

MEDICINE

Spinal Experiment Gives New Hope for Paralytics

► CANADIAN RESEARCHERS have found a way to make injured spinal cords repair themselves.

Rats having spinal cords that were surgically cut were able to walk almost normally after injections of extra nerve tissue into their bodies, they reported.

It previously had been accepted that a severed spinal cord cannot regenerate. Microscopic examination shows that when the cord is cut, the nerves sprout a tiny distance into the scar tissue around the injury.

But such growth is always abortive—it never grows far enough to enable the patient to regain the use of his lower limbs. Attempts to reduce the amount of scar tissue do not extend the nerve growth.

Dr. William J. O'Callaghan and Dr. T. J. Speakman of the University of Alberta, reported in the *Canadian Medical Journal*, 90:602, 1964, that the failure of regeneration to occur may be due to a lack of a readily available reserve of the substances used in nerve production.

To supply this they devised a mixture in water of spinal cord and brain tissue taken from newborn rats. This was injected into the abdominal cavity of rats having severed spinal cords. Within eight weeks ten out of 35 rats were well, a feat never before achieved.

People frequently suffer injuries that cut the main nerves in arms or legs. The use of these limbs can be restored by carefully sewing the ends of the nerves together, but when the body's main nerve bundle, the spinal cord, is broken, the patient inevitably is left with paralysis and lack of feeling in a large portion of his body. Dr. O'Callaghan believes that this research will lead to a new life for those previously consigned to life-long paralysis.

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SEISMOLOGY

Volcanic Squeeze Measured in Hawaii

► AS A VOLCANO begins to rumble, boil and bubble, nearby rocks start to contract or stretch.

A delicate instrument has been installed on the Hawaiian island of Oahu to measure just how much the island rocks squeeze or stretch as molten rock begins to flow from the earth's interior to fill deep wells stretching 30 miles beneath the volcanoes.

The instrument, called a strain seismometer, is also designed to study the extensive plumbing system under Hawaii's active volcanoes and measure the deep conduits up which the molten rock flows, explained Dr. Frank Press, director of the seismological laboratory of the California Institute of Technology, Pasadena.

Only two volcanoes on the Hawaiian chain of islands are still active—Mauna Loa and Kilauea, both on the island of Hawaii.

The island of Oahu, site of the instrument, is some 200 miles northeast of these

volcanoes, but will be able to pick up any volcano rumblings, explained Dr. Press who is in charge of the research.

The instrument is so sensitive, he said, that it can record a squeeze or stretch of one-fifth of an inch in rock, in an area of 3,000 miles.

When Mauna Loa is getting ready to erupt, it gives plenty of warning in the form of tilting and small earthquakes. Its eruptions can be predicted and no one gets hurt.

Seismologists believe that conduits extend about 30 miles beneath the volcanoes because regular seismograph instruments have recorded small earthquakes at that depth. These quakes occur apparently when molten rock is pouring into the lower end of the conduits.

Another bit of evidence is that the molten rock is about 1,800 degrees Fahrenheit. This probably is the temperature at which the pressurized magma is forced upward too rapidly to cool.

Under tremendous pressures, the rock in the interior of the earth becomes liquid and squeezes up the conduits and vent of the volcano.

This substance, called magma as long as it remains underground, is termed lava when it appears above ground.

The Oahu strain instrument, located in a long tunnel in an ancient lava flow about 200 feet below the surface, is being operated for Caltech by members of the U.S. Coast and Geodetic Survey.

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PSYCHOLOGY

New Use for Home Movies: Psychoanalysis

► CHILDHOOD MOVIES taken under ordinary family circumstances shed useful light on the early behavioral patterns of a person, a Chicago psychiatrist believes.

The home film catches expressions of the very young child, when he is quite transparent in his actions and readily betrays emotions such as pleasure, anxiety, disappointment, jealousy and mortification, Dr. Herman M. Serota reported in *Science*, 143:1195, 1964.

In later years, under the impact of a changing environment, the child's ego builds up defense functions. His early reactions undergo complex transformations that are apparent on the home movies even to psychiatric patients themselves, Dr. Serota said.

These 8-mm and 16-mm sequential motion pictures, sometimes stored away as long as 25 years, are a good source of childhood data in the psychoanalysis of adults, he explained.

They give additional evidence to what the patient says and how he behaves during analysis. Other sources include photographs, diaries, baby books, writings and art works.

The unedited home films also reveal another facet—the motivations, designs and frustrations of the parent-photographer.

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IN SCIEN

AUTOMATION

No More Cart-Pushing In Automated Market

► ONE CAN NOW shop simply by picking up cards instead of an armload of packages.

At the ABC Supermarket in Stockholm, Sweden, the work is all done by a computer.

Stacks of cards are placed beneath each item on sale. Customers do not help themselves to a can of fruit or a package of sugar. They take a card, instead.

When customers arrive at the exit, they hand in their cards and these are immediately fed into a computer. The computer issues a bill, notifies the stock room of the customer's purchases and brings the stock control accounts up to date. And by the time the customer has paid his bill, his goods are ready.

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DENTISTRY

Hot Light Beam Tried To Prevent Tooth Decay

► LASERS SOMEDAY may be able to glaze tooth enamel, thereby causing it to become resistant to cavities.

This possibility is indicated in preliminary research by Drs. Ralph H. Stern and Reidar F. Sognaes of the University of California at Los Angeles, School of Dentistry. They described their experiments at the International Association for Dental Research in Los Angeles.

The research suggested the possibility of using intense light beams not only for preventing dental cavities but also for repairing existing cavities.

The laser might be used to drill out the cavity and to fuse into it powdered dental enamel or porcelain. The result would be a tooth-colored dental restoration, fused solidly to the cavity walls.

The investigators emphasized their preliminary study was concerned only with effect of the laser on dental tissue and standard dental repair material.

Heat produced by the intense beam is apparently no problem. Temperature changes in underlying dental tissue, when surface enamel is exposed to the laser, appeared to be significantly less than that caused by the standard dental drill.

One problem is that tooth enamel, being a highly reflective substance, more readily "deflects" the laser beam, reducing its ability to be lased. Development of a low-reflecting cementing vehicle that could be placed in the area to be fused might solve this problem.

Future dental applications for lasers are expected to follow further advancements in fiber optics studies.

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CE FIELDS

DENTISTRY

Sea Salt, Not Olive Oil, Protects Greek Teeth

► FLUORIDE IN THE ROUGH, crude type of salt evaporated from sea water is believed responsible for the low amount of tooth decay in Greece. Olive oil, another indispensable part of the Greek diet, has now been tested and found to contain much less fluoride than Greek salt.

The fluoride content of sun-evaporated sea salt is about 40 parts per million, but olive oil was found to have as little as 0.36 ppm. Thus olive oil could not make any significant contribution to the fluoride effect on teeth, reported Dr. D. M. Hadjimarkos, Greek-born scientist now at the University of Oregon Dental School, Portland.

He had previously found the fluoride content of Greek teeth in Athens and Salonika to be high. This fact could not be related to drinking water in those cities, because the fluoride content of the water there is reported to be only 0.04 parts per million and 0.5 ppm.

Dr. Hadjimarkos said in *Nature*, 195:392, 1964, that protection against tooth decay may also be given in other parts of the world where the salt consumed is prepared by evaporating seawater.

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ENTOMOLOGY

Suffocation Used as New Weapon Against Insects

► SUFFOCATION is a new weapon scientists are using in the battle against insects.

A new type of nylon balloon house has been developed to provide an efficient answer to the age-old problem of preventing the destruction of stored crops by insects, a serious difficulty in all tropical countries. The airhouse is being field tested in India.

Made of nylon, it is a huge circular container, 66 feet in diameter, 22 feet high and capable of holding 500 long tons of wheat. A nylon floor is joined to the dome section. There are no doors and all seams and ports are as near airtight as possible when sealed.

After being pegged down in the usual way, the structure is inflated by a powerful fan unit. The grain is then blown in through a flexible pipe and falls from the top of the dome, forming a natural cone in the center of the airhouse. When full the perimeter of the cone just meets the angle between floor and dome.

The airhouse is then collapsed by expelling the remaining air and all ports are sealed. This has to be done with great care.

From previous experiments it is believed that the insect life in the grain will have used up all the remaining oxygen in about

two weeks and that thereafter the grain will remain completely sterile until required for use.

Removal is a simple reversal of the filling process. The airhouse is inflated; then a suction pipe is run through one of the inspection ports and the grain is sucked out.

Manufactured by the Gourcock Ropework Co., Ltd., of Glasgow, Scotland, the nylon airhouse was developed in cooperation with the Tropical Stored Products Center, one of a number of research organizations financed by the British Government's Department of Technical Cooperation, British Nylon Spinners and British Geon.

Dr. D. W. Hall, director of the Tropical Stored Products Center, believes that the cost of storage in structures of this type will prove substantially lower than in permanent installations such as are now in use. He points out that the PVC-coated nylon fabric also provides a completely weather-proof cover and can be moved easily from site to site as required.

Throughout the world the task of protecting foodstuffs in storage is tremendous and it is conservatively estimated that the overall losses amount to about 5%. In tropical countries they sometimes reach 70%.

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PSYCHIATRY

Psychiatric Training Called 'Malpractice'

► THE AVERAGE PSYCHIATRIST treating a severely disturbed person is like a doctor just out of medical school performing delicate brain surgery, a leading mental expert contends.

Dr. Lawrence S. Kubie of the Sheppard and Enoch Pratt Hospital, Towson, Md., told a group of specialists at the National Institute of Mental Health at Bethesda, Md., that the present way of training psychiatrists is "a form of medical malpractice."

The trouble with psychiatric training, as Dr. Kubie sees it, is its focus on hospitals. Hospitals get to see the patients only after their problems explode, and not while their troubles are simmering within.

Helping a severely disturbed adult is difficult—if not impossible—without an appreciation of the way he was before his psychotic attack, Dr. Kubie said.

"It is as though your whole training in medicine was going to be at the autopsy table.

"The training of the young psychiatrist should begin in the delivery room and go on until it includes an understanding of the early years, of adolescence and of young adulthood."

Dr. Kubie, in addition to training psychiatrists himself, edits the *Journal of Nervous and Mental Diseases* and is a professor of psychiatry at the University of Maryland School of Medicine, Baltimore, and a lecturer in psychiatry at the Johns Hopkins University School of Medicine, Baltimore.

He became interested in this cradle-to-grave approach to psychiatry when he noticed that the most able psychiatrists he was training had extensive experience with children and young people.

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MEDICINE

Tiny G Suits Advised For Premature Infants

► MINIATURE SPACE SUITS have been seriously suggested as garments for premature babies. The suit's counterpressure is believed to improve blood circulation.

Fringe benefits for the newborn from this country's men-on-the-moon project were seen by Dr. Mary Ellen Avery of Johns Hopkins Hospital, Baltimore, in studies of analogies to space travel, reported in the *Journal of the American Medical Women's Association*, 19:121, 1964.

Dr. Hubertus Strughold, chief scientist, U.S. Air Force Aerospace Medicine Division, Brooks Air Force Base, Texas, in the same issue, also pointed out similarities between life in the uterine capsule and life in the space capsule.

Weightlessness and the day-night cycle of sleep and wakefulness, called the "circadian" cycle, were compared in astronauts and infants.

Although a fetus is under the full gravitational force of the earth, it is "weightless" in relation to the surrounding fluids and tissues of its mother's uterus.

"If the gravitational force of earth were the same as that on the moon, one sixth of one G," Dr. Strughold said, "the baby would probably be able to run around within a few months."

However, a baby born in a moon station might first learn to swim and later to walk, he said.

The effect of excessive oxygen pressure on astronauts and babies was another comparison made by Dr. Avery.

Astronauts breathe 100% oxygen, but the symptoms of oxygen poisoning depend on duration of exposure and oxygen tension or pressure. These symptoms include chest pain, dizziness, convulsions, eye irritation, tingling and a fall in hemoglobin level with a rise in bilirubin, bile pigment.

Our knowledge of the effects of oxygen at altered pressure in the baby is all too meager, Dr. Avery said. She explained, however, that the warning we take from the U.S. Air Force studies is not to let the oxygen pressure in blood vessels get much above normal with respirators or hyperbaric chambers.

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GEOPHYSICS

Mountain Ridge Found Under Antarctic Ice

► DISCOVERY of a mountain ridge under the ice in Antarctica is reported by two scientists, Drs. Charles R. Bentley and John C. Behrendt, from the University of Wisconsin's geophysical and polar research center at Madison. Only the device they used, an air-borne instrument for measuring the earth's magnetism, could have detected the land mass.

Their exploration was supported by the National Science Foundation.

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