

MEDICINE

3-Way Protection Cuts Radiation Fatalities

► A THREE-WAY protection against radiation death was reported to scientists attending the Second Australasian Conference on Radiobiology in Melbourne, Australia.

The death rate among mice exposed to radiation from gamma rays and fission neutrons was cut drastically by giving the animals cysteine, streptomycin and bone marrow cells, Dr. Howard H. Vogel Jr. of Argonne National Laboratory, Lemont, Ill., said.

The mice were exposed to single doses of irradiation high enough to kill 80% to 90% within 30 days. Daily streptomycin therapy reduced mortality for the first ten days, Dr. Vogel said. Intravenous injections of bone marrow cells within a few hours after exposure to fission neutrons did not protect against death for at least eight days.

However, combining the two treatments resulted in only 12% mortality among neutron-irradiated mice within the 30-day period. The same dose was lethal to 90% of untreated mice.

When the amino acid cysteine was injected into the mice prior to irradiation and both bone marrow and streptomycin were used, only seven percent of the mice died, Dr. Vogel said. In contrast, 98% of untreated irradiated mice died within ten days following exposure to the same supralethal dose of fission neutrons.

The number of unrecovered mice following the first dose, using 30 days as the lethality limit, indicates that an animal's chances of survival increase greatly with longer periods between two equal doses of fission neutrons.

Associated with Dr. Vogel in the studies were Donn L. Jordan, Dr. Samuel Leshner and Dr. Edward W. Daniels, all with the biological and medical research division at Argonne.

Science News Letter, January 3, 1959

METEOROLOGY

Study Meteor Dust in Increases of Rainfall

► THE QUESTIONS of whether rainfall can be increased by meteor dust sifting down through the earth's atmosphere is being investigated by U. S. and Australian scientists.

New evidence that the dusty trails of comets through which the earth passes can increase rainfall 30 days later was reported to the National Science Foundation by an Australian scientist. Dr. E. G. Bowen, chief of the radiophysics division, Commonwealth Scientific and Industrial Research Organization, Sydney, Australia, said the finding could give weathermen a new tool for more accurate rainfall prediction.

With his colleagues, he has found that rainfall in January tends to be abnormally high about the 12th, 21st and 31st of each year.

U. S. scientists have also found such peaks at about these same dates in January. When the numbers of freezing nuclei in the

atmosphere were measured for February and March, however, they could not find any association with meteor streams a month earlier.

Drs. Dwight B. Kline and Glenn W. Brier of the U. S. Weather Bureau found, instead, that the freezing-nuclei peaks seem to be related to solar radio bursts. These are powerful discharges of energy from the sun that are detected by sensitive radio receivers operating in the radar frequency range.

One possible source of the freezing nuclei and the rainfall peaks associated with high nuclei counts is dust from the earth.

Cloud physicists believe that freezing nuclei are one of nature's methods of forming ice crystals that then fall on the ground as rain when temperatures in the atmosphere's low layers are warm enough.

Drs. Kline and Brier made their observations on freezing nuclei in a Washington suburb. They used a cloud chamber, or refrigerated container, to form the ice crystals, then let the crystals grow in a sugar solution in order to count them.

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MEDICINE

Heredity, M-S Link Twin Studies Indicate

► A NEW STUDY of twins links heredity as a possible cause of multiple sclerosis.

Heredity has long been under investigation as a possible factor in the cause of this disease of the central nervous system. Now, the results of a study of twins suffering from multiple sclerosis are reported in the *Archives of Neurology and Psychiatry* (Dec.).

Drs. Roland P. Mackay and Ntinios C. Myriantopoulos of the University of Illinois College of Medicine studied both identical and non-identical twins.

Among identical twins, both members of two sets definitely had multiple sclerosis, both of five sets apparently had it, and only one member of each of 22 sets was afflicted.

Among non-identical twins, both members of one set had the disease; both apparently had it in three sets, and one member each in 21 sets definitely had the disease, the scientists reported.

Some of the twins exhibit partial symptoms. These symptoms may flower into the full clinical picture, while other twins now free may develop the disease.

Yet, it seems highly unlikely that multiple sclerosis is caused by a genetic factor alone, the scientists caution. Thus it is possible that a genetic factor may require the addition of an environmental agent before the disease can develop. When one of a set of twins does not develop the disease, it may be due to the fact that one of the pair has not yet encountered the unidentified environmental factor.

Multiple sclerosis was from 20 to 33 times as prevalent in more than 1,000 relatives of the twins studied as in the general population. Currently, more than 500,000 persons suffer from this and related diseases.

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IN SCIENCE

ELECTRONICS

Computer Composes For String Quartet

► AN ORIGINAL four-movement piece of music called the "Illiac Suite for String Quartet" has been composed by a high-speed digital computer at the University of Illinois.

The suite is the result of an experiment aimed at showing how electronic "brains" can contribute to creative arts.

Recorded excerpts were played by Dr. Lejaren Hiller, assistant professor of music at the University of Illinois, for scientists attending an American Association for the Advancement of Science meeting.

Dr. Hiller said the process of musical composition involves a series of choices of musical elements from an endless variety of possibilities. Musical composition by robot depends heavily upon input instructions, he said. Factors not specifically accounted for are left entirely to chance.

Musical composition by robot is not an expression of the machine's soul, but, instead, as Dr. Hiller put it, "the extraction of order out of a chaotic environment."

For computer composition, random integers (whole numbers, not fractions) are made the equivalent of notes, rhythmic beats, and other musical elements. These are then worked over mathematically to express rules of composition, and are fed into the machine.

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PSYCHIATRY

Child Murderers Do Not Need Much Provocation

► CHILDREN commit murder in the United States without much provocation, Dr. Melitta Schmideberg, New York psychiatrist, told the meeting of the American Association for the Advancement of Science.

Each society has the crimes it creates, condones or fails to nip in the bud, she said. Our society is a child-dominated society. In other, parent-dominated, societies, parents often commit crimes against their children, commit infanticide, brutality, incest, and, in some Eastern countries, sell their children into prostitution.

Normal people, pointed out Dr. Schmideberg, assume as a matter of course that to take a life is such a terrible thing that the murderer must be deeply abnormal or carried away by an irresistible impulse. This is not necessarily so, she said; sometimes to him the other person's life is just cheap. Murder does not seem such a big thing; hence he needs little provocation and has little reaction of guilt or remorse. He is so highly self-centered that he regards every hurt as a lese majesty that justifies every and any type of retaliation.

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E FIELDS

ROCKETS AND MISSILES

NASA Accepts Bid for High-Thrust Engine

► A ROCKET engine with "far more thrust than any other rocket now in existence" will soon be under development, the National Aeronautics and Space Administration has reported.

The engine will be used to launch space payloads weighing as much as several tons. It will be designed and developed for NASA by Rocketdyne, a division of North American Aviation, Inc., Canoga Park, Calif.

Rocketdyne was selected from among six companies submitting proposals in the NASA competition for the project calling for an engine in the 1,000,000- to 1,500,000-pound thrust class. T. Keith Glennan, NASA Administrator, said the selection was based on careful assessment of the technical value of the proposal, and of the facilities, experience and other qualifications of the company.

The engine will be a liquid bi-propellant, single-chamber, booster rocket. It will use liquid oxygen and hydrocarbon propellants but will be designed to use other liquids without major change. Performance flight rating tests of the engine will be based on unmanned vehicle applications although the engine may eventually propel manned satellites and space craft.

The original design will provide a 1,000,000-pound thrust, but will be capable of being developed for delivery of 50% more.

NASA's long-term big engine program may require a period of from four to six years to bring it to useful completion, Mr. Glennan said. The program includes use of Government facilities and test stands to be constructed at Edwards Air Force Base, California, in addition to the engine development. It also includes Government-furnished fuel for testing components as they are developed and is expected to cost in excess of \$200,000,000.

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AGRICULTURE

Propose Nuclear Reactor To Sterilize Farm Land

► TWO SCIENTISTS at the University of California at Los Angeles have proposed a portable nuclear reactor for sterilizing agricultural land.

Drs. Samuel G. Wildman and Amos Norman told the American Nuclear Society meeting in Detroit that such a reactor may prove to be a practical, economical means of treating soil prior to planting.

Gamma rays and neutrons from the reactor bombarding the soil would kill and prevent reproduction of such parasites as nematodes, fungi and insects which

afflict crop plants and reduce yields, they said, as well as prevent the germination of weed seeds.

They said that since the portable reactor would be operating (probably by remote control) in relatively unpopulated areas, unwieldy shielding could be reduced substantially.

Thus it would probably be of much simpler design than stationary ones. Any radioactivity induced in the soil would be short-lived enough not to constitute a hazard either in the soil or in crops grown in it.

The portable reactor should be designed to move at about six or seven miles per hour, irradiating 100 square feet of soil per second to a depth of six inches.

The UCLA scientists estimated that the reactor could be designed to be used in field treatment at a cost of approximately \$70 an acre. Compared to the present \$300 to \$500 per acre it costs for chemical sterilization, the economic advantages are obvious.

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ROCKETS AND MISSILES

Rocket Trip Indicates Man Can Survive

► MILITARY scientists have indicated that man can live in the same weightless condition as that experienced by Little Old Reliable, the monkey rocketed into space Dec. 13.

Although the monkey was not recovered, data transmitted by radio throughout the entire flight has led scientists to term the experiment "98% successful."

Capt. Norman L. Barr, director of the aeronautics division of the Navy's Bureau of Medicine and Surgery, said it is still too early to draw full scientific conclusions from the experiment.

The monkey's heart rate, blood pressure, respiration, temperature, breath sound and body-motion sound were measured during the 13-minute space flight.

For almost nine minutes, the monkey was in a weightless state and showed no adverse physical change, said Capt. Barr. In fact, the irregular respiratory and heart rates experienced during acceleration returned to normal as it entered the weightless state.

Capt. Barr and Col. Robert H. Holmes, chief of the biophysics and aeronautics research branch of the Army's Medical Service's Research and Development Command, said the South American squirrel monkey had been trained for four to six weeks and had been placed in the capsule several times before the actual launching. Observations were made for about 30 minutes with the monkey in position before he was sent aloft.

Problems connected with the internal environment of the capsule, said the two scientists, involved the removal of carbon dioxide and the supply of oxygen. A still newer difficulty was the maintenance of a constant temperature. The capsule in the launching contained a small seven-watt light bulb to help keep the monkey warm, said Col. Holmes.

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PSYCHIATRY

Schizophrenic Children May Not Show Pain

► WHEN CHILDREN with the mental disease schizophrenia are hurt or injured, the majority do not react to pain as the normal child does.

This fact is reported by Dr. William Goldfarb of the Henry Ittleson Center for Child Research, New York, to the *American Journal of Orthopsychiatry*. (Oct.). Of a group of 31 schizophrenic children observed, he reported, only six were not abnormal in reaction to pain. He cited these examples:

Alice caught her finger in the door. The tip was cut and the finger was swollen and blue. She did not cry. Later she looked smilingly at the finger with no report of pain.

Jane was found sitting on a hot radiator with no apparent awareness of the heat. The teacher found the radiator so hot she could not keep her hand on it.

Jill smacked Alice loudly on the right cheek. When asked where Jill had hit her, Alice pointed uncertainly to her left cheek.

Of the 31 schizophrenic children, seven were found to injure themselves. Some of these were driven not so much by aggression against themselves as confusion between their own bodies and the outer world.

Benny liked to cut any available material with scissors. One day he was found cutting the palm of his left hand until he had produced a bleeding gash.

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BIOCHEMISTRY

Boron Drugs May Penetrate Brain Barrier

► THE POTENCY of boron compounds that might provide scientists with a selective brain tumor killer can be measured by their solubility in benzene.

Increased solubility in a lipid solvent is an important measure of the penetration of the brain by a drug, Dr. A. H. Soloway of the department of neurosurgery, Massachusetts General Hospital, Boston, reports in *Science* (Dec. 19).

The "neutron capture therapy" of nerve cell tumors has given scientists the possibility of destroying only diseased cells without harmfully affecting adjoining normal cells. When boron-10 captures a slow neutron part of the large amount of energy liberated is shared by an alpha particle.

This alpha particle is then propelled about 0.00035 inch, or nine microns, through the brain tissue so that the radiation effects are confined to a small region, the part of the cell, usually diseased, containing the capturing boron atom.

Boron compounds that show the greatest effects on the central nervous system and greater concentration in the normal brain relative to tumor do concentrate more in the lipid solvent benzene, Dr. Soloway suggests.

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