

ASTRONOMY

Sun Particles Cause Red Spots on Moon

► THE RED SPOTS on the moon that astronomers have reported finding from time to time recently could be caused by sun particles bombarding the surface.

The particles would have higher energies than those in the solar wind because they have been trapped and speeded up in turbulent magnetic fields.

This theory to account for the brief appearance of colored spots on the moon was suggested by Dr. A. G. W. Cameron of the National Aeronautics and Space Administration's Goddard Institute for Space Studies in New York.

In *Nature*, 202:785, 1964, Dr. Cameron states that the short periods of luminescence would be more likely to occur when the moon is full.

The solar system is a steady stream of very low-energy charged particles constantly spewed into space by the sun. Both the earth and moon intercept the solar wind as they circle the sun.

On the sunward side of the earth, the earth's magnetic shell deflects the solar wind, somewhat as water flows around a rock in a stream. Beyond where the deflection occurs, there is a shock wave. Between the two is a region of extreme turbulence.

In this turbulent region, Dr. Cameron believes, solar particles could be accelerated to higher energies by the chaotic magnetic fields. Streams of particles that have thus become more highly charged could cause luminescence when they hit the moon's surface.

Because the reactions are so complex, the hazard such radiation might cause for man traveling in space is not known, Dr. Cameron reports.

• Science News Letter, 85:360 June 6, 1964

TECHNOLOGY

New Driving Simulator Varies to Suit Driver

► A NEW KIND of driving simulator has been developed, in which the "traffic conditions" can be varied to suit the driver.

In a driving simulator, the subject sits at a mock-up of the controls of a car and faces a moving picture representing the road ahead, with other cars and traffic hazards. Previous simulators have been limited to one set of traffic conditions, usually presented by a film.

In the new system, developed at Liberty Mutual Insurance Company's research center, Hopkinton, Mass., traffic conditions can be changed at will by either the subject or the instructor.

A transparent circular turntable is marked with highways, side streets, curbs and center stripes. Model cars and other vehicles, trees, buildings and other surface features are placed on the turntable. A light shining through the turntable projects an image of the scene on a translucent screen.

The subject sits on the other side of the screen, and uses standard steering wheel, gear shift, brakes and gas pedal to control the motion of the turntable. Unlike previ-

ous systems, in which the "driver" is limited to the route already "programmed," the new device permits him to turn off onto side streets or to follow any route he chooses.

To present some of the more dangerous habits of other drivers, a motion picture, shown in the subject's rear view mirror, shows cars occasionally tailgating or weaving in and out of traffic, adding stress to the driver's problems.

A metallized paper tape makes a continuous record of car speed, motion of the steering wheel, use of the gas pedal and brake pressure. If the driver runs over a curb or hits a parked vehicle, a buzzer sounds.

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NUTRITION

Science Keeps Chili Hot And Celery Crunchy

► THE CRUNCH in the celery, the stickiness in the peanut butter and that hot sting of pain in the chili sauce are some of the good things of life that scientists are working to preserve.

People like and accept food that way, and that's the way it should be kept, states Dr. Emil M. Mrak, food expert and chancellor of the University of California at Davis.

Food technology has done wonders during the past century in making food taste good, keeping it stable and safe to eat, and also in keeping it nutritious, Dr. Mrak told the conference on Food and Civilization in San Francisco.

Some of the developments in producing, processing and distributing food have been so dramatic that the average person in America has often come to take it for granted, he said.

Within the past few years, technology has taken the labor out of the home kitchen and placed it in the factory, he pointed out. The hours of work spent by the housewife peeling potatoes, chopping, cooking and mashing have been eliminated as she buys a box of instant mashed potatoes. And anyone can make a good cake today, simply from a box of cake mix.

From the standpoint of food preservation, he said, no great advances have been made in the past 100 years. Ancient methods of preserving food by drying, smoking or covering it with salt to keep it from spoiling have been used for centuries. Even the process of freezing material is very old in areas of frozen wastelands and cold winter climates.

The last great advance in preservation of foods was made more than 100 years ago in France when Nicholas Appert invented the use of heat treatment and the forerunner of the tin can to keep Napoleon's army fed.

Radiation, filtration and ultrasonics are modern techniques but are limited in use and still in the experimental stage, he pointed out.

The food conference, was held by the University of California's San Francisco Medical Center, assisted by Campbell Soup Company.

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IN SCIENCE

GENERAL SCIENCE

Walker Chairman of National Science Board

► DR. ERIC A. WALKER, president of Pennsylvania State University, University Park, has been elected chairman of the National Science Board, governing body of the National Science Foundation. Dr. Walker succeeded as board chairman Dr. Detlev W. Bronk, who is president of the Rockefeller Institute, New York.

Elected as vice chairman of the National Science Board was Dr. Philip Handler, the James B. Duke professor of biochemistry and chairman of the department of biochemistry at Duke University, Durham, N. C. Dr. Handler succeeded Dr. Lee A. DuBridge, president of the California Institute of Technology, Pasadena.

The National Science Board supervises the activities of the National Science Foundation, which was established in 1950 to stimulate and support scientific research in the United States and abroad. The NSF operates on an annual budget of more than a quarter of a billion dollars. The current director of the NSF is Dr. Leland J. Haworth.

Dr. Walker, an electrical engineer, has been president of Pennsylvania State since 1956. He holds seven academic degrees, including the doctor of science from Harvard, 1935. He is also a member of the Board of Trustees of SCIENCE SERVICE, member of the manpower panel of the President's Science Advisory Committee, chairman of the Naval Research Advisory Committee, and vice chairman of the committee which is establishing the National Academy of Engineering.

Dr. Walker just completed a term as president of the Engineers' Joint Council and another as president of the American Society of Engineering Education.

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METEOROLOGY

Radioactivity Measures Air's Moisture

► AN ANSWER to one of meteorology's long-standing problems, accurate measurement of the air's moisture content at varying altitudes, has been found in radioactivity.

Water condenses at a higher temperature in a more humid atmosphere. A device developed by Honeywell Corporation's aeronautical division in Minneapolis, works by measuring the temperature at which a fixed amount of water condenses on a flat, radioactive surface.

A detector adjusts the temperature, by measuring how much radioactivity is blocked off by the film of water. The temperature reading from the device's surface can be converted easily into humidity.

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CE FIELDS

TOXICOLOGY

Canned Chili Peppers Cause Two Deaths

➤ THREE CASES of botulism from eating home canned chili peppers and ending in two deaths, were reported from the U.S. Public Health Service's Communicable Disease Center, Atlanta, Ga.

This brings to nine, in 1964, the number of botulism cases, all of them caused by home canned food.

On May 14, the uncle of a couple in San Jose, Calif., became critically ill and died, presumably of a stroke. When the wife later died and the husband became critically ill, poisoning from the peppers which all three had eaten, was suspected.

Four children in this stricken family, aged two to nine, fortunately did not like peppers and ate none.

As the home canning season approaches, food authorities warn housewives that the pressure cooking method is the only safe process to use when meats and vegetables are canned at home.

Boiling and preserving by the open kettle method will not destroy the botulinus germs that cause botulism.

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PUBLIC HEALTH

American Coeds Afraid Of Hard Physical Work

➤ AMERICAN COEDS are behind Swedish women in work, or exercise, capacity. They could better their record if they were not afraid of the discomforts of physical exertion, a California physical education specialist told SCIENCE SERVICE.

Tests on a bicycle ergometer (an apparatus that shows the amount of work done by muscles over a period of time) revealed that 30 untrained college girls had only 80% of the work capacity of untrained Swedish women.

Dr. Ernest D. Michael of the University of California, Santa Barbara, said in an interview that there should have been no real physical reason for the American girls falling behind.

"We tested their heart rate and oxygen uptake. Their heart rate was 180 to 190 beats a minute, which was normal and equal to that of the Swedish women. But their oxygen uptake, or capacity to breathe harder when the bicycle pedaling was increased, equaled only 80% of that attained by the Swedish women."

Swedish women, like the pioneer American women of covered wagon days, are used to harder work than the average American woman today, Dr. Michael said. He estimated that college girls in other parts of the country may fall below the California coeds, who lead above-average outdoor lives.

"There is no reason that more girls should not compete in the Olympics," the California professor said. "When I ran a test two years ago on Olympic swimmers, American girls competing had a physical capacity equal to any in the world. It has only been in the last ten years that our girls have entered the Olympics, however."

Shortness of breath worries young Americans, but if there is no physical handicap, they merely need to work harder, breathe harder and develop tolerance, Dr. Michael believes. He reported his findings to the 79th anniversary convention of the American Association for Health, Physical Education and Welfare meeting in Washington, D. C., a department of the National Education Association.

Dr. Michael was assisted in his study by Dr. Steven Horvath, also of the Santa Barbara branch of the University of California. Dr. Irma Astrand, well-known Swedish biochemist, tested the Swedish women. They were young housewives in the Stockholm area, but had similar height, weight and previous lack of athletic experience.

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MEDICINE

Tranquilizers Can Pep Up Indifferent People Too

➤ SOME TRANQUILIZERS work two ways.

The widely advertised Miltown and Librium are true tranquilizers, relieving neurotic tension, but the phenothiazines, most widely used of the so-called tranquilizers, improve indifferent attitudes and other symptoms of schizophrenia, the most common mental disease.

Dr. Jonathan O. Cole, director of the psychopharmacology service center, National Institute of Mental Health, Bethesda, Md., told SCIENCE SERVICE that more study is needed for an understanding of the phenothiazines.

New evidence shows that these drugs improve poor social participation, self care, confusion, indifference to environment and the giggling and grimacing called hebephrenic gestures. Trade names of these drugs are Thorazine, Mellaril and Permitil.

Dr. Cole based his conclusion on a nine-hospital collaborative study of 340 patients.

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TECHNOLOGY

World's Biggest Memory Built Into Computer

➤ ONE OF the world's largest memories has been built into an electronic computer.

The Radio Corporation of America's model 3488 can remember more than 5.4 billion bits of information, keeping it all filed away on magnetized cards. The device operates under the command of either the RCA 3301 Realcom computer or the smaller RCA 301.

It has random access to all its knowledge and makes it available at about one-tenth the cost of similar systems.

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GENERAL SCIENCE

Science Service Writer Honored

➤ MRS. BARBARA TUFTY, staff writer of SCIENCE SERVICE and SCIENCE NEWS LETTER, is one of five writers given honorable mention for the Thomas L. Stokes Award for outstanding writing in a daily newspaper on development and conservation of natural resources. The award itself for 1963 was won by R. G. Lynch, of the Milwaukee Journal.

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TECHNOLOGY

Lifetime Motor Oil Not in Near Future

➤ LIFETIME LUBRICANTS for passenger car engines have not been achieved, nor do they appear to be just around the corner.

There are two reasons for this, according to R. E. Jeffrey and L. G. Boschma of the Shell Oil Company, Detroit, Mich., who spoke at a meeting of the American Petroleum Institute's division of refining in St. Louis.

First, crankcase ventilation systems designed to allow exhaust gases that leak past the piston rings to escape from the inside of the engine sometimes get clogged. This can cause corrosion of engine parts. The only solution so far is periodic oil changes.

Second, in many areas of the United States cold weather requires special grades of oil for easy starting and maximum performance.

The extended new car warranties adopted by auto manufacturers in 1963 and 1964 will provide much information for research on lifetime lubrication. However, oil manufacturers are waiting until the data on service problems of the new cars can be analyzed before they proceed with development.

Though a permanent engine oil is not expected to be developed for some time, the interval between oil changes will probably continue to grow longer.

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MEDICINE

Lung Cancer Relation To Heredity Is Small

➤ SMOKING is not the only cause of lung cancer, all researchers agree. Studies of family groups show that heredity plays a part, although it is small.

Dr. P. R. J. Burch of the University of Leeds, England, and the British Medical Research Council, estimates the heredity factor to be less than three percent.

Especially when certain close relatives marry, other malignancies as well as lung cancer occasionally appear, Dr. Burch reported in *Nature*, 202:711, 1964.

Childhood leukemia and lymphosarcoma have been found in family groups.

Reviewing recent studies of hereditary factors in human cancer, Dr. Burch concludes that further work is needed.

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