GEOPHYSICS

Evidence Indicates Stars Are Cosmic Ray Source

➤ INCREASING EVIDENCE that cosmic rays come from the stars and perhaps from distant galaxies was reported at Pasadena, Calif., by Dr. H. V. Neher, physics professor at California Institute of Technology.

He said possible sources for cosmic rays included super-novae, or exploding stars, and radio signal sources in space. The radiation might also be the residue of the birth or death struggles of stars.

Dr. Neher, a member of the panel on cosmic radiation of the U. S. National Committee for the International Geophysical Year, has just returned from an IGY expedition that made cosmic ray measurements from sea level to 100,000 feet altitude and from the Arctic to the Antarctic. The information was obtained by radio from 80 instrumented balloons.

It showed that cosmic rays probably do not come from the sun, Dr. Neher found. The IGY study on cosmic ray distribution is supported by the Office of Naval Research and the National Science Foundation.

Balloon measurements give several hours' worth of data, compared to the few minutes' worth available for rocket flights. Many of the measurements were taken simultaneously from an ocean and a land location. This double-check method is so the scientists can determine whether variations in the cosmic radiation were due to latitude changes or to world-wide fluctuations.

Science News Letter, March 7, 1959

TECHNOLOGY

Higher Cost No Bar to Synthetic Diamond Use

➤ THE GAP between the price of synthetic diamonds and the price of nature's own industrial diamonds is rapidly closing, the world's only significant producer of man-made diamonds told SCIENCE SERVICE.

General Electric Company's disclosure that man-made industrials the size of sand grains are selling for just 70% of their initial price in 1957 indicate that the synthetic cutting stones now are firmly entrenched in America's tool industry where they are used to sharpen new ultra-hard cemented carbide tools and to maintain existing tools in good condition.

General Electric Company sells synthetic diamonds for industrial cutting purposes for $2.96 per carat today, whereas the first bulk sales 18 months ago brought $4.25 per carat.

Although the price tag has been lowered, the synthetics still sell for a little more than natural stones. The tool industry's reason for accepting General Electric's diamonds even at the higher price is explained by Dr. H. Tracy Hall, director of research, Brigham Young University, Provo, Utah, in a review of high pressure research in *Science*.

Dr. Hall points out that synthetics sell in spite of their slightly higher price because "extensive tests have shown that the grinding efficiency of the man-made diamonds exceeds that of natural diamonds by 35%."

Officials of General Electric's metallurgical products department, Detroit, emphasized that the efficiency figure stated by Dr. Hall is "only an average and applicable only to the grinding of cemented carbide tools." They told SCIENCE SERVICE actual tests place a synthetic diamond grinding wheel's wear as "at least 15% and up to 75%" better than the wear characteristics of a grinding wheel impregnated with natural diamonds.

There is a simple explanation for this difference.

"Man-made diamond crystals are rough and blocky," they said, "whereas natural diamonds are smooth; therefore the manufactured variety stays bonded to the grinding wheel longer, cuts more freely and requires 20% to 35% less power in wheel operation."

Because of the difference in shapes of the crystals, General Electric officials pointed out, the rough synthetics will stay lodged in the grinding wheel long after wearing has caused the smooth natural diamonds to "pop out."

Science News Letter, March 7, 1959

METALLURGY

Bureau of Mines Makes Yttrium Ductile

➤ YTTRIUM, a metal long considered too brittle for structural uses, has been transformed into a pliable, easily formed material that may find important applications in atomic reactor and missile designs.

The transformation method was discovered by U. S. Bureau of Mines metallurgists in Albany, Oreg., who learned recently that yttrium's forming qualities could be improved by ridding it of dissolved gases.

Yittrium's advantage in the nuclear field is its relatively low thermonuclear cross section. This means it has less resistance than many other materials to the passage of neutrons needed to sustain a nuclear reaction. The metal also has a melting point of 2,825 degrees Fahrenheit, about equivalent to that of carbon steel, and high enough to enable it to withstand reactor temperatures.

Yttrium is found in close association with the rare-earth elements and is difficult to separate from its companion metals. It is produced commercially in relatively small amounts and is rather expensive.

The best yttrium available before the discovery of the new method had limited ductility, even though it was almost free of contaminants. Although the new method does not reduce production costs, it does not increase them significantly and certainly results in a material with improved ductility capable of wider applications.

The Bureau of Mines foresees a potential value for yttrium in alloys. Moreover, availability of the metal in ductile form will permit a reevaluation of its possible applications in other important fields.

Yttrium, pronounced IT-ree-um, is No. 39 on the periodic table of chemical elements. It has at least 14 radioactive isotopes.

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IN SCIENC

MEDICINE

Successful Preservation Makes Bone Bank Reality

➤ THE SUCCESSFUL PRESERVATION of living bone marrow cells that will make a "bone marrow bank" a reality has been announced.

Live bone marrow cells have been preserved in a frozen state and later injected into the patients they were originally drawn from. The intravenous injections produced dramatic improvement in the low blood counts of the patients who were receiving radiation therapy for cancer, Dr. Nathaniel B. Kurnick, chief of the hematology service at the Long Beach, Calif., Veterans Administration Hospital, said.

Bone marrow was taken from four cancer patients at the hospital. The marrow was slowly frozen in glycerol to keep ice crystals at a minimum and was maintained at minus 79 degrees centigrade. Cells may be stored in this manner for at least one year and perhaps indefinitely, Dr. Kurnick said.

When the patients' blood showed a dangerously low level of vital elements because of injury to the marrow from X-rays, the preserved marrow was thawed and injected.

Vigorous growth of new bone marrow cells was noted within weeks after the injections. Blood counts returned to nearly normal within a month to six weeks. There were no adverse side reactions to the injections.

Now that preservation of bone marrow has proved to be successful, cancer patients can be treated much more intensively with radiation than has been thought advisable in the past, the doctor said.

Because the body rids itself of all foreign tissue and cells, doctors have not been able to transplant healthy bone marrow cells from one person to another except in identical twins.

Science News Letter, March 7, 1959

ENGINEERING

Plastic Forms Make Unusual Concrete Effects

➤ UNUSUAL ARCHITECTURAL effects are being obtained through the use of plastic forms for shaping concrete.

J. A. Hanson, development engineer of the Portland Cement Association in Chicago, told the American Concrete Institute meeting at Los Angeles that architectural treatment may consist of both surface finish and pattern decoration.

The plastic forms enable concrete surfaces to be made glossy smooth or textured. Pattern decoration is achieved by vacuum forming the plastic sheet over wood, plaster, metal, glass or other pattern materials.

Science News Letter, March 7, 1959

E FIELDS

CHEMISTRY

Trees May Protect Earth From Pollution Heating

➤ TREES may be able to save mankind from a disastrous warming of the earth resulting from air pollution.

A "tremendous increase" in the blanket of carbon dioxide that industrial man is loosing into the atmosphere surrounds the earth and will tend inevitably to capture more heat from the sun.

Dr. Chauncey D. Leake, professor of pharmacology at Ohio State University, warned the National Conference on Air Pollution, Washington, D. C., that if the heat capture occurs it will cause a "gradual melting of the huge polar ice caps, and the gradual rise of our oceans, drowning out still further our shore lines."

He believes the extensive planting of trees, ten for every car and 100 for every truck, might help. Trees and other green plants absorb carbon dioxide and "breathe" oxygen into the atmosphere.

Dr. Leake also urged automobile manufacturers to direct greater effort to the problem of controlling exhausts.

Science News Letter, March 7, 1959

ICHTHYOLOGY

Colorful Parrotfish Wear "Nightgowns"

➤ WEARING nightgowns is just one of the odd things about the parrotfishes.

They also have teeth in their throats.

Described as one of the "most resplendent of all sea creatures," the parrotfishes belong to a family found throughout the world's tropical waters. Now, in the first systematic zoological description of the whole group, published by the Smithsonian Institution, details of the parrotfishes' habits and characteristics are revealed.

Wearing nightgowns is apparently limited to one of two West Indian species, Dr. Leonard P. Schultz, U.S. National Museum curator of fishes, said. As night begins, the fish starts secreting a transparent mucous envelope. Starting with the mouth and extending backward, the envelope completely encloses the body except for a little flap with a hole in the center in front of the fish's open mouth and a small hole in the rear.

The nightgown-making process takes from 30 minutes to an hour and a half. It stops entirely, Dr. Howard E. Winn of the University of Maryland observed, whenever light is turned on.

Wearing nightgowns and spending the night leaning against some solid object—rocks, arms of coral, or inside conch shells—seems to be a practice dictated by some nervous mechanism set off by darkness.

Parrotfishes, Dr. Schultz pointed out, eat mostly algae which are scraped from the coral branches. Their so-called pharyngeal mill, or teeth in the throat, crushes coralline algae, coral fragments and other food items.

There are about 80 species known, with color patterns including blue, pink, red, orange and yellow. A few species are brownish; some of these drab fish are females. Males predominate in shades of green or blue with green teeth.

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BIOCHEMISTRY

Lipid Research Lab To Be Set Up at UCLA

➤ A CENTER for the study of fatty substances that cause heart trouble is being established at the University of California at Los Angeles.

To be known as the Lipid Research Laboratory, the center will be supported by National Heart Institute grants of up to $60,000 annually for at least five years.

Dr. James F. Mead of UCLA's physiological chemistry department will be director of the center's program, which will include both training and research in the complex lipid field.

Research to be carried out in the UCLA laboratory includes determination of the composition of fatty deposits that obstruct the arteries, leading to high blood pressure and heart disease, and studies of changes in brain lipids due to aging and of changes in blood lipids with different amounts of dietary proteins

The program is part of a nation-wide effort initiated by the National Heart Institute because of increasing awareness of the importance of fats in health and disease and the need for more research personnel trained in the field, Dr. Mead said.

Similar centers are being established in the East, Midwest, South and Southwest. The laboratory will be located in UCLA's West Medical Campus Building. It will contain the most modern equipment for separation and analysis of the complex mixtures that make up the natural lipids. These include a gas chromatographic apparatus, capable of complete analysis of samples to small for the naked eye to see, and radioactive tracer equipment.

Science News Letter, March 7, 1959

ANIMAL HUSBANDRY

Pellets Fatten Lambs for Market in Four Months

➤ PELLETED FEEDS could enable flock owners to fatten lambs ready for market in four months after birth, tests made by Arthur L. Pope, University of Wisconsin sheep specialist, have indicated. The average time now is six to seven months.

Mr. Pope predicted that feed pellets are the "coming thing" in lamb feeding, and that in ten years flock owners no longer will use baled hay. The pellets contain corn, alfalfa leaf meal, soybean oil meal, bone meal and trace mineralized salt as the basic ration, plus added antibiotics and vitamins.

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BIOCHEMISTRY

Man-Made Antibiotic Achieved in 30 Steps

➤ THE TOTAL SYNTHESIS of an antibiotic that has biological activity may pave the way for other man-made antibiotics that cannot be made from living organisms.

Chemists at Lederle Laboratories Division of American Cyanamid Company in Pearl River, N. Y., have produced by a series of 30 chemical reactions a derivative of demethylchlortetracycline, an antibiotic previously available only by fermentation of living organisms. Drs. James H. Boothe, Andrew S. Kende and Raymond G. Wilkinson with Thomas L. Fields report their total synthesis in the *Journal of the American Chemical Society* (Feb. 20).

The tetracyclines are a family of chemical compounds, including such antibiotics as Aureomycin chlortetracycline and Terramycin oxytetracycline, which have proved useful in control of bacterial diseases.

Synthesis of the complex compound proves that the chemical structure assigned to demethylchlortetracycline and other antibiotics of this family are correct. The scientists are now trying to synthesize other tetracyclines, although they do not believe that the man-made process will compete economically with the current fermentation methods.

Science News Letter, March 7, 1959

PUBLIC HEALTH

Model Program Shows Filariasis Control

➤ THERE IS real hope of controlling filariasis, a mosquito-borne disease suffered by 189,000,000 people in the tropical regions of the world.

A model medical program conducted in experimental areas of Tahiti has shown how it can be done, Dr. John Kessel, professor of infectious diseases at the University of California at Los Angeles Medical School, reported following a tour of infected areas.

The highly successful control program is a joint effort of the French Overseas Medical Service and the UCLA Medical School.

It involves both the use of a drug, diethylcarbamazine, which destroys the tiny disease parasite in the human bloodstream, and control of mosquitoes that carry the disease organism.

Children in the one-to-five age group who have grown up in areas where the program is enforced are free from infection, Dr. Kessel reported. Formerly six percent of this age group were infected.

Studies related to the introduction of similar programs in the Fiji Islands, Indonesia, Malaya, India and parts of Africa are in progress, he says. He believes that if ways could be found to institute Tahiti-type programs throughout the world's infected areas, filariasis could be wiped out.

Filariasis is an infection that causes chills, fever, headache, and discomfort. It is caused by adult worms that live in the lymphatic or circulatory systems, connective tissue or body cavities.

Science News Letter, March 7, 1959