

GENETICS

Space Changes Heredity

► **CHANGES IN HEREDITY** of organisms can occur from space flight, Soviet scientists reported at the Third International Space Symposium in Washington, D. C. However, the adverse physical effects in men and dogs who have orbited for short periods in space do not appear to be permanent or pathological in nature.

Dry onion seeds orbited in space grew faster than their earth counterparts. A significant acceleration of the processes of cellular division was revealed in sprouts of pea, corn, and wheat seeds carried aboard the Soviet spaceships. Genetic effects observed in orbiting fruit flies showed gene mutations to be 10 times that of a control group. Chromosome changes in the marrow cells of mice who had orbited appeared in about 10% of the cells examined as compared to three percent in the control animals. In dogs, however, the changes were not pathologically significant. Strelka, for example, had two healthy, normal litters following her space flight.

Plant and animal experiments in space in each instance were compared with a control group that had been subjected to all the physical stresses of space except for the flight itself.

Biochemical changes were evident in the blood, urine, and nervous system of rats, dogs and mice following flight; but the variations disappeared after some time. However, in these animals conditioned reflexes resulting from their attempts to adjust physically to weightlessness were apparent, in some instances, for several days after return to earth.

Both Cosmonauts Gagarin and Titov experienced unusual sensations during weightlessness. Gagarin's flight lasted 108 minutes; but the sensations were not severe enough to hamper the performance of his duties in space.

Titov, during the transition from active flight to the glide into weightlessness reported a temporary illusion of being upside down. This was followed by giddiness and nausea which intensified when he moved his head.

His appetite suffered and his first sleep was restless. "There are reasons to believe that giddiness, nausea and the decrease of appetite were the results of the change of the activity of the nervous regulatory mechanisms which appeared under zero-gravity (weightlessness) due to the interaction of a number of different systems," the Soviet scientists said.

Titov's discomfort lessened when he limited his head movements. Sleep reduced the discomforts further. They disappeared completely with the onset of extra gravity stress which accompanied his return to earth.

Soviet Academicians V. V. Parin and O. G. Gazenko reported on the Russian biological space program. On the basis of USSR studies, they urged the necessity for further study of the influence of protracted weightlessness, of the biological action of space radiation, of the effects of excess gravity after prolonged stay in weightlessness and of the entire spectrum of space flight factors, including emotional strain.

• Science News Letter, 81:326 May 26, 1962

ASTRONOMY

Meteorite Dust Hazard

► **SPACE TRAVELERS** will be in less danger from micrometeorite hits on Mars than on the moon although Mars is more than 500 times farther away from earth.

The rate at which big meteorites are chewed up by bombarding tiny meteorites has been measured and it shows that there is less meteorite dust around and beyond the planet Mars than near the earth. This dust can penetrate aluminum sheeting and is a potential danger to space travelers.

Dr. Fred L. Whipple, Smithsonian Astrophysical Observatory, Cambridge, Mass., told *SCIENCE SERVICE* that the meteorite dust hazard anywhere in the solar system is greater near the moon surface because such dust hits the lunar surface and "kicks" up other particles already lodged there. This happens because the moon has no atmosphere like the earth's to act as a shield.

Dr. Whipple reported to the International Space Science Symposium's Committee on Space Research (COSPAR) in Washington, D. C., that measuring the argon-38 and argon-39 content in meteorites will give the rate by which big meteorites dwindle into little ones and in time become the

meteorite dust that destroys other big meteorites.

The erosion rate shows that stony meteorites dwindle ten times faster than iron meteorites and fragments from comets dwindle ten times faster than stony meteorites. It would take about 20,000,000 years for tiny meteorites to wear off an inch thickness of a larger iron meteorite and 2,000,000 years for a stony meteorite.

Meteorites, "space travelers" of unknown source, travel around the sun in an orbit beyond Mars and in an earth orbit before striking the earth.

The erosion rate of the meteorites shows there must be fewer of these dust particles around Mars and beyond. This was deduced from measurements taken of meteoritic dust "close" to earth by rockets and satellites. If there were as many dust particles close to Mars, meteorites would be destroyed faster on their travel in the solar system than has been measured.

Dr. Whipple said meteorite dust is abundant close to earth because the dust is knocked off the moon by other meteorites.

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Explore Solar Flares

► **MAN-MADE** radiation on earth has resulted in the development of new knowledge and techniques for exploring solar radiation with satellites in outer space, Dr. Herbert Friedman of the U. S. Naval Research Laboratory said in an interview at the Third International Space Symposium in Washington, D. C.

Spectrographs used to measure the temperature and density of gases in nuclear reactors will be used in an Orbiting Solar Observatory (OSO), to be launched next year, to measure the temperature and density of gases from solar flares. This OSO will permit scientists for the first time to study the full spectrum of solar flares that may yield clues to the flare's origin.

Solar flares are the emission of high energy particles that appear to explode or flame out from the surface of the sun. They affect radio, television and radar reception and weather. The ability to predict solar flares is essential for the safety of man in future deep space probes, and, indeed, is vital for better communication results in satellite launchings.

They originate, according to present theories, from electromagnetic disturbances, or thermal reactions. Heat and density measurements with the spectrograph will indicate which theory best explains the flares, although it is possible that the causes are interrelated.

Experiments are being planned to map the sun and observe its corona with satellites. Scientists will be able to make more observations of the corona in a day than has previously been possible.

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SEISMOLOGY

Mexico Quake Largest Since Disaster in 1957

► **THE EARTHQUAKE** which shook three southern states in Mexico on May 11 was the worst in that area since 1957 when 68 persons were killed, many injured and property damage extensive, seismologists claimed in Washington, D. C.

The quake struck nearly half way between Mexico City and the famous resort town of Acapulco. The shock resounded around the world for several hours.

Buildings collapsed in Chilpancingo, nearby capital of Guerrero State, and plaster and bricks, light poles and fountains fell in Acapulco and Mexico City. An electric power plant was knocked out in Mexico State and scores of persons were rushed to hospitals in the Mexico City Federal District.

Accompanying the 1957 quake was a tsunami or sea wave 8.5 feet high generated at Acapulco. Little or no wave is expected from the present quake, according to latest information.

The quake reached a 7 magnitude on the Richter scale, compared to a 7.9 recording for the 1957 shock.

This difference is quite significant, seismologists point out, since 1 magnitude is multiplied 64 times in intensity.

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