

PSYCHOLOGY

"Picture" of Learning Drawn by Brain Waves

► ELECTRICAL impulses from the brain waves, for the first time, have drawn a "picture" of the learning process.

Thus an animal's moves are "telegraphed" so that scientists can predict his learned responses.

These developments in scientific "mind reading" have occurred in brain experiments reported by Drs. Keith Killam and E. Roy John of the University of California at Los Angeles School of Medicine, at the Baltimore meeting of the Society for Pharmacology and Experimental Therapeutics.

Cats were taught by a warning signal, either a flashing light or a clicker, to move so as to avoid an electric shock.

This learning was accompanied by changes in brain waves emanating from certain brain areas. The waves were carried through permanent electrodes in the cat's head and recorded by an EEG machine. A characteristic wave pattern preceded certain of the cat's moves.

Tranquilizers administered to the animals made them forget what they had learned about the light-clicker-shock relationship. Tranquilizers also erased the "trained" patterns of brain waves. They were replaced by patterns characteristic of untrained cats.

As these drug effects wore off the cats again remembered what they had learned about the warning signal. "Trained" electrical patterns also reappeared on the EEG recordings.

The UCLA investigators suggested that these "trained" patterns may be memory correlates, not previously demonstrated in EEG experiments.

Science News Letter, December 7, 1957

ENGINEERING

Castor Oil in Dash Boards Makes Car Driving Safer

► CASTOR OIL in the crash panel of your automobile will make driving safer and still preserve the car's interior beauty.

Castor oil as a softening agent is the key to a new foam plastic described as "outstanding" crash padding before a meeting of the American Chemical Society in New York.

Most plastic foams tried as automobile crash padding have sacrificed maximum safety for better appearance. Scientists have found the best impact shock absorbers to be completely crushable materials with no elasticity or rebound, such as very thick honeycombs of paper or blocks of polystyrene, the light-weight Christmas ornament plastic foam. However, such pads usually are too thick for use on an automobile instrument panel, and would soon be covered by unsightly dents from everyday knocks and bumps.

Thinner flexible pads that do not dent permanently, such as foam rubber, simply do not absorb impact shock.

Drs. M. E. Bailey, A. Khawam and G. C. Toone, and J. W. Hull, National Aniline

Division, Allied Chemical and Dye Corporation, Buffalo, N.Y., reported a successful compromise in the form of a castor oil-softened diisocyanate plastic foam. The padding has enough stiffness to absorb fully nearly all instrument panel bumps encountered in most auto accidents. However, the scientists reported, enough flexibility is built into the new foam to allow it to return quickly to its normal shape after being dented.

Besides making possible superior crash padding, the new castor oil-diisocyanate formulations can also be used as adhesives with higher bonding strength than any other known material, or as protective coatings with outstanding resistance to the action of chemicals and abrasives, Dr. Bailey said.

Urethan, an isocyanate blown into a multi-celled foam by gases released when the ingredients react, is used in some present auto crash pads. The properties of the new castor-oil softened derivative surpass those of urethan and are far superior to those of other plastics, the scientists reported.

Science News Letter, December 7, 1957

BIOLOGY

Rapeseed Oil Used To Lower Fertility

► AN OIL taken from rapeseed lowers fertility in rats and may be useful as a new method of birth control for humans.

This is reported by Drs. K. K. Carroll and R. L. Noble of the University of Western Ontario, London, Canada, who studied the effects of feeding erucic acid to rats.

Erucic acid is a fatty acid found abundantly in rapeseed and related oils. It was given to both male and female rats and progressively reduced the fertility of the males until they became completely sterile, although still healthy, five months after starting the special diet.

In the female rats, the erucic acid did not appear to affect fertility and pregnancy, although few of the offspring survived for long because of poor milk production by the mothers.

Erucic acid may interfere with reproduction by interfering with the way the body normally uses the essential fatty acids in the diet, the researchers reported.

In the male rats, the erucic acid decreased the number of sperm cells produced. If the diet was not kept up too long, however, sperm-producing ability returned when the acid was no longer continued in the animals' food.

"The reduction in fertility as observed in the male rat, if reproducible in other species, may have significance for the control of fertility in the human," the scientists report in the *Canadian Journal of Biochemistry and Physiology* (Nov.).

Erucic acid is readily available and palatable in the diet, it is easily broken down by body chemistry and it produces no side effects.

Further studies of it are now going on in other species of animals.

Science News Letter, December 7, 1957

IN SCIEN

MEDICINE

Effects of Brain Strokes Unknown for Weeks

► The full effects of a brain "stroke" such as President Eisenhower has had, are not often apparent for several weeks. Such occurrences are known medically as "cerebral vascular accidents."

Often they are fatal, but when they do not involve an actual hemorrhage in the brain, the chances for complete recovery are good.

How permanent such symptoms as speech impairments will be cannot be predicted immediately after the attack, because they may be due to either actual destruction of brain tissue, or merely to a temporary interruption of normal function due to swelling and other factors.

In the President's case the middle cerebral artery was involved, and a small branch of it became occluded by either a blood clot or a vascular spasm. When the vessel is small, most patients survive this type of attack unless complicating factors are present.

Hardening of the arteries and high blood pressure are the most frequent cause of such accidents. The small vessels lose their elasticity, become narrowed and cause the blood flow to stop.

There are usually no signs of an impending attack and most of the time it strikes quickly.

Science News Letter, December 7, 1957

ENDOCRINOLOGY

Long Use of Reserpine Changes Rat's Sex Gland

► CONTINUED use of reserpine results in abnormal changes in the sex gland cells that produce the hormone androgen in rats, scientists at the University of Helsinki, Finland, report in the British journal, *Nature* (Nov. 23).

A prolonged trial of reserpine was made on the animals to determine what effects the tranquilizer had on endocrine glands when administered over a long period of time.

They found the only glands showing any significant changes after the trial period were the testes of the male animals. Although the production of sperm was normal, there was a decided reduction in the number of interstitial cells in the glands of treated rats.

The interstitial cells are necessary to produce the male hormone, androgen, which results in the development of the secondary sex characteristics such as growth in humans of the beard and body hair and other "masculinizing" features.

Reporting the work were O. Eranko, V. Hopsu, E. Kivalo and A. Telkka, of the University of Helsinki's anatomy department.

Science News Letter, December 7, 1957

CE FIELDS

GENERAL SCIENCE

Science Institutes To Benefit About 5,250

➤ A PROGRAM for improving the teaching of science and mathematics that predates sputnik by five years will provide summer training for approximately 5,250 of the nation's high school and college teachers in 1958.

The National Science Foundation has reported that during the summer of 1958 it will award stipends and pay the tuition for 5,000 high school and 250 college teachers of science and mathematics to attend summer training at 108 institutes in 104 educational institutions.

Dr. Alan T. Waterman, the Foundation's director, announced awards of the grants totaling \$5,340,000 to support the summer institutes.

"The summer-institutes program of the Foundation," Dr. Waterman said, "is in step with current plans for strengthening the training of scientists in the United States.

"Good science teachers are apt to be the first to stimulate an interest in science among our young people in secondary schools. But if instruction is not stimulating, and contains outdated concepts, it tends to weaken youths' motivations toward science careers. Foundation-supported summer institutes provide opportunities for thousands of hard-pressed high school science teachers to learn at first hand the rapidly advancing developments in today's science, mathematics, and engineering."

The highly successful program for bringing teachers up-to-date in the sciences and mathematics was started experimentally in 1953. The grants, given to the institutes, cover tuition and fees and the participant receives a maximum of \$75 per week plus allowances for dependents and travel expenses.

Science News Letter, December 7, 1957

TECHNOLOGY

Flexible "Light Bulbs" Have Been Developed

➤ PLIABLE "light bulbs," made of nylon, other plastic or steel mesh, have been developed by Westinghouse scientists.

The flexible lamps, that can be shaped as desired, are seen as the forerunners of window shades, drapes and other bendable materials that actually produce light.

Called "Rayescent" lamps by Westinghouse, the flexible light producers are electroluminescent cells—sheets or panels of glass, metal or plastic coated with a phosphor and treated to conduct electricity. When supplied with power, they light up.

To produce the flexible electric lamps, Westinghouse scientists, who have been developing electroluminescent panels for wall and ceiling lighting and recently reported

the possibility of windows that can be "turned on," now have found a method to apply phosphors to nylon, plastics and steel mesh. (See SNL, Nov. 9, p. 296.)

Although the flexible lamps will not be at the local store for several years, E. G. F. Arnott, director of research for the Westinghouse lamp division, predicted the lamps could be useful in the home, theater and for special effects in restaurants and stores. He also foresees their use in the form of illuminated tapes for the military.

The flexible lighting, which can be made in various colors and whose light intensity can be increased or decreased as desired, might be available for use in airplane instrument panels within two years.

Science News Letter, December 7, 1957

TECHNOLOGY

Show Chemical Memory For Computing Machines

➤ MILLIONS of microscopic cells containing photosensitive liquid may provide the first practical chemical memory for computing machines.

A laboratory demonstration of a large-scale prototype that prints, reads and erases information on the photosensitive film was demonstrated at the dedication of the engineering and research center of the National Cash Register Company, Dayton, Ohio.

The technique of encapsulation forming "solid liquids" by composing droplets of liquid a millionth of an inch in diameter in gelatin film and then coating them on paper or other substances was described by Stanley C. Allyn, chairman of the board.

The company's scientists, during 12 years of research, have developed new oils or dyes called metachromic dyes. When a blue light shines on them, they turn a brilliant blue. When a yellow light shines on them, they become colorless again. This chemical switch can be made and erased indefinitely.

By putting these dyes in a capsule of microscopic size, containing millions of droplets per square inch, they can be handled like solids and used for computing machine memories.

Similar to magnetic tapes, now being used, the chemical memories have the advantage of eliminating spreading. They also promise computers with high storage capacity, high access speed and low cost. Ideally, 1,000,000 bits of information could be stored on a square inch.

The same technique has provided National Cash Register Company scientists with a commercial carbonless business form. As the key of a typewriter strikes the paper coated with these tiny droplets, the cells break, leaving a print.

The same techniques may provide a means of printing, with magnetic characters that can be read by both people and machines, and will be used in pharmaceutical practice for keeping reactive compounds separate in tiny droplets.

The company hopes to have a working model of its chemical memory computer in a year and one-half, Mr. Allyn said.

Science News Letter, December 7, 1957

ENDOCRINOLOGY

Weight Loss Produced By Hormone Injection

➤ A LOSS of weight, even without reducing the number of calories eaten, can be produced by injections of a pancreatic hormone in rats.

This was reported by Drs. I. W. F. Davidson, J. M. Salter and C. H. Best, University of Toronto, Canada, in *Nature* (Nov. 23).

The hormone tested was glucagon, a protein secreted by the pancreas and believed to play some role in the production of diabetes. Animals receiving injections of it gained less weight and contained much less fat, protein and water than control animals who ate the same number of calories.

The effects of the hormone indicated that it speeded up the metabolic rate of the animals, so studies were made of the amount of oxygen consumed by the animals.

It was found that the metabolic rate jumped about 35% and oxygen consumption was at its greatest one hour after the injection.

"A stimulating effect of glucagon on the metabolic rate has not been noted previously," the scientists report.

How and why the hormone has this effect is not understood, although it was found that animals who had had their adrenal glands removed were not affected by the injections.

This, the scientists conclude, points to the possibility that adrenal hormones are involved in the metabolic rate change and should be carefully studied.

Science News Letter, December 7, 1957

OCEANOGRAPHY

Chemical Study Measures Rise in Ocean Floor

➤ SCIENTISTS in Bombay have developed a chemical process for measuring the rate at which the floor of the Pacific Ocean is building up.

Chemical extraction of a radioactive isotope of beryllium from a 49-foot core drilled from the floor of the Pacific indicates dirt, sand, dead marine life and other sediment are building up new floor at a rate of about 18 hundredths (0.18) of an inch every 1,000 years.

The work, reported in *Deep-Sea Research* (Vol. 4, 1957), is based on the known decrease in activity of the long lived beryllium-10 isotope, with a half-life of 2,700,000 years. The isotope, produced by cosmic ray action, is believed to have been precipitated for millions of years with rain water. The scientists assumed the precipitation to have been unvarying, and assumed the core under study represented sediment that had been undisturbed for millions of years.

Chemical extraction of the isotope selected at measured depths on the core gave samples of the radioactive isotope from which it was possible to determine the age of the sediment at a particular depth.

Science News Letter, December 7, 1957