

## MEDICINE

**Space Test Volunteers All Develop Anemia**

➤ SPACE TEST volunteers exposed to pure oxygen in a 30-foot altitude chamber during four two-week periods developed anemia but remained otherwise healthy, a "space environment" scientist said.

This tendency to anemia, the Aerospace Medical Association meeting at Los Angeles was told, could represent "potentially serious or disabling" conditions during longer periods or in combination with other stresses of space flight.

Dr. William M. Helvey, chief of the space environment and life sciences laboratory at Republic Aviation Corporation, reported on a study to determine the effects on man of prolonged exposure to an artificial environment without nitrogen at simulated altitudes. It was made for the National Aeronautics and Space Administration.

During confinement, each of four groups of male volunteers put in a 10-hour day performing a total of 683 physiological and psychological tests. They were monitored around the clock by physicians, psychologists, environment engineers, biochemists and other scientists. Medical specialists from Columbia University, Brookhaven National Laboratory and the Lovelace Foundation aided the Republic staff during the study.

Although the health and morale of the four groups remained high despite the development of anemia, Dr. Helvey said the exact mechanism of the blood abnormalities and the significance of the relative absence of nitrogen require further investigation.

He recommends special blood tests and exposure to pure-oxygen atmosphere as a part of an intensified screening of astronauts scheduled to make prolonged orbital missions.

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## ZOOLOGY

**Zoo Population Increase Affects Animals' Hearts**

➤ ANIMALS, too, become tense from having too many fellow creatures around.

A population increase at the Philadelphia Zoo has intensified the animal social interactions, and created more heart diseases and heart attacks, Prof. Herbert L. Ratcliffe, University of Pennsylvania Medical School, believes.

Man may be reacting against greater population pressures in much the same way, he stated in *Circulation*, journal of the American Heart Association.

During the past eight years, Prof. Ratcliffe has observed a ten-fold increase in heart disease among mammals at the zoo. Animals died from heart attacks during this time, he observed, although there had been no deaths from this cause prior to 1955.

These increased heart problems resulted from more complex living conditions, as more and more animals were added to the zoo's collection.

About five years before the increase in

heart disease became evident, zoo officials set up a program to assemble and maintain breeding pairs and groups of many mammal species. As the animal pairs matured, bred and raised their young, relationships among all members of exhibition groups became more and more complex.

These same complex population problems are creating pressures in man, Prof. Ratcliffe believes.

The intensified social and economic pressures that accompany urban density may be an important underlying cause of hardening of the arteries in man, leading to heart attacks, strokes and other circulatory diseases.

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## SOCIOLOGY

**Suicide and Jobless Rates Closely Related**

➤ UNEMPLOYMENT and suicide rates are closely related.

When unemployment rises, there are more suicides; when unemployment goes down, the suicide rate decreases. This relationship held during the 30-year period from 1929 to 1959, particularly for the years after World War II. It applies to white males in the 45- to 54-year-old bracket. A British study for the years 1923-47 shows the same results.

It has been known that suicide rates vary with social conditions, but these new figures indicate unemployment is the specific economic condition most directly related to suicide rates.

Unemployment may be the main cause of suicide, Drs. Brian MacMahon and Thomas F. Pugh of Harvard University School of Public Health, Boston, and Dr. Samuel Johnson of the University of Colorado School of Medicine, Denver, have found.

Suicide rates reached a peak in the depression years, when unemployment was at its highest, then declined during World War II. They climbed after that war for older males. The younger men, returning from the battlefields, were successfully competing for the jobs the older men held, the scientists said.

As men get older, suicide rates increase. For women, however, the rate reaches a peak when they are in the early fifties, then declines.

This difference exists in only a few other countries, and may reflect pressures peculiar to the U. S. social system.

Although suicide rates for Negroes are generally lower than those for whites, in this country, the rate for Negro males up to age 35 living in the North is just as high as the rate for whites, the doctors reported in *Public Health Reports*, 78:285, 1963. The Negro meets different social and economic pressures when he moves to the North, they said.

They indicated that men are particularly responsive to social pressures because their jobs are such an important part of their lives. Being unemployed puts great stress on a man, and may be the reason why suicide rates go up when jobs are scarce.

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**IN SCIEN**

## DENTISTRY

**Dental Pool Treats Midnight Toothache**

➤ RELIEF is in sight if you wake up in the night with a sudden unbearable toothache.

The way to handle the problem is with an "emergency referral service." This is in operation in Chicago.

Dr. Harold H. Epstein, chairman of the Chicago Dental Society's emergency dental service committee, told the National Dental Health Conference at Chicago that in about nine months the 700 participating dentists in the Chicago metropolitan area had taken about 2,200 emergency calls.

In some cases the dentist can prescribe relief over the phone so a trip to the office can be postponed until regular hours. The society maintains an around-the-clock telephone answering service that either puts the caller in touch with his own dentist or refers him to one of the dental pool.

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## TECHNOLOGY

**Spiders Out of Business In Today's Rocket Age**

➤ IT'S BACK to the rose bush for space-age spiders.

A new development for etching extremely fine lines directly into glass has put many a spider out of work in the optical instrument business.

For years spiders were busy spinning webs for industry. Their fine threads, especially those of the black widow, were used for delicate cross-lines in optical instruments.

But now finer tolerances are needed for aligning parts of space vehicles, and the ancient spinner must take his natural occupation back to the garden.

Cross-lines are being etched in optical glass to precise measurements from 100- to 120-millionths of an inch in diameter—while dame spider spins threads in thicknesses of 70- to 100-millionths of an inch.

Etched lines have replaced spider threads in all but two of the 46 optical sighting instruments for aligning many parts of the giant Saturn space vehicle booster, report scientists at Chrysler Corporation's Space Division in New Orleans.

In new sighting techniques for space instruments, a light is beamed through the cross-lines in the optical instruments. The same lines reflected from a mirror are lined up exactly with each other. Just as images are superimposed in a range-finder, the etched lines in the glass are superimposed.

Spider webs are almost impossible to reflect through a mirror because of their microscopic construction, explained engineers at the Space Division. The etched lines, however, are sharp and clear.

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# CE FIELDS

## VITAL STATISTICS

### Death Rates Show Inequality of Sexes

► DEATH RATES show the inequality of the sexes and that the inequality is increasing.

In the United States a female's life expectancy at birth is more than six years longer than a male's.

The death rate for males has climbed above the rate for females since the 1930s. If the trend continues at its present pace, there will soon be two male deaths for every one female death, population officials reported in Philadelphia.

"Rarely in the history of man have mortality rates for males so greatly exceeded those for females," they told the meeting of the Population Association of America.

To explain this fact by pointing to "an inherent superiority of the female" in inherited and hormonal makeup is unfair, because the difference in death rates for the sexes began just a few decades ago. Therefore, it cannot be explained in terms of innate biological differences. Figures on death rates in the United States and in England-Wales from 1900 to 1957 show the sex mortality differential is recent, Dr. Phillip E. Enterline and Nicholas E. Manos of the U.S. Public Health Service reported.

"Environmental agents," common to the U.S. and to England-Wales, have contributed to the increase of male deaths over female deaths, they explained. These agents are seen in the rising male mortality rates for cancer, heart disease and high blood pressure diseases. These diseases accounted for more than 70% of the increase in the U.S. and 80% of the increase in England-Wales.

A rise in deaths for the 45-to-64-year-old age group accounts for the sex difference in both places. The rate of increase of male over female deaths "shows no sign of diminishing," they reported.

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## MEDICINE

### Immunity Seen Possible To Snail-Carried Disease

► SCHISTOSOMIASIS, which affects up to 200 million people in various parts of the world, can be resisted by animals, and probably by man. Schistosomiasis, called bilharziasis in Africa, is spread by snails.

Immunity to such parasites as the schistosomes is a complex affair, Dr. Elvio H. Sadun of Walter Reed Army Institute of Research, Washington, D.C., reported in New York.

This is because the microorganisms go through developmental phases that change their forms and functions drastically, he told the New York Academy of Sciences' conference on host-parasite relationships.

Dr. Sadun found that animals exposed to irradiated trematode worms in the second phase of cycle growth, called cercariae, may develop antibodies to kill the worm eggs in spite of the fact that they were not exposed to the eggs at all.

Dr. Sadun reported success in inoculating animals with ground-up infected worms, but he said the success with artificial immunization was less marked than when the animals were infected experimentally with the disease.

Rabbits, monkeys and mice developed an acquired resistance to *Schistosoma japonicum* following a previous exposure to the same parasite. Similar results were obtained in rats exposed to *Schistosoma mansoni* a second time. Evidence of protection by infection with the related schistosomes has also been shown in experimental animals.

Like most parasitic diseases, schistosomiasis has a cycle of reinfection. Drinking the infected water, swimming in it, or even stepping into it may bring persons into contact with snails that harbor the germs.

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## VIROLOGY

### Virus-Like Substance Causes Leukemia

► DISCOVERY of a tiny virus-like substance that causes an exceptionally infectious and deadly form of leukemia in mice was reported by a University of Chicago scientist.

Dr. George B. Humphrey said L4946 lymphatic leukemia in mice is caused by a highly infectious agent smaller than the viruses known to cause other forms of leukemia in these experimental animals.

He transmitted the disease to healthy mice by injections of abdominal fluid from mice with leukemia. But all cells were removed from the fluid, so the disease was not caused by malignant cells. The virus-like substance was smaller than a cell.

The fluid contained protein and ribonucleic acid, or RNA, and injections of small amounts of both into healthy mice also caused leukemia.

When the fluid was whirled in a centrifuge with a force that would cause known mouse leukemia viruses to drop out as a sediment, it remained clear and kept its power of infection. The L4946 leukemia infectious agent is sensitive to heat and cold, and can be made inactive by heating or chilling to temperatures that would not affect the other known viruses.

This form of leukemia, Dr. Humphrey told the Federation of American Societies for Experimental Biology meeting at Atlantic City, N. J., has these advantages for research over other forms of mouse leukemia:

1. It infects adult mice, although some forms can be transmitted only to newborn animals.

2. It can be transmitted to more strains of mice.

3. It is fatal more than 95% of the time within 20 to 30 days after injection, although some forms of leukemia in mice take several months to develop or have a much lower death rate.

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## MEDICINE

### Formation of Gallstones Triggered by Imbalance

► THE DISCOVERY of how gallstones begin is seen as a breakthrough in research to find ways of preventing the disease.

Studies with humans as well as with guinea pigs at the University of Utah show for the first time what triggers the actual initial formation of gallstones.

The abnormal bile acid that causes gallstones is ornithocholic acid, the Federation of American Societies for Experimental Biology meeting was told at Atlantic City, N.J. This acid results from joining together of ornithine, an amino acid found in the human liver, and each of the cholic acids that compose normal bile acid.

Drs. Ludvik Peric-Golia and Russell S. Jones found that ornithocholic acid upset the balance of the bile's normal cycle through the digestive tract, and thus caused a chemical reaction that started gallstones.

A severe infection from the *Klebsiella bacillus* causes the formation of ornithocholic acid in the bile, thus interfering with the normal chemical balance that maintains cholesterol in solution.

Because of this imbalance, some of the cholesterol precipitates out of solution and joins with some pigment to form the nucleus of a gallstone. This usually triggers an inflammation of the gallbladder and from then on, the Utah scientists said, the situation is comparable to the formation of a pearl in an oyster. When the "grain of sand" is deposited, continuing irritation causes the development of the stone.

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## DENTISTRY

### Dentists Treat Elderly With Portable Equipment

► NEW PORTABLE equipment is now bringing the dentist into the homes of elderly or chronically ill persons too weak to make office visits.

Just as dentistry has become a part of hospital services, Dr. John W. Collins of Cleveland told the National Dental Health Conference at Chicago, it should become an integral part of home health care.

In a recent study, about 60% of the aged and chronically ill in Kansas City nursing homes and private homes were found to be treatable and needed care.

Applying this rate to other cities in the U. S. where 400,000 live in nursing homes, about 300,000 are in home care institutions and one million are ill at home, Dr. Collins estimated an enormous need for home care.

Dr. Collins, who is director of the Cleveland Dental Home Care program, said such a program can be more successful if it is coordinated with other health agencies. The Cleveland project is affiliated with a county long-term illness hospital, a school of dentistry and with the Visiting Nurse Association's home care program.

One-fourth of the dental schools in the U. S. are including home care in their curriculums, and young dentists are showing increasing interest in such training.

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