

GEOPHYSICS

Cosmic Rays Linked To World-Wide Weather

➤ A LINK BETWEEN the weather and the cosmic rays bombarding earth from space has been suggested by a U. S. scientist.

Dr. Edward P. Ney of the University of Minnesota believes weathermen should investigate whether changes in the cosmic radiation cause variations in weather. He said such effects could occur through the indirect route of atmospheric ionization.

Dr. Ney said that part of his suggested link is well established, part is speculation. Well known is the fact that high solar activity, when the sun is at the peak in its 11-year cycle, as at present, results in low levels of cosmic radiation. This, in turn, is known to decrease the amount of atmospheric ionization, since cosmic rays electrically charge the air through which they pass.

This decreased ionization, Dr. Ney then speculates, could lower the air's electrical conductivity, making it a better insulator. This, in turn, might increase the build-up of electric fields and thereby increase storminess. The increased cloud cover associated with the thunderstorms would produce extra cooling of earth and, therefore, a lower mean temperature at sunspot maximum.

Carefully labeling his theory as speculation, Dr. Ney urges weathermen to look for other patterns besides temperature changes that might be used to test his cosmic ray-weather variation idea. The suggested chain of events is outlined in *Nature* (Feb. 14).

Science News Letter, March 14, 1959

CHEMISTRY

Tailored Molecules Fight Population Growth Ills

➤ "MOLECULAR ENGINEERING," which means custom tailoring chemicals to fit specific needs, is a "truly revolutionary" development that will allow our expanding population to continue its explosive growth.

This view was expressed by Frederick T. Moore, economist with the RAND Corporation, at a symposium, held in Washington, D. C., on the outlook for chemical technology sponsored by Resources for the Future, Inc. Mr. Moore said the recent products of the chemical industry showed the idea of an exploding population that depends on a fixed resource base is "essentially a myth in the long run."

Economic growth, he charged, will not be limited by a shortage of natural resources. Products of chemistry are better and cheaper substitutes for products that come from more scarce natural resources such as metallic deposits.

Another result of molecular engineering, Mr. Moore predicted, will be a speed-up in the progress of underdeveloped countries, since the U. S. can export chemical techniques for obtaining useful products from low value resources. This is preferable to these countries trying to duplicate ex-

actly existing U. S. industries, which have been shaped by this country's economic history and resources available.

Concerning chemical development in the U. S., Mr. Moore said that the use of computers to control chemical processing will increase rapidly. Even now, he pointed out, computers can be instructed to "learn" how to change factors in their control program based on the results of production runs.

No technological unemployment can be expected in the chemical industry because of automation, however. The skilled and scientific personnel will be in demand in other industries using chemicals.

Molecular engineering can be applied to many kinds of chemicals, Earl P. Stevenson, chairman of Arthur D. Little, Inc., reported. He said the synthesis of new drugs may be more important to mankind than any other application of molecular tailoring.

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MEDICINE

Diagnosis Method May Aid Disease Control

➤ THE EASE and speed with which human diseases can be detected and diagnosed are among the chief virtues of the new diagnostic technique announced by the Department of Health, Education and Welfare.

In making the announcement, Secretary Arthur S. Flemming said the speed of the system could be a large step forward in controlling rheumatic heart diseases, polio, influenza, rabies, diphtheria, and a wide range of other diseases.

Known as the fluorescent antibody technique, the new system enables doctors to complete tests in only a few minutes that formerly required two to three weeks. Here is how it works:

When a person contracts a disease, such as polio, his body produces a protein substance which combats the polio virus. The same antibodies are produced by animals whose blood is drawn and kept in storage.

The antibody-containing blood serum is stained with a fluorescent dye and put on a slide which already has been smeared with material taken from a patient suspected of having polio. If viruses are present in the smear, the antibodies attach themselves to it.

The slide is washed off, but the fluorescent antibodies and the viruses remain in the smear and are detected by ultraviolet light. They appear like tiny neon lights with a greenish fluorescence.

Laboratory studies with the technique have proved so successful that field trials on some 50 diseases have been started. A completed rabies study has shown the technique to be in 100% agreement with the old, reliable, lengthy method.

Originally developed as a defense against germ warfare, the technique is so simple that non-medical civil defense personnel could easily be taught to use it.

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IN SCIENCE

METEOROLOGY

Foresee Cheap Rockets For Daily Weather Use

➤ A CHEAP plastic rocket that could be fired daily by Weather Bureau personnel in large cities, in order to provide more accurate weather forecasts, is foreseen as a development following the successful firings of the ARCAS rocket.

ARCAS stands for All-purpose Rocket for Collecting Atmospheric Soundings. It is a solid fuel, low cost meteorological rocket that can be launched by a two-man crew.

Eventually the rocket will be made of finely spun glass fibers so that it may be fired over populated areas, then exploded into harmless fragments when the desired information has been gathered.

ARCAS test firings were conducted by the Army Signal Missile Support Agency at the White Sands Missile Range, N. Mex., for the Office of Naval Research. The rocket was made by the Atlantic Research Corporation in Alexandria, Va. It is seven feet long and four and a half inches in diameter. When fueled, it weighs 71 pounds

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AGRICULTURE

Oriented Corn Planting Conserves Soil Moisture

➤ PLANTING seed corn kernels with points down and flat sides parallel to the rows conserves soil moisture and increases yield per acre, U. S. Department of Agriculture scientists report.

Precise placement of kernels takes advantage of the natural growth habit of corn leaves. The leaves develop usually on opposite sides of a stalk and at right angles to the flat sides of the seed from which each plant grows.

Known as orientation planting, this method causes the leaves to grow so they extend into the mid-rows. The method has been tried successfully in experiments conducted by Federal-state scientists at the Illinois Agricultural Experiment Station, Urbana, Ill.

It was found corn planting oriented in this manner reduced the amount of moisture-consuming sunshine striking the ground by as much as 90%, so that more moisture was available to the corn during the critical ear-setting stage.

In limited tests, yields of corn from the oriented plots were found to be from three to 23 bushels greater per acre than yields from random-planted plots.

Orientation planted corn grows with its leaves in fan-like formation at right angles to each side of a row. The leaves thus provide ground shade but do not block sun from striking surrounding plants.

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E FIELDS

EDUCATION

Engineering Degree Is No Longer "Open Sesame"

► COMPANIES are getting more choosy in hiring engineers. Gone are the days when an engineering degree meant "open sesame" to a good job for graduating seniors, reports Cornell University.

"The cry now is not so much for more engineers as for better ones," said Donald H. Moyer, director of the office of student personnel for the University's College of Engineering.

The top half of this year's class will have "little placement problems," he said, but the below-average student may have to scratch around to find a suitable job.

He traced to the recession one reason for the back-off by industry. But other things have happened also: 1. Some companies have started training liberal arts graduates for some jobs previously held by engineers. 2. Many companies have hired technicians and technical assistants for similar positions.

An accelerated business recovery could add to the demand for engineering graduates this June, he said, but there will be 10% more graduates available this year than last. So this year's employment picture is expected to be about the same as last year's.

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ENGINEERING

Underwater Ejectors Tested for Jets

► ALL BRITISH Fleet Air Arm jet pilots are to be taught how to use ejector seats to escape from submerged aircraft. A tank for the purpose is being built near the big naval port of Portsmouth.

As a result of trials, recorded in an instructional film, the gun which fires the seat from aircraft is being modified for use underwater. In the film, a pilot in a standard ejector seat, is shot from the bottom of a 25-foot-deep hydro-ballistic tank. He pulls a blind over his head and is fired to the surface from the open cockpit or through the closed hood above his seat.

Trials, which began early in 1957, were held at the Admiralty's request by the RAF Institute of Aviation Medicine. Tests included escapes from a jet aircraft's cockpit 40 feet under water.

It is believed that by using the ejector seat a pilot can escape from an aircraft 100 feet down. A member of the team, Surgeon Lt. Cdr. D. McNutt, said that the actual escape lasts about three-fifths of a second and is a thrilling experience.

The method was perfectly safe but it was advisable that a pilot should not use the ejector mechanism until the aircraft had sunk about ten feet.

One of the chief problems at the trials was

the effect of the blast pressure on the pilot when the charge is fired. The pressure wave hits the pilot's middle with a peak force of 100 pounds per square inch. But it was found that this "punch" had the effect of driving the air from his lungs and thus counteracting the decreasing water pressure on his body during the ascent.

The first trials were with a life-size dummy. Two seat guns were used. One, giving a velocity of 60 feet per second through the air, propelled the object through the water at about 26 feet per second. The other was more powerful, propelling dummy and seat at 33 to 35 feet a second. The vertical distance traveled by seat and dummy averaged 14 to 17 feet. It was found that the change in pressure was roughly equivalent to that from ground level to a height of 18,000 feet. There was a mean acceleration of less than 6g, well within the tolerance limit for normal aircraft ejections in the air.

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ICHTHYOLOGY

Big Fish Strike Hook Rather Than Small Fish

► WHAT MAKES a big fish strike at the minnow bait on your hook when there are many small fish swimming about?

According to Dr. Raymond B. Cowles, zoologist at the University of California, Los Angeles, it is all a part of a "beautiful" interdependence between prey and predator that has insured survival of the fittest and sanitation in nature.

Dr. Cowles explained that predator-prey relationships among fish are the same balance-of-nature pattern as those exhibited among all types of animals.

Predators habitually prey upon the abnormal because resultant odd behavior singles them out from the normal population. Abnormalities may be the result of disease or inherent handicaps from genetic causes.

Thus predators help keep down disease by eliminating diseased animals and help keep genetic stock strong by eliminating the genetically weak.

The odds against any one particular bait fish being randomly taken over millions of normals around him are so great as to make hook and line fishing a total failure were it not for this habit of predator fish attacking oddly behaving individuals, Dr. Cowles said.

He described experiments in which crippled fish were dropped among large schools of their fellows. The crippled fish were consistently singled out by predators.

Efforts of man to tamper with successful patterns of nature that have functioned satisfactorily for millions of years have generally proved unwise and economically unsound.

Dr. Cowles decries recommendations such as those concerned with planned mass reductions of sea birds off the South African coast to protect the economically important fish. Such birds as cormorants and other avian predators help maintain a healthy and vigorous fish population, he believes.

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ASTRONOMY

Meteors Found Acting As Mirrors in the Sky

► METEORS act as "mirrors in the sky," reflecting radio waves to interfere sometimes with communications of "ham" operators and with radio sets in the home.

Dr. Gerald S. Hawkins, assistant astronomy professor at Boston University, said a nine-month study of meteors showed the radio-reflecting properties. The study also showed that meteors do not emit radio noise themselves.

Meteors are tiny bits of interplanetary debris that make "shooting stars" when they burn up in the earth's atmosphere at great speeds. Dr. Hawkins said the average meteor releases power at a rate of 10,000,000 watts of energy when it disintegrates in the earth's upper atmosphere. If this energy were converted into light energy, it would yield enough power to light 10,000 flood lamps of 1,000 watts each.

The meteor study was supported jointly by the Army, Navy and Air Force under contract with the Massachusetts Institute of Technology. Two super-Schmidt meteor cameras, operated by Harvard College Observatory personnel at Sacramento Peak, N. Mex., were used to obtain photographs of the luminous objects, from which their heights and velocities could be determined.

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AGRICULTURE

Former Malaria Swamp Yields Fertile Fields

► FERTILIZERS, food and flowers are coming from land that only a few years ago produced only malaria and mosquitoes.

Where there was once a lake and swamp-land at Lake Hula, Israel, there is now some 60,000 dunams, 18,000 acres, of high quality farmland and peatland. Getting this land meant changing the course of a river, the Jordan, and establishing an elaborate system of drainage channels so that flood waters could be controlled.

Right now it is still a "problem" to select the right crops for this peatland and much of the agriculture is experimental. Rice has been grown on a relatively small scale, although the yields have been high. Cotton and peanuts are two other crops being grown now as industrial crops; a peanut separating mill is in operation and this year there will be a cotton gin. Peppers, wheat, sorghum, corn, and asparagus are being grown on the reclaimed land.

Researchers believe the peat can be successfully "mined" as an organic fertilizer, especially in combination with the chemical fertilizers such as the superphosphates. According to some estimates, a small area of only about 60 acres could provide fertilizer for 100 years.

Another potential for the Hula development is the growing of flower bulbs. They are already being grown—iris and gladiolus among others—but the planting could be much more extensive.

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