants and microorganisms are somewhat more catholic in their tastes than animals and can make use of a wider variety of analogs and derivatives of thiamin."

Thiamin, Dr. Williams also explained, can act as a coenzyme in the form of its pyrophosphate compound. A coenzyme, he explained, is a component part of the several natural catalysts in the body known as enzymes. The enzymes which involve thiamin have to do with the utilization of starches and sugars for the production of energy or the creation, in the body, of the necessary components of the tissues.

It is this last function of thiamin which explains the diversified nature of the symptoms caused by its absence. The reactions involving thiamin occur in all the tissues of the body, no matter how specialized their function may be, and so a deficiency of the vitamin in the food may impair any one of a number of bodily functions depending upon which tissue or organ is most affected.

New Drying Agent

Better stainless steels, candy, drugs, leather, paper, glass and varnishes are resulting from a new water absorbent now being used by industry. The new absorbent is activated alumina, a granular, white inert solid which can be completely rejuvenated with ease for further use merely by heating. While small scale units for the home have not yet been made available it is possible that the lead of industry may be followed by home use with increased summer comfort.

Activated alumina was described by R. B. Derr of the Aluminum Company of America before the 4th Annual Chemical Engineering Symposium of the American Chemical Society, meeting in Philadelphia.

The drying absorbent is used by industry where almost complete removal of moisture is vital, or a constant moisture content is required, said Mr. Derr.

One hundred per cent. dehumidification is possible, he added, until the activated alumina absorbed from 12 to 14 per cent. of its own weight of water. Large commercial units of activated alumina are now in operation which can remove 15,000 pounds of water daily from the atmosphere.

The absorbent has been particularly useful for the stainless steel industry where any trace of moisture during annealing produces a bluish cast on the metal instead of the bright polish. Another important use is in the manufacture of toxic gases used in household refrigerators which cause corrosion if they contain moisture.

The use of activated alumina to decrease the humidity in the home for better summer comfort has only been partially explored as yet, said Mr. Derr. Mainly this has been because its uses have been developed first for drying equipment in existing or less competitive lines of development. Further, the absorption of moisture by the alumina generates a considerable amount of heat which must be removed; a technical problem somewhat difficult to solve in a home installation.

Science News Letter, January 8, 1938

MEDICINE

Alcohol, Ether, Exposure Lower Pneumonia Resistance

THE REASON why pneumonia is especially likely to follow exposure to cold, ether anesthesia and alcoholic indulgence or over-indulgence is explained in research reported by Drs. W. J. Nungester and Roy G. Klepser of the University of Michigan's Hygienic Laboratory at the meeting of the Society of American Bacteriologists.

These conditions interfere with the normal action of the epiglottis and the vocal folds in the throat, structures which ordinarily act like curtains, closing over the trachea at the slightest irritation. Since the trachea or windpipe is the passage from the throat to the lungs, it is obvious that failure of these protective curtains would leave the passage to the bronchi and lungs open to pneumonia germs in the air.

The Michigan scientists found that the protective mechanism in the throat failed three times as often in rats that had been exposed to cold as in rats under normal conditions, and more than twice as often in intoxicated rats as in normal ones.

When pneumonia germs were put into the rats' noses, nearly half the rats that had been exposed to cold got pneumonia but only just over a tenth of the rats living in normal temperatures developed the disease. Over a third of the intoxicated rats and over a third of the rats under ether anesthesia developed pneumonia.

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PSYCHOLOGY

Psychologists Puzzled Over Adaptability of Workers

Brain Waves Throw New Light on Sleep; Intelligence Influenced by Good Home; Social Life of Mice Watched

ABILITY of workers to adjust to difficult working conditions and increased demands with an economy that no man-made mechanical device can imitate, is a puzzle to psychologists, Dr. A. T. Poffenberger, of Columbia University, told the meeting of the American Association for the Advancement of Science in his address as vice-president of the section on psychology.

When men have to work in excessive noise or in a room extremely hot or filled with distractions, the output of work may not be decreased, experiments have demonstrated. It is likely to continue at the same level. In fact, in an unconscious attempt to maintain the level despite handicaps, the workers are inclined to overshoot the mark and do even better than usual.

Does work done in noisy surroundings or in excessive heat and humidity take its toll of human energy? Do incentives of all sorts commonly employed to increase effort and thereby to increase efficiency really increase efficiency, or are they more costly when efficiency is properly computed?

These are questions that psychologists recognize but are not yet ready to answer, Dr. Poffenberger indicated.

Each person recognizes his own level, Dr. Poffenberger said. "One thinks of himself as just so good." He also has an aspiration level that represents the achievements he would like to reach. These levels are constantly adjusted in the light of experience.

When difficulties are encountered or the task is unexpectedly made harder, the individual automatically makes an adjustment necessary to keep to his own level of performance and avoid disappointment. After a period of adjustment the output is normal and the effort apparently not increased.

The persons who make this adjustment report that they "are not bothered" or "paid no attention" to the distracting conditions.

Dr. Poffenberger cited two possible explanations. First, the sense organs and musculature may act as a protective

mechanism against distraction and by automatically relaxing they transmit the otherwise disturbing conditions at a reduced level, one too low for competition with the important ones. Second, the hammering at other sense organs may really increase or reinforce the intensity of signals carried by the senses actually employed at the task.

Men And Mice Alike

The rhetorical query, "Are we men or are we mice?" loses most of its significance through studies reported to the American Association by Dr. Jacob Uhrich, of the University of Chicago and Kansas State Teachers College. Dr. Uhrich has found that men and mice are very much alike in some phases of their social conduct.

Male mice fight a good deal, females don't. There is some bickering between the sexes. The severity of the fighting differs from group to group, and within the same group at different times.

There is a tendency for one "boss mouse" to establish dominance over the other males. His rule may last for several months, or he may be overthrown after only a few days.

Brain Waves Chart Sleep

Persons who claim they go to sleep the instant their heads touch the pillows must be wrong, it appears from brain-wave studies of sleep reported by Drs. Hallowell Davis, P. A. Davis, A. L. Loomis, E. N. Harvey and G. Hobart of Harvard Medical School, Princeton University, and the Loomis Laboratory.

Brain-wave studies made of individuals as they went to sleep and the reports of the sleepers themselves indicated that sleep does not come all at once. Different parts of the brain go to sleep in stages, one at a time, and there is a "floating" or drowsy stage before real sleep which shows up in brain-wave records as well as in the reports of the sleepers. This drowsy stage, incidentally, gives a brain-wave record so much like those found in abnormal mental states that the investigators warned that it must be avoided in using brain-wave