

## PSYCHOLOGY

**Electric Shock Improves Learning Ability of Mice**

EARLY infantile experience affects the ability of a mouse to learn as an adult.

Baby mice taken from their nests, handled, and carried to an experimental apparatus and there given a mild electric shock have increased learning scores.

Drs. Victor H. Denenberg and Robert W. Bell report in *Science* (131, 227, Jan. 22, 1960) that young mice are especially sensitive to such effects at two to three days of age. Their learning scores as adults are affected even when the baby mice are taken from the nest and carried to the shock apparatus and back without having any shock administered.

The animals were tested for learning ability as adults by sounding a buzzer, followed five seconds later by an electric shock. If the mouse made an appropriate response before the onset of the shock, the electric shock did not occur and the mouse was credited with an "avoidance response." The mice that were shocked at a very young age were better at learning to avoid the shock as adults, provided the shock was not too strong.

Drs. Denenberg and Bell were at Purdue University, Lafayette, Ind., when they conducted this research but Dr. Bell is now at Allegheny College, Meadville, Pa.

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## BIOCHEMISTRY

**Isolated DNA Changes Normal Cell to Cancerous**

A NUCLEIC acid believed to be the basic "stuff" of chromosomes—has changed a normal cell to a cancerous one.

This is the first time that an isolated nucleic acid has produced cancer, a team of researchers reported in the *Proceedings of the National Academy of Sciences*. The discovery points to the possibility that a different DNA could cause a change in the opposite direction from cancerous to normal cells, the researchers said.

Earlier studies had shown that RNA, or ribonucleic acid, isolated from plant or animal viruses will cause infections in healthy cells. (Viruses are known to consist of either RNA or DNA, as deoxyribonucleic acid is called, coated by a protein. It is the nucleic acid that causes the virus disease.)

The DNA in this study was isolated from a polyoma virus of leukemic mice. The virus produces almost 24 types of cancer in various laboratory animals.

First the virus was grown, then its protein "jacket" removed and the virus nucleic acid injected into embryo cells. An infection resulted that was characteristic of the one produced by the whole, intact virus. Also, the scientists reported, all hamsters that were injected with the tissue culture medium had tumors.

However, as soon as the enzyme DNase—which destroys DNA only—was added to the isolated nucleic acid, it became non-infective. This proved it to be of the DNA

type. Direct injections of nucleic acid also produced tumors in hamsters.

Drs. G. A. DiMayorca, C. Friend and A. Bendich of the Sloan-Kettering Institute for Cancer Research in New York City, and Drs. B. E. Eddy, S. E. Stewart and W. S. Hunter of the National Institutes of Health reported on the DNA cancer discovery.

Reported in the same issue of the *Proceedings of the National Academy of Sciences* is the discovery that DNA reproduces itself in the same way whether it is found in bacteria or more complex, one-celled plants called algae.

This supports the scientists' belief that what is learned about bacteria and viruses can be applied to higher organisms such as algae and even mammals, Dr. Noboru Sueoka of the Harvard Biological Laboratories indicated. He showed that when a green alga cell divides into two "daughter" cells, they share each of the original parent's DNA molecules.

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## ROCKETS AND MISSILES

**Thin, Flat Space Saucer Could Fly on Sunlight**

A THIN, flat, spinning saucer made of aluminum-coated plastic membranes may be the space exploration vehicle of the future. It would run on sunlight.

Dr. Theodore Cotter, University of Michigan physicist, told the Institute of the Aeronautical Sciences meeting in New York, that this device appears to be "an extremely promising concept for space propulsion."

Dr. Cotter said there are no major technical obstacles to an early trial of such a device.

He said the first step would be to launch a small saucer of 600 feet to 900 feet in diameter as an experiment to test the idea. It would be instrumented, but carry no passengers. If it proved itself, a larger one later could be used to carry passengers on space trips without using any fuel other than the pressure exerted by sunlight and the pull of the sun's gravity.

By adjusting its angle with respect to the sun, the saucer could mix the push of sunlight with the pull of the sun's gravity so that it could go in any desired direction in the solar system.

Dr. Cotter said a saucer big enough to carry a man in its passenger pod, deep within, would probably measure more than 1,300 feet in diameter. Its useful payload, including a man, would be about 1,000 pounds.

The space saucer would have to be launched into orbit by a conventional rocket. But once in an earth orbit, it could adjust its angle to spiral slowly away from earth on a space mission, then later return to its earth orbit.

An immediate application of the idea, Dr. Cotter said, might be to equip conventional earth satellites with smaller versions of this "solar sail." These sails could be used to make small or large changes in the satellite's orbit without help of rockets.

*Science News Letter*, February 6, 1960

**IN SCIENCE**

## GENETICS

**Gene of Fruit Fly Has Great Variability**

A SINGLE fruit fly may contain many of the genetic possibilities found in thousands of flies. It has an "unexpectedly great portion" of all the genetic variation found in the population to which it belongs, a University of Michigan zoologist reports.

An experiment was made tracing one variation—crossvein defect—in the offspring of 21 wild pairs of fruit flies. Results seem to support the theory that "presently observable steps in evolution are made through new combinations of common genes" that have already been tested by natural selection, Dr. Roger Milkman said.

Twenty-one "pregnant" female fruit flies were collected from their natural habitat—grocery stores, Dr. Milkman reported in *Science* (131, 225, Jan. 22, 1960). The offspring in 21 groups were then inbred to produce 1,000 second generation flies. These were examined to see how much of the crossvein defect, which is determined by presence of some rather common genes in rare combination, appeared.

Half of the 21 original flies produced at least one fly in a 1,000 with crossvein defects that ranged from slight to complete absence of the posterior crossvein in the wing.

Results like these should be borne in mind in the consideration of the many human traits that are determined by several genes, concluded Dr. Milkman.

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## AERONAUTICS

**All-Weather Sub-Killing Can Be Done by 'Copters**

NAVY TESTS have proved conclusively that helicopters can be used day and night and under all weather conditions to find and "kill" submarines.

Helicopter flight tests under instrument flying conditions, were made from the decks of modern carriers against evasive submarine targets.

Lt. Donald B. Bennie of the Naval Air Test Center, Patuxent, Md., told the Institute of the Aeronautical Sciences meeting in New York that submarine-hunting helicopters must be flown automatically by electronic computers.

Computers must be used because the processing rate for instrument information at a low-altitude hover is beyond the experienced pilot's ability, he said.

The tests also showed the guarding missions for aircraft carriers becomes "highly successful" through use of all-weather helicopters.

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# CE FIELDS

## PHYSIOLOGY

### Tranquilizers Lower Rats' Cold-Stress Resistance

SEVERAL widely used tranquilizers reduce laboratory rats' ability to withstand extreme cold, a Harvard University researcher reports.

Tests with serotonin and vasopressin indicate that the drugs cause responses in treated animals similar to those found in animals lacking their adrenal glands. The survival time of cold-stressed animals in the three groups was similar, Dr. R. Michel Zilberstein points out in *Nature* (Jan. 23).

This suggests that treatment with these drugs results in a temporary "cutting out" of the adrenals as far as the glands' normal functioning is considered.

Reserpine "clearly differs" from the other tranquilizers, Dr. Zilberstein says. Its effects were still evident 18 hours after the rats were injected, even though by that time most of the drug is known to have been used up or metabolized by the body.

Variations in the survival time of untreated animals subjected to the extreme cold at different times of the day appear to reflect the daily cyclic changes in adrenal activity, Dr. Zilberstein concludes.

In the experiment, rats were placed in individual cages in a cold room at about 37 degrees Fahrenheit, either immediately following injection with a tranquilizer or, in some cases, 18 hours afterwards.

Science News Letter, February 6, 1960

## MEDICINE

### Prescribing Tranquilizers Called Doctor Disease

PHYSICIANS appear to be prone to a new disease—writing up prescriptions for tranquilizers.

Actually, they are pressured into doling out tranquilizers by forces that include the practitioners' own mind plus patients, mothers, colleagues, detail men, samples and selected literature, Dr. Morgan Martin, formerly of Regina General Hospital, Regina, Sask., reports in the *Canadian Medical Association Journal*. (82, 133, Jan. 1960.)

The doctor cites the dangers of tranquilizers, among which were their side effects, drug dependency, habituation and addiction. He suggests that doctors adopt a code of "thinking" about tranquilizers so that they will be better prepared to withstand the deluge of claims that accompany each new product.

The Canadian doctor advises physicians to keep in mind the various pressures which influence his decision to prescribe these tension-relieving pills.

First, there are four types of doctors that

fit into the group prone to prescribe tranquilizers. The doctor who cannot communicate with patients and has great difficulty in talking; the doctor who has nothing to offer as an alternative to the tranquilizer; the doctor who wants to please, and lastly, the doctor who cannot stand anxiety.

Then, he continues, patients who have read a popular article about the pills will pressure the doctor. So will parents and relatives of the patient and colleagues. Next, free samples, detail men and "selected literature," favorable to the product, of course, attempt to erase from the physician's mind any doubts about the benefits of the pills.

In conclusion, Dr. Martin suggests that doctors need to keep in mind and understand the pressures pushing them towards prescribing tranquilizers and to know how to evaluate them. Dr. Martin is now at Upper Saddle River, N. J.

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## ASTRONAUTICS

### Long Trip to Mars Now Too Strenuous for Man

MAN DOES NOT appear to be able to remain in a space ship for the length of time it would now take to cruise to Mars.

Perhaps ships will have to travel much faster, cutting down on the number of "space hours" a man spends hopping from planet to planet. Such short planetary missions may be the only possible method of keeping a man alive in space, Dr. Hubertus S. Strughold suggested in summarizing a series of lectures on space medicine at Brooks Air Force Base, Tex.

Presently United States scientists are planning methods of sending missions to other celestial bodies by means of minimum-energy trajectories, the adviser for research at the School of Aviation Medicine at the Base said. In this manner the space craft "coasts" in space. Thus, a round trip to the moon would take less than one week. Providing a man with food, water and oxygen during such a flight would pose no serious problem.

On the other hand, a flight to a planet such as Mars would require almost nine months with present propulsion systems, Dr. Strughold reported.

This length of time would pose many problems. Tests to date on men in cabins such as those that will be used in space flight indicate such lengthy flights would cause intolerable psychological and physical changes.

The entire environment inside the cabin would need recycling. Food and water supplies would have to be supplied by this intricate recycling system. Tests already run indicate that a man in the cabin begins to grow weary of the experiment after only seven days.

The solution, Dr. Strughold suggests, is a shorter mission-period, which means faster powered space craft. He also suggests applying continuous flight acceleration to the craft once it is space-borne.

Science News Letter, February 6, 1960

## MEDICINE

### Healthy Hearted Bantu Still Puzzles Scientists

EXACTLY why the African Bantu is relatively immune to severe atherosclerosis remains a mystery, but eight researchers have virtually eliminated low coagulation as a possible answer.

Many scientists have suspected that the low incidence of atherosclerosis might be due to a particular property of the Bantu's blood—slow coagulation. They reasoned that since white men suffer a high incidence of heart disease coupled with rapid coagulation of the blood, the low coagulability of the Bantu might explain the African people's low rate of heart disease.

But after careful observation of the blood of a group of white controls and of Bantus, which included comparisons of both their coagulation ability and clot dissolving properties, the eight scientists report in the *British Medical Journal* (Jan. 23) that they found no significant differences. Research was directed by Drs. C. Merskey, H. Gordon and H. Lackner, who were assisted by Dr. V. Schrire, Dr. R. Sougin-Mibashan, B. J. Kaplan, H. L. Nossel and A. Moodie, all from the departments of medicine and surgical research at the University of Cape Town.

The Bantu thrives on a diet lacking many of the nutrients considered essential for good health. Despite that, or perhaps because of it, the natives are relatively free from heart disease, certain types of cancer, diabetes, peptic ulcer and appendicitis.

Atherosclerosis, a form of hardening of the arteries, is very rare in the Bantu and, when it does exist, it seldom leads to heart disease as in Americans.

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## AGRICULTURE

### Number of Farm Tractors Increases 70% in Decade

THE NUMBER of farm tractors in the world has increased by about 70% in the past decade. During the same period, the farm horse population has dropped by seven percent.

The number of tractors in 1957, excluding Russia and Red China, had gone up to 8,728,000 against 5,149,000 in 1949, the Food and Agriculture Organization of the United Nations has reported.

Ninety-three percent of the world's farm tractors are concentrated in North America, Europe and Oceania. The remaining seven percent are spread over various countries in Latin America, the Far East, and Near East and Africa, regions that account for 65% of the world's arable land.

Four reasons cited by the FAO for the expansion in farm mechanization were more favorable prices for farm products, the rising cost of agricultural manpower, a greater variety of machines more suitable to local conditions, and increasing machine-consciousness coupled with wide-spread government encouragement.

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