

TECHNOLOGY

New Leg Brace Allows More Natural Walking

► **POLIO-PARALYZED** patients can achieve more natural walking movements with a new, hydraulically controlled leg brace developed by John Bray of UCLA's Prosthetics Education Project of the University of California, Los Angeles, Medical School.

Located just above the ankle segment of the brace, the hydraulic cylinder acts as a shock absorber and helps to do the work of muscles which normally control the foot movements in walking.

The hydraulic action controls the "flail leg" characteristic of the polio paralysis victim and permits the wearer of the brace to duplicate almost the normal ankle and foot movement in walking. The ankle control contributes to stability at the knee.

The brace also incorporates a J-shaped hinge at the knee which enables the wearer to bend his knee, eliminating the stiff-legged walk previous braces have demanded.

The device, called a functional long leg brace, is now being made available for public use.

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BACTERIOLOGY

How Bacteria Eat Studied To Help Fight Diseases

► **KNOWING** how the tiny bacteria, half to a third of a millionth of an inch in diameter, eat and regulate their food intake may help in the fight against disease, including cancer.

Prof. Russell E. MacDonald, bacteriologist at New York State College of Agriculture, is making "a study of mechanisms regulating the passage of molecules across the cell membranes of bacteria."

In order for bacteria to grow, food must be available. If the bacteria in man or animal can be starved or kept from developing rapidly, white blood corpuscles can take over and destroy them. This would aid the fight against certain diseases.

The major problem is to deprive the bacteria of food without killing the animal.

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CONSERVATION

Air Cushion Craft Threaten Bird Life

► **HOVERCRAFT** that ride on a cushion of air over land and water with passengers or freight represent man's latest threat to bird, animal and plant life.

The British Government's Nature Conservancy fears that when these new-type vehicles begin to operate more widely, traffic will cross many difficult and previously inaccessible areas. Among these are tidal flats, shallow lagoons and rivers, which become bird and animal sanctuaries.

The air cushion vehicles may cause damage by disturbing roosts and feeding areas and damage vegetation such as reed beds by flattening them. There will also be the

temptation to harry birds or mammals, like seals, to provide passengers with a thrill.

These vehicles might in the future be used to establish camps in places at present inaccessible. They might be used to land groups of people, and possibly dogs, on islands with colonies of ground-breeding birds.

Officials of the Conservancy have made test journeys in air-cushion vehicles and decided that the crafts' spray and noise on a regular service need not be unduly disturbing if colonies of resting, breeding or feeding birds or other animals are not unreasonably approached.

"One can already foresee air cushion craft of motorcar or motorboat size, which would give poachers unrestricted mobility," E. M. Nicholson, director general of the Conservancy, said. "If we do not take steps now the craft could enable ill-advised projects of interference on our scientific sites to be rushed through with even less notice than at present. But we have no desire to embarrass the invention's development."

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GENERAL SCIENCE

Time Capsule Is Highlight Of New York World's Fair

► **A NEW** time capsule will be buried at the 1964-65 New York World's Fair.

Its purpose is to tell the story of the last 25 years to those living 5,000 years from now.

The capsule buried in 1939 holds records of culture up until then.

However, the 1939 capsule has no information about nuclear power, man in space, new drugs, satellites, television, the United Nations, the four-minute mile, World War II, the conquering of Mt. Everest, the discovery of the Dead Sea Scrolls and other events of the last quarter century.

For the 1939 capsule numerous authorities in the physical and social sciences chose the articles to be deposited for future generations. The capsule was buried 50 feet below the surface of a granite monument in Flushing Meadows Park, N.Y.

Included were 35 articles of common use—from a woman's hat to a slide rule, 75 samples of such materials as fabrics, metals and synthetics, and three and a half reels of microfilm explaining our arts, entertainments, religions, philosophies, education, sciences, technology and medicine. Messages from Drs. Albert Einstein, Robert Millikan and Thomas Mann to the generations of the future were also recorded on microfilm. A special "Book of the Record" was printed on permanent paper with special ink and widely distributed to insure that the capsule would be found. The capsules are supposed to be opened in 6939.

A duplicate of the original capsule, which has been sealed since 1938, will be opened and put on exhibit. Materials selected for the new capsule will also be on display.

A special committee of experts in the fields of science, industry and education will choose the contents of the new capsule. When the World's Fair closes, the new capsule will be deposited beside the old one.

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IN SCIEN

ZOOLOGY

New Laboratory Animal Used in Cancer Studies

► **STOMACH CANCER** research scientists in the U.S. are looking hopefully to a new laboratory animal for clues that will lead to progress in their work.

The African mouse has been imported from Johannesburg, South Africa, to help researchers study one of the most common cancers, Dr. L. C. Strong of the Roswell Park Memorial Institute biological station in Springville, N.Y., told SCIENCE SERVICE. It is one of the few animals besides man that develops stomach tumors. In Johannesburg the mouse has been used to study the black plague.

The animal, *Rattus (Mastomys) natalensis*, is intermediate between a mouse and a rat. It is a cereal eater and produces large litters.

To prevent the animal from escaping and becoming a rodent pest in the U.S., it is kept under lock and key, Dr. Strong said. The Roswell Park laboratory and the National Cancer Institute, Bethesda, Md., are the only two places where the animals are kept in this country. In order to use the African mouse for a research project, a scientist must obtain a license.

None of the animals at the Roswell Park laboratory has developed cancers because they are thought to be too young. Chromosome studies of normal animal cells have been reported in the Journal of Heredity, 53:95, 1962, by Dr. Strong and Dr. C. C. Huang, also of Roswell Park Memorial Institute.

Current research is being undertaken at Roswell Park to study the chromosome structure of cells in chemically induced tumors.

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EDUCATION

Engineers With Advanced Degrees Are Increasing

► **THE FASTEST** growing segment of the academic population is the engineer group with advanced degrees.

The rate of increase of students receiving doctorates in engineering during the past seven years is three times greater than the increase of advanced degrees in all other fields, announced the U.S. Department of Health, Education and Welfare.

In 1962 the number of Ph.D.'s awarded in engineering was about 1,200, almost 28 per cent greater than the previous year. In the M.A. category 9,000 were awarded in 1962, an increase of nearly nine per cent.

On the undergraduate level, the number of engineering students is declining slightly.

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CE FIELDS

GENERAL SCIENCE

Funds for Research and Development Increased

➤ ALMOST one-third more will be spent for research and development by the Government during the fiscal year ending June 30, 1963, than in 1962.

Nearly \$14.7 billion is being invested in military, space, atomic energy, health and welfare during the year ending June 30, 1963. Of this, an estimated \$4.5 billion is for research, \$8.5 billion for development, \$1.6 billion for facilities and \$100 million for scientific and technical information.

The spending figures were obtained from a survey by the National Science Foundation, in cooperation with other Federal agencies, of 27 agencies. Four of these—Department of Defense, National Aeronautics and Space Administration, the Atomic Energy Commission and the Department of Health, Education and Welfare—account for 95 per cent of the total estimate for fiscal 1963 research and development.

About four-fifths of such Federal funds are for support of work outside the Government.

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MEDICINE

Arrow Poison Used Conditions Drinking

➤ A PARALYZING drug long used by South American Indians to tip their poisoned arrows now is being mustered into the fight against alcoholism.

If it proves successful, the drinking man who talks about "getting paralyzed" will not be joking.

First experiments by three Canadian scientists show promise that temporary paralysis, brought on by the drug, "Scoline," may be effective in conditioning alcoholics to avoid alcohol.

Scoline, which is similar to the curare poison Indians make from bark, causes a nerve-muscle block. In the Canadian tests it was used on five persons in conjunction with a sound signal. For a brief period all of the persons were unable to move or breathe, although they remained fully conscious.

When the sound signal was repeated on various occasions later, without using the drug, the five persons showed measurable signs of an "anxiety" response associated with their earlier harrowing experience.

Alcoholics presumably could be conditioned to respond in a similar way to a drink.

The Canadians, R. E. Sanderson, Dugal Campbell and S. G. Laverty, of Queen's University, Kingston, Ontario, came upon Scoline in their search for a means for bringing about a traumatic experience that would not cause permanent injury to human

subjects.

In the past, drugs that cause vomiting have been used in similar "conditioning" of alcoholics, but have not proved entirely satisfactory.

Unlike other conditioning procedures, which tend to wear off in time, conditioning based on a traumatic experience such as paralysis actually appears stronger several weeks later than just after the first test. This tends to support what many doctors have noted: that anxiety may be a permanent consequence of a really perilous experience, the Canadians believe.

They told of their experiment in *Nature*, 196:1235, 1962.

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BIOLOGY

Trout Repopulation in Great Lakes Speeded

➤ NATURE seems to be speeding up reproduction processes to help repopulate the Great Lakes with lake trout.

Reports made to the Great Lakes Fishery Commission at a meeting in Ottawa showed that the fish are spawning about two years younger than fish biologists consider normal.

The lake trout population of the Great Lakes has been almost wiped out by sea lamprey attacks, except in Lake Superior, where only breeding stock remains. But the lamprey are being brought under control in Lake Superior and restocking of lake trout will soon begin on a large scale. Lamprey control measures are also beginning on the other lakes.

In a Lake Superior study, it was found that whereas in 1950 the youngest spawning male lake trout was eight years old and the youngest female trout with eggs was nine, in 1962 four similar males were found at the age of four and females in the seven- and eight-year age class contained eggs.

Because of the present scarcity of the trout, these comparisons are only an indication of a possible trend toward younger spawning.

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MEDICINE

Prefer Blood and Plasma In Treatment of Shock

➤ THE COPIOUS use of blood and plasma or a suitable plasma substitute was emphasized at Philadelphia in the treatment of shock, a condition that may lead to death following blood loss, severe injury, infection or emotional factors.

Dr. Richard C. Lillehei of the Department of Surgery, University of Minnesota Hospitals, Minneapolis, told the Eighth Hahnemann Symposium on Medical Considerations in the Surgical Patient that he abhors the use of vasopressor agents (drugs that cause constriction of blood vessels and a rise in the blood pressure).

Dr. Lewis C. Mills of the Hahnemann Medical College and Hospital, Philadelphia, said that vasopressor drugs had been used by many physicians to increase blood flow to various vital organs, but that blood flow may, in fact, decrease. If such a drug is used it should be carefully assessed, he said.

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TECHNOLOGY

Sintered Circuits Are Cheaper, More Durable

➤ NOW CIRCUITS for radio and television sets are sintered instead of printed.

In a new technique developed by the Bell Telephone Laboratories, copper powder is heated into a solid mass without melting and is mechanically bonded to a plastic base, forming a conducting circuit known as the sintered circuit. The plastic base holds the conductors in place and acts as a support for other circuits or components. The circuit can be easily automated.

Up to the present time conducting circuits have been made by chemical etching of copper foil and bonding this to the insulating base with adhesives and also by spraying and electroplating. These methods are limited because of die problems and deterioration under high temperatures.

In producing the sintered circuit, grooves machined in the die are filled with copper powder and sintered into place at a high temperature. The circuit is then pressure molded to the plastic to form a strong mechanical bond.

Since this technique does not involve photographic processing, chemical etches or grinding off of unwanted material, it is simpler and less expensive.

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GEOLOGY

Nile Expedition Finds Ancient Climate Clues

➤ THE NILE has provided a clue to ancient climate changes.

A section of the middle Nile Valley scheduled to be submerged when the Aswan Dam is built has given information about the river's fluctuations as far back as 25,000 years ago.

Indications are that the periodic floodings and recedings of the Nile follow world sea-level variations. Both are in phase with changes of solar radiation. The work on ancient climates is important in predicting the weather of the future over a long-range period.

A U.S. expedition measured the ages of silt deposits by radiocarbon dating of marine animals. Silt deposits were greatest during periods of little rainfall. The oldest silts are probably 25,000 years old. Studies indicated that the present level of the Nile was reached 5,000 years ago. It is thought that there have been long periods of high and low Nile floods.

The Mesolithic and Neolithic artists portrayed a varied fauna life north of the Nile from 7,000 years to 11,000 years ago. It is thought that the animal life migrated from Egypt, which was going through a period of heavy rainfall with seasonal monsoons during this period.

The expedition was headed by Prof. Rhodes W. Fairbridge, Columbia University, New York, who reported its findings in *Nature*, 196:108, 1962. It was sponsored by the National Science Foundation.

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