

## TECHNOLOGY

**First Section of Atom Smasher Successful**

► **SUCCESSFUL OPERATION** of the first four-inch superconducting linear atom smasher section has been achieved by scientists at Stanford University, Stanford, Calif.

This brings a step closer to reality the exploiting of superconductivity to make a new kind of high-energy accelerator that would be the most efficient, powerful and versatile ever built.

The new superconducting accelerator is similar in design to Stanford's linacs, or linear electron accelerators, largest of which is a two-mile machine now under construction. Atom smashers are used to bombard atomic nuclei in efforts to learn more about the fundamental characteristics of matter.

The four-inch section, called a "cavity," is a cylindrical chamber surrounded by liquid helium in which the electrons are accelerated. The cavity was operated by H. Alan Schwettman, Dr. Perry B. Wilson and Dr. William M. Fairbank.

The role of the cavity is to trap as much as possible of the input energy, which is microwave radiation, and make it available to accelerate atomic particles.

The Stanford experiments proved that a superconducting linac is feasible and now they hope to build one big enough for nuclear research, estimated to take some five years.

If it can be developed to its full potential, the new accelerator would:

1. Produce a stream of high-energy electrons, instead of the short bursts of conventional linacs.
2. Generate several times the energy of today's linacs for any given length.
3. Produce electrons with very close to identical energies, important to scientists for comparing particle reactions.

Superconducting technique could be applied to a great variety of atom smashers, including proton linear accelerators, synchrotrons or particle separators.

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## BIOTECHNOLOGY

**High Pitched Sound Measures Unborn Child**

► **SOUND WAVES** too high pitched to be heard can measure the size of an infant's head before birth, and thus eliminate the danger of X-ray damage.

Knowing an unborn baby's head size permits doctors to judge whether a woman can have normal birth, Dr. Barry Goldberg of Albert Einstein Medical Center, Philadelphia, told the Radiological Society of North America in Chicago.

Ultrasound measurement is as accurate as an X-ray picture and avoids the dangers of radiation, he said, reporting tests with 300 births.

Once doctors know the fetus' head size, they can estimate its body weight, which is particularly important if the mother has diabetes, a weak heart or some other condition likely to complicate labor. Weight is

also used to indicate when an unborn child is mature enough for cesarean delivery.

Weights were predicted within half a pound for 80% of the sample group. The researchers were able to judge head size to within 1.4 millimeters of the size following birth.

A group of 75 babies was measured during the Philadelphia experiment. An instrument vibrating on a pitch too high for the human ear sent pulsations of sound through the mother's abdomen to the child's skull. The different echoes produced by flesh and bone were then recorded. By using an oscilloscope, "picturing" the echoes, the skull's diameter was determined.

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## ZOOLOGY

**New Studies Planned For Animal Behavior**

► **THE BEHAVIOR** of birds, bats and other animals will be closely studied in a newly-created Institute for Research in Animal Behavior, to be conducted jointly by the New York Zoological Society and the Rockefeller University.

The Institute will be headed by Rockefeller's Dr. Donald Griffin, known for his studies on bird navigation and the effects of the sun and stars during migration.

Living animals will be studied under near natural conditions in the University laboratories with the use of research facilities of the Zoological Park, Aquarium and Trinidad Station of Zoological Society, it was announced.

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## GENERAL SCIENCE

**Lemur May Be Stand-In For Human Allergy Tests****See Front Cover**

► **A TINY RELATIVE** of the monkey may some day come to the aid of hay fever sufferers.

This unusual animal, seen on this week's front cover, is an African lemur and may be the ideal test animal for diagnosing human allergies.

Someday the bush baby may be taking "scratch tests" for hay fever victims to indicate the source of allergy, thus sparing the patient the risk of developing a reaction to test allergens, or becoming sensitized to substances he would not otherwise have encountered.

In connection with studies of allergy induced by castor bean meal, Dr. L. L. Layton of the Department of Agriculture's Agricultural Research Service, shown holding the lemur, developed an allergy test about two years ago using monkeys as stand-ins for humans. He injected the serum of allergic persons into a monkey's skin. Twenty-four hours later, the animal was injected with blue dye and then given injections or scratch tests with the suspected allergens. If the patient was allergic to any of the allergens, the sensitized site on the monkey's skin turned blue.

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## TECHNOLOGY

**Ground Glass Lubricant For High Temperature**

► **GROUND GLASS** is anything but a lubricant. Nevertheless, that is what North American Aviation has made of it.

Concocted of gritty glass and lubricating ingredients, the substance is baked on bearings to withstand temperatures in excess of 600 degrees F. It is the first such "dry film" lubricant to stand up under temperatures generated by the XB-70 supersonic bomber, claims North American.

In addition to aerospace applications, the lubricant, trade named "Vitrolube," can be used to protect moving parts in automatic weapons.

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## CHEMISTRY

**NAS Urges Increase In Chemistry Program**

► **MORE MONEY** and increased effort in all fields of chemistry will bring "unforeseen major discoveries," the National Academy of Sciences reported in Washington, D.C.

The discoveries could range from synthesis of new drugs and improved insecticides and fertilizers to better methods of preventing corrosion and the development of chemicals for war and riot use that disable temporarily without causing permanent injury.

To achieve such "significant progress" in the many fields of chemistry, a 15-member committee of the National Academy of Sciences-National Research Council called for a 25% increase in support of chemical research during the next three to four years. This would bring the total from today's \$50 million per year to \$120 million by 1968.

The panel on the Survey of Chemistry recommended that this broadened base of financial support should come both from public and private sources. The panel said that the expanding horizons of chemistry should not be limited, as they are now, by inadequate financing of basic research.

U.S. chemistry is in a period of rapid advance, due in large part to the effective application of new theory and powerful electronic tools of analysis, including computers.

Dr. Frank H. Westheimer of Harvard University is chairman of the panel. The study is one of a series being made under National Academy auspices to provide an overall perspective on research needs and opportunities within major areas of science.

The 220-page report, entitled "Chemistry: Opportunities and Needs," is available from the National Academy (\$5.00).

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# CE FIELDS

## OCEANOGRAPHY

### Wave Forecasters Will Help Hovercraft Services

► WAVE CONDITIONS in the English Channel are being forecast by Britain's National Institute of Oceanography for the benefit of future hovercraft services between Dover and Calais.

The Institute has taken a year's data on wind speeds and directions in the Channel and from this is working out a "profile" of wave heights and speeds to be expected during a year. The information is being passed on to Hovercraft Development, a government-backed organization exploring the possibilities of hovercraft.

To check its results, the Institute is currently recording wave data between Dover and Calais that will help both in designing suitable hovercraft and in operating the craft across the Channel.

The data may also be useful in investigating the construction of a Channel tunnel. One of the suggested schemes is to dig a groove in the seabed in which to lay a sunken tube. The sections of the tube would be lowered to the ocean floor from surface vessels.

Accurate forecasts of wave conditions would make it possible to calculate how many days' work might be lost because of rough seas and thus make the economics of such construction more precise.

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## SPACE

### Space Goals for Next 20 Years Should Be Set

► THE UNITED STATES should plan now for its space goals in 1985, the American Physical Society meeting was told at Los Angeles, Calif.

Plans for putting a man on the moon, Project Apollo, are complete and much of the equipment for the scheduled 1969 lunar landing is already being built. However, very little has been done concerning programs following Apollo, Dr. Gordon J. F. MacDonald of the University of California's Institute of Geophysics and Planetary Physics charged.

A manned mission to Mars, he said, is very likely to be the next national space goal unless the public is given "exciting alternatives."

Such a Martian mission does not contribute to solving any of the "rich variety of problems for which space probes could so profitably be used."

Dr. MacDonald urged that the delivery system and the spacecraft be designed for specific space experiments, rather than regarding experiments as "necessary nuisances" to be added after the system and vehicle are designed.

The space program, Dr. MacDonald said,

sets the image for basic science in the U.S. If such glamorous technological achievements as placing a man on the moon are confused with fundamental science, then the latter will suffer both in terms of long-range public support and in its ability to attract gifted individuals.

Dr. MacDonald reported that there are three principal areas of science to which the space program can make major contributions. These are the physics of the lower atmosphere, such as involved in weather and auroras, the origin and evolution of the solar system and the nature of the universe.

The greatest potential for space research is in astronomy, he stressed.

The earth's atmosphere has limited man's view of the universe, but satellites and space probes open up a new window for scanning the cosmos.

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## BIOLOGY

### Life May Have Begun Without Preexisting Life

► THE IDEA that life began spontaneously without preexisting life has been advanced again. Dr. Sidney W. Fox, director of the University of Miami Institute of Molecular Evolution, advanced the theory at a conference on Elementary Biological Systems and Biogenesis held in Paris.

The opposing theory, that life can rise only from life, also was discussed.

To a layman, the scientists seemed to be talking about the old question, "which came first—the chicken or the egg?" But Dr. Fox put the query in terms of cells or protein.

Dr. Fox made no pretense of having produced life in a flask in his laboratory, although experiments there have produced amino acids of the kind found in proteins and their polymers, and nucleic acid compounds, called nucleotides. These are among the principal molecular components of the living cell.

Dr. Fox said that there is a growing body of evidence supporting the theory of spontaneous generation, which holds that life can spring from natural combinations of compounds on the earth.

Catalytic activities, he said, have been observed in synthetic molecules, pointing to the theory that the nonliving enzyme preceded the living gene.

"The studies to which our laboratory has devoted major attention," Dr. Fox said, "are those which can explain the origin of biopolymers in the absence of cells and in the absence of the chemist, and the spontaneous conversion of the polyamino acid type of such polymers in the first cells."

He said the requirements for formation of polymer and microscopic units are no more specialized than a condition of rain falling on volcanic zones.

"Consistent with Louis Pasteur's analysis," the biochemist stated, "we can say at the experimental level, that studies since 1959 have demonstrated how abiotic, or pre-life, matter is also of appropriate origin and molecular structure."

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## CONSERVATION

### Russian Wildlife List Shows Animal Research

► RUSSIA IS MAKING ECONOMIC and scientific use of its bees, sables, beavers, tigers and lotuses, as well as its minerals, medicinal plants and beautiful nature areas.

The first English translation of the Soviet publication, "Game and Wild Life Preserves in the U.S.S.R.," describes how rare and useful animals, plants and other resources are protected in 66 game preserves.

In about 10.7 million acres of living laboratories, species such as the exploited European bison are being restored, the rare Ussuri tiger and the fragile lotus are being protected, honeybee areas are being set aside, rich fishing industries are being encouraged, and imposing granite columns and virgin, treeless steppes are being preserved and made available to sightseers.

The acreage of land where these conservation projects are being carried out is about 0.2% of Russia's total area. Five times that percentage is set aside for wildlife preserves in the United States—1.0% according to the booklet, edited by Dr. and Mrs. Henry Field working out of Peabody Museum of Harvard University. In Czechoslovakia, 1.13% of the land is devoted to wildlife, 1.5% in the Netherlands, 1.8% in Canada, 4.0% in Great Britain and 4.22% in Japan.

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## PUBLIC HEALTH

### Milk-Drinking Could Affect Artery Clogging

► HEAVY MILK-DRINKING among teenagers, with other uses of animal fats beginning in childhood, could play an important part in the early development of clogged arteries, or atherosclerosis, a prominent heart specialist said in New York.

Dr. Paul Dudley White of the Harvard Medical School, who has investigated this type of heart disease not only in the United States but in Japan, Italy and Greece, told a symposium sponsored by St. Barnabas Hospital that children inherit an environment that can harm them as much as gene inheritance.

If a father and mother eat too much rich food, smoke too much and are exposed to constant stress without any exercise, it is likely that children's habits will be similar, thus leading to early illness.

Other points stressed by the heart specialist included his belief in the value of exercise, which he sees as producing muscular metabolism.

"Since drugs so often have harmful side effects," he said, "it would seem that we should rely more on muscular metabolism."

Stress can bring on a severe attack of angina pectoris, or chest pains, and even sudden death, he pointed out, but its immediate relationship to coronary thrombosis and damage of heart muscle is less clear. He repeated a former statement that "stress is life and you had better enjoy it."

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