

ASTRONOMY

Stars May Throw Off Cosmic Rays

► THE POWERFUL cosmic rays continuously bombarding the earth from space may be material thrown off from rotating stars with strong magnetic fields, Dr. Armin J. Deutsch of Mount Wilson and Palomar Observatories suggested to the American Astronomical Society meeting in Nashville, Tenn.

Such stars, known to astronomers as spectral class A, are about 100 times as luminous as the sun, and have a mass two or three times that of the sun.

Dr. Deutsch's theory is that if an atom of interstellar hydrogen came very close to such a star, as close as ten times the radius of the star itself, the light energy of the star could split the hydrogen atom into the electron and proton of which it is composed.

Because of the star's strong magnetic and electric fields, the two particles, in just six seconds after their separation, would pick up energies of over 1,000,000,000 volts by moving a distance of one stellar radius along the star's lines of force.

Some of these energetic particles, Dr. Deutsch believes, might move out into space, where they would be further speeded up to become the powerful cosmic rays.

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VIROLOGY

Virus Involved in Change Of Normal Cell to Cancer

► TRANSFORMATION OF a normal cell to a cancer cell involves the production of a virus, according to evidence presented at the meeting of the American Association for the Advancement of Science in Boston.

This does not mean, however, it was emphasized, that cancer is contagious.

Leukemia, cancerous disease of the blood forming organs, can be induced by a virus filtered from cancerous blood, Dr. Sarah E. Stewart of the U. S. Public Health Service Hospital, Baltimore, reported. This virus can localize not only in blood cells, but under some conditions in other cells as well and, thereby, produce new types of cancer.

Cancer viruses can be changed by their hosts, that is, the bodies in which they live and grow, studies reported by Dr. Kenyon S. Tweedell of the University of Illinois show.

Dr. Tweedell studied a cancer which is common in kidneys of frogs of northern Vermont. These cancers yield a virus that will localize in normal kidneys and transform them to the same kind of cancer. However, the virus does not have this effect in frogs from another geographic area. The same species of frogs from New Jersey, Wisconsin, Illinois and Kentucky are never affected by Vermont virus.

In time, however, a Vermont cancer

grafted into the eye of a Wisconsin frog, after growing slowly will regress and almost fade away. Then it starts growing again. The new growth has in it a virus trained to induce cancer in kidneys of Wisconsin as well as Vermont frogs. If it fades away a second time and regrows again, it can attack other organs as well as the kidneys.

This host-induced adaptation of a cancer virus gives scientists a little better understanding of the relationships between the host cell and its directors. Apparently under normal conditions the directors, which are within the cell and are probably nucleoprotein chemicals, govern the growth and differentiation of normal tissues. It is now believed that it is only when they become faulty that they direct abnormal growth and differentiation, and then are recognized as viruses.

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PUBLIC HEALTH

Smog Deaths Partly Due to Two Chemicals

► THE DEADLY effect of smog, which killed 4,000 in London in one month last year and 20 in Donora, Pa., in 1948, can be partly explained by the interaction of sulfur dioxide and sulfuric acid mist.

Guinea pig studies showing this were reported by Dr. Mary O. Amdur of Harvard School of Public Health at the meeting of the American Association for the Advancement of Science in Boston.

When guinea pigs breathed air contaminated with these two substances together, they had trouble breathing within the first hour. The breathing difficulty got progressively worse as the exposure continued. Frothy fluid appeared in the nose and mouth. The labored breathing, "surprisingly," continued for one or two days after the animals were breathing fresh air again.

By contrast, when the animals breathed air contaminated only with sulfuric acid mist, at a concentration capable of producing severe breathing trouble and of killing half the animals or more in eight hours, the survivors breathed normally within two hours after the exposure ended with a few rare exceptions.

In the experiments, the concentrations of sulfuric acid mist and sulfur dioxide breathed by the animals were so small that each by itself caused little or no symptoms of breathing trouble, no loss of weight and only moderate lung damage.

The combination, however, not only made it very hard for the animals to breathe, but also made them stop growing and caused severe, extensive lung damage.

Dr. Amdur stressed that, in the studies reported, only one concentration of the chemicals and only one exposure time of eight hours were used. The results, therefore, must be considered preliminary although the effect of the combination of sulfur chemicals is "so striking."

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IN SCIEN

GENERAL SCIENCE

Left Side of Newspaper Front Page Read First

► OVER THREE-QUARTERS of the readers of daily newspapers look first at the left side of the front page, despite the fact that a large number of editors place what they consider the most important stories and pictures on the right side.

This discovery, made using the photoelectric eye camera, was reported by Dr. Herman F. Brandt, director of the Institute of Visual Research, Chicago, to the American Association for the Advancement of Science in Boston.

The ocular patterns of a hundred subjects, 50 male and 50 female, were recorded. They first looked at a symmetrical design the same size as a newspaper folded. Then they viewed an actual newspaper. Of them, 78% looked first at the left side. They divided their first 15 seconds of reading time 59.6% to the left side and 40.4% to the right for the top half of the front page, and 57.6% to the left side and 42.4% to the right side for the lower half.

Editors of 100 newspapers in all 48 states were asked to tell how they believed readers read their front pages. Sixty of them replied and answered: upper left, 20%; upper right, 35%; about equal, 45%. For the first 15 seconds of reading, the editors' guesses were: left side, 8.3%; right side, 36.7%; about equal, 55%.

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MEDICINE

Dye Lights Up Disease Fighting Plasma Cells

► THE GLOW of a fluorescent dye has let scientists see where disease-fighting antibodies are formed in the body and at the same time, has cleared the long-time mystery of what the "plasma cell" does in the body.

The plasma cell and its ancestors are responsible for antibody formation, Drs. Elizabeth H. Leduc, Albert H. Coons and Jeanne M. Connally of Harvard Medical School reported at the meeting of the American Association for the Advancement of Science in Boston.

They made their discovery by injecting diphtheria toxoid under the skin of rabbits. Then they added a fluorescent dye that combines with the diphtheria antibodies. This let them see the cells in which the antibody was forming in response to the toxoid.

The plasma cells that form the antibodies exist in the filters of lymphatic tissue such as tonsils, adenoids and lymph glands.

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CE FIELDS

MEDICINE

USAF Mike Adapted to Save Polio Patients

► A STANDARD U.S. Air Force microphone has been adapted to give life-saving warning when polio patients are threatened by obstruction of the airway from nose and throat to lungs.

It has been tried out in two epidemics and "proved to be of the greatest value," Dr. F. D. Stott of the electro-medical research unit, Medical Research Council, and the Stoke Mandeville Hospital, Aylesbury, reports in the *British Medical Journal* (Dec. 26, 1953).

The airway obstruction must be removed at once or the patient will suffocate. Continuous watch must be kept over patients with the bulbar form of polio to detect such obstruction at the earliest moment. However, even experienced nurses, especially if there is much other noise in the ward, may not immediately catch the bubbling sound caused by obstruction of the airway.

So Dr. Stott adapted the laryngeal mike with an amplifier and loudspeaker attachment. The mike is placed over the patient's larynx in the neck and held in place by an elastic band. If the patient is in the prone position, the mike can be put on the back of the neck, over the temple or the back of the head, where sounds will be picked up by bone conduction.

The volume is adjusted so that the intermittent rushing sound produced by normal breathing is just audible without being obtrusive. Under these conditions the bubbling sound produced by obstruction of the airway is loud enough to draw attention from the far end of the ward.

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GENERAL SCIENCE

Harness Electron To Guide Blind Persons

► BLIND PERSONS some day may be able to walk with certainty through unfamiliar territory without the aid of seeing-eye dogs or canes, scientists foresaw at the American Association for the Advancement of Science meeting in Boston.

Clifford M. Witcher of the Massachusetts Institute of Technology revealed a device that has been built at MIT to warn its blind user of obstacles and potential hazards, such as curbs. The handle is used to transmit the warning to the blind person. When an obstacle is coming into "range," stimulator points on the handle press against the user's fingers.

Mr. Witcher suggested that the entire handle could be made to vibrate at a high frequency when the blind person came

nearer to the obstacle, and that a strong, low frequency vibration could indicate a step-down at a curb.

Thomas A. Benham of Haverford College, Pa., reported that a "seeing-eye cane" developed by the U.S. Army Signal Corps has been tested, and that the principles it embodies have been found to be sound. The device itself, however, still needs to be improved.

Carried like a lunch pail, it shoots out a beam of light that is reflected by obstacles. The reflected light is picked up by a built-in optical reception system. A vibrator in the handle translates the reflections into warnings and reassurances for the user.

Blind users reported they had some difficulty in remaining attentive to the continuous vibrating signals put out by the sensory aid. They also had some difficulty in spotting curbs.

Scientists now hope to improve the device. A transistor laboratory model already has been found to offer numerous improvements over the original version.

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MEDICINE

New Kind of TV Helps Nervous Heart Patients

► A NEW kind of TV developed to help nervous persons learn to relax and thus ease the strain on their hearts was announced by Dr. Edmund Jacobson of Chicago at the meeting of the American Association for the Advancement of Science in Boston.

The apparatus, Dr. Jacobson said, "for the first time in history brings up the nervous state of the individual with all the clearness of the television screen."

He calls it "neuromuscular television." It gives the patient a visible record of the tension of his muscles and nerves even when he thinks he is relaxing. Then he can see the change when he really does relax.

With or without attendant emotion, overeffortful living is equivalent to habitual, prolonged moderate activity of muscles, Dr. Jacobson finds. This, he thinks, causes the heart to work protractedly with resultant wear and tear and damages the arteries of the heart.

The first sign of change is spasm of the overworked artery. The patient then feels chest distress, which he perhaps ignores. With continual overdrive of the human organism, changes natural in aging arteries are accelerated. In consequence of increasing sclerosis (hardening), the blood supply is increasingly impaired and, accordingly, the heart fails to respond adequately to the requirements of the patient in his excessive adjustments to his environment.

Unless these requirements are diminished appropriately, later stages, Dr. Jacobson declared, are marked by stoppage of the artery, the so-called "heart attack" that often results in death.

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PSYCHOLOGY

Skid Row Drunk May Not Be an Alcoholic

► THE SKID row derelict may not be an alcoholic, popular opinion to the contrary.

This social outcast, like the stage or screen comedian, may exhibit drunken behavior, but that does not mean that they are alcoholics, Dr. Raymond G. McCarthy of Yale University Center of Alcohol Studies, New Haven, pointed out at the meeting of the American Association for the Advancement of Science in Boston.

A distinction must be made between drinking and alcoholism, he declared. Alcoholics can be found in every walk of life and so can people who drink and get drunk. The only two signs that can be applied to all alcoholics, except that they are not abstainers, Dr. McCarthy thinks, are these: 1. the use of alcohol associated with a kind of discomfort; 2. the inability to control its use once begun.

Many people, he pointed out, use alcohol on purpose to relax, to get a mild sedative effect, to make life with all its tensions and difficulties more acceptable. However, they do not lose contact with reality, they still recognize that life is difficult, they can stop drinking, and their drinking does not involve them in further difficulties. These are not alcoholics.

The alcoholic uses alcohol to achieve a change in reality, not just to be able to accept it more easily. And there are always, Dr. McCarthy emphasized, involvements of family life, jobs and physical complaints associated with the alcoholic's drinking.

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MEDICINE

Male Hormone Triggers Mice Fighting Behavior

► INJECTION OF a single hormone can in some cases trigger an entire pattern of behavior much earlier than normal, Dr. John A. King and Joel Victor Levy, Jackson Memorial Laboratory, Bar Harbor, Me., reported at the American Association for the Advancement of Science meeting in Boston.

Young male fighting mice do not usually begin fighting until they are about 34 days old, when male sex hormones are believed to be actively secreted into the blood stream.

After injections of the male sex hormone, testosterone propionate, the young mice began scrapping as early as 18 days. Fighting is a complicated pattern of social behavior, the scientists pointed out, requiring a certain level of physical and mental development.

This stage of development is evidently reached by the mice as early as 18 days of age and needs only the injection or secretion of the male hormone to set it in motion.

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