

BACTERIOLOGY

Bacteria, Fungi "Fly" Atlantic in Air Masses

► BACTERIA AND fungi can make successful west to east crossing of the Atlantic Ocean by "flying" in moving air masses.

Air samples taken on two round-trip flights showed the presence of the organisms in every air mass, Drs. S. M. Pady and C. D. Kelly discovered. The number of organisms varied considerably, but appeared to depend on the type of air mass. No evidence of fewer organisms as distances from land increased was found.

Microorganisms in air masses from the tropics were much more numerous than in air masses from polar regions. The scientists report in the *Canadian Journal of Botany* (Jan.) that the organisms were chiefly from the soil.

The research was carried on at McGill University, Montreal, and was supported by the Defense Research Board of Canada. Dr. Pady is head of the department of botany and plant pathology at Kansas State College, Manhattan, Kans. Dr. Kelly is in the department of bacteriology of McGill University.

Science News Letter, March 20, 1954

CHEMISTRY

Producing Zirconium Chemical Nightmare

► ZIRCONIUM IS the new metal with almost unique advantages for building atomic reactors, but it is so temperamental that its metallurgy is a nightmare for chemical engineers.

Similar in behavior to titanium, both metals resist corrosion after they have been won from their ores. During the process of extraction, however, they are so active chemically that they combine with the vats and tubes that hold them, rust the valves, clog up the pipes and burst into flame whenever air or water come anywhere near.

Extracted from their ores by the process worked out by Dr. William Kroll of the U. S. Bureau of Mines, these unusual metals are protected during their purification by a blanket of helium, the non-flammable gas. Experience has allowed production of titanium by this process to increase from one 15-pound batch in 1946 to 2,241 tons during the year 1953.

Adaptation of the Kroll process to production of zirconium has, however, met with many difficulties. Chlorine, which combines with zirconium in the first step of the refining process, may produce a light fluffy product or a dense, hard form of the same compound. Metallurgists had first to learn to produce the dense kind, which they describe as "hail," instead of the fluffy "snow," which takes up too much room in the sealed vat in which the reaction must take place.

Reduction of the chlorine compound with the metal magnesium, the next step in getting zirconium in the form of a metal, re-

sults in a mud-like substance that clings to the sides of the vat, to the scraper which removes it, and to the second scraper which is used to try to remove it from the first.

These difficulties were described to the American Institute of Chemical Engineers meeting in Washington by H. L. Gilbert of the U. S. Bureau of Mines, Albany, Ore., and C. Q. Morrison of the Carborundum Metals Corp., Akron, N. Y.

The chemical engineering aspects of titanium metal production were explained by R. L. Powell of the Titanium Metals Corporation of America, New York. Use of sodium instead of magnesium in reduction of these metals was reported by Marshall Sittig of the Ethyl Corporation, New York.

Science News Letter, March 20, 1954

GENERAL SCIENCE

National Science Fair Expected to Double

► THE NATIONAL Science Fair is expected to double its size in 1954, Joseph H. Kraus, coordinator of the national event, has reported.

Last May, 30 areas scattered throughout the United States were represented at the national fair held in Oak Ridge. This year, about 60 areas may send delegates to the national fair at Purdue University, May 13 through 15.

This means that competition will be even tougher for the teen-aged scientists who will enter the exhibits that won them top place in their local fairs. If the expected number enter the National Science Fair, about 120 high school students will be in the competition. Each local fair can send two finalists to the national event.

The grass roots of the national fair have spread this year even into Canada. Students in a small southern section of British Columbia will be able to seek entry into the National Science Fair through the Inland Empire Science Fair, to be held in Seattle, and covering parts of Montana, Idaho, Washington and Oregon.

All science students in New Mexico, Indiana, West Virginia, Delaware and Rhode Island now have a local fair to enter. About four-fifths of New Jersey and all but the four northwest counties of California are covered by local science fairs.

About two-thirds of Tennessee, North Dakota and Washington, half of Connecticut, one-third of Arizona and one-fourth of Idaho now have local fairs of their own.

Aimed at encouraging interest in science at the grass-roots level, the National Science Fair is sponsored by Science Clubs of America, administered by SCIENCE SERVICE. Last year about 13,000 science-minded high school students competed for national honors through their local fairs. Half a million persons saw the exhibits made by the teen-agers, and 15 million learned about the program through their local press.

This year these totals will more than double because the areas involved are much larger.

Science News Letter, March 20, 1954

IN SCIEN

PHYSICS

Clue to Atom's Heart In Waves of Nucleus

► ATOMIC PARTICLES passing near an atom's nucleus set up undulations or waves over the nucleus surface just as the moon regulates tides on the earth. This discovery by a Massachusetts Institute of Technology research team may give scientists another key to understanding the atom's invisible, mysterious heart. (See SNL, Aug. 29, 1953, p. 135.)

Clyde McClelland and Hans Mark, research assistants working under Dr. Clark Goodman, associate professor of physics at MIT, have discovered that the waves on the nucleus surface take the shape of bulges that travel around the nucleus at definite speeds.

Sponsored by the Office of Naval Research and the Atomic Energy Commission, the scientists found that tungsten nuclei absorbed little electric energy when accelerated through 1,000,000 volts in an electrostatic generator. The energy absorbed appeared as "pure rotational energy."

Dr. Goodman, who reports the experiments in *Physical Review* (Feb. 15), believes these findings bring one step nearer an exact description of a nucleus and its behavior.

Science News Letter, March 20, 1954

METALLURGY

Non-Rusting Crystals Achieved in Laboratory

► PURE NON-RUSTING iron crystals in the form of "whiskers" a thousandth of an inch thick and about one inch long have been achieved in laboratory experiments.

Dr. C. G. Suits, vice-president and director of General Electric's research, said in a forum in connection with Omaha's centennial that the crystals prove theoretical calculations which indicated that a pure iron crystal one inch square could hold up a million pounds.

Although the crystals produced in the company's Schenectady laboratory are microscopic threads, it is believed they give a "new and exciting dimension in metallurgy," Dr. Suits declared.

The crystals in many ways are not like iron at all. They not only exhibit a strength 100 times greater than previously made crystals that were thought to be nearly perfect, but also seem to have a mysterious "built-in" resistance to rust which attacks ordinary iron readily.

It is believed the perfection in atomic structure in the new iron crystals gives them the strength and anti-rusting qualities long sought by metallurgical engineers.

Science News Letter, March 20, 1954

CE FIELDS

AGRICULTURE

Red China Rations Grain; Famine Possibility Seen

► POSSIBILITY OF a famine in Red China has been seen in the Communist state's announcement of strict grain rationing, despite claims of increased food production.

According to British Embassy officials in Washington, there is good evidence that Red China's 1953 grain crop fell below the 1952 level, but they believe reliable reports do not indicate general famine yet.

British observers have reported rationing and food shortage in Peiping, Nanking, and Shanghai.

Poor food distribution has created pockets of famine almost every year in China, the foreign service men said. Surplus food and grain in one area cannot be moved quickly to shortage areas.

Science News Letter, March 20, 1954

MEDICINE

Smoking as Cancer Cause Tracked by Ultraviolet

► BECAUSE MOST cancer-causing chemicals fluoresce under ultraviolet light, scientists at Memorial Center for Cancer and Allied Diseases, New York, believe they have a way to determine whether cancer-causing chemicals get into the lungs of cigarette smokers who inhale.

When a smoker who inhales then exhales the smoke to bubble through a liquid, the liquid will fluoresce under ultraviolet. Smoke from the mouth of a person who does not inhale does not cause this fluorescence. This discovery, made by German scientists, has given the Memorial scientists hope that they can catch and identify the fluorescing material, and determine whether it is or is not cancer causing.

This research project is one of several looking toward prevention of cancer which Memorial's director, Dr. C. P. Rhoads, announced at a luncheon conference in New York.

Second factor blamed by some authorities for the increase in recent years in lung cancer is polluted air in our large cities and industrial centers. To probe this further, Memorial scientists will analyze New York City air samples collected by the city's health department. They may be able to detect cancer-causing chemicals in this air and, if so, to find ways of removing such chemicals.

Third prong in Memorial's attack on the lung cancer problem will come from a new technique by which they are beginning to grow normal human lung tissue in experimental animals. Any chemicals in ciga-

rette smoke or the air suspected of causing cancer can then be tested on human lung tissue. Previous studies linking smoking with lung cancer have been criticized because the suspected chemicals were tested on lungs of laboratory animals, and the reactions might be different from those of human lungs.

Memorial Center scientists have already helped oil and chemical industries find methods of preventing cancers in their workers, Dr. Rhoads reported.

To push further the cancer prevention program, Laurance S. Rockefeller, Memorial Center president, announced a campaign to raise \$10,000,000.

Science News Letter, March 20, 1954

PHYSICS

Transistor Improvements Described to Military

► TRANSISTORS NOW can be protected from their worst enemies, air and heat, top-ranking military officials were told by James J. Sutherland, general manager of the electronics division of Sylvania Electric Products Inc.

These two new developments, Mr. Sutherland said, promise to make the electronic devices suitable for military equipment such as radar, and for commercial electronic computers.

Transistors are tiny nuggets of germanium or silicon. They can amplify electronic signals as the vacuum tubes in radio and television sets do, and they require little power to operate.

Despite their desirable qualities, however, they often are not used because of their vulnerability to attack by air and heat. Mr. Sutherland said laboratory tests show that this can be counteracted.

A "stabilized germanium" for transistors has been produced by Sylvania scientists, he reported. Although the process is considered a "company confidential," it was revealed that the transistors are treated in molten potassium cyanide.

A 98% germanium-2% silicon alloy was found to be "quite successful" in resisting attack by heat which often kills the ability of transistors to perform properly.

Some alloys of germanium and silicon have produced transistors that will operate at temperatures touching 350 degrees Fahrenheit, he said. Germanium crystals ordinarily lose their amplifying qualities at about 212 degrees Fahrenheit.

Also recently announced was a manufacturing process said to "lock in" the virtues of germanium diodes, making them suitable for use in electronic equipment that requires high stability.

Germanium diodes are midsize chunks of metal that can do some of the jobs now handled by vacuum tubes in home radios.

The process was worked out by Sylvania engineers at Woburn, Mass., but details were not revealed beyond the statement that the germanium can be given a "molecularly stable surface."

Science News Letter, March 20, 1954

BIOPHYSICS

Radioactive Plutonium Health Danger Lessened

► DANGER TO workers in atomic energy plants of poisoning from radioactive plutonium seems less as a result of tests at the Hanford plant operated by General Electric Company for the Atomic Energy Commission.

For one thing, the tests showed that if any workers should accidentally swallow some of the radioactive stuff, it would take about 40 times more than previously believed to be dangerous. This came from tests in which rats were fed radioactive plutonium.

Second safety advance is the finding that some of the radioactive plutonium could be removed from the rat's body if treatment was started within 30 days after the plutonium was absorbed in the animal's system.

Third safety finding was that almost no plutonium applied to the skin of rats penetrates unless it is in a solution "so strong it destroys the outer skin layer." Best agents for removing the material from the skin, the tests showed, are those that also remove part of the outer layer of skin.

The tests were part of a continuing health and safety program carried on at the Hanford plant, even though there never has been a serious injury caused by radioactive materials there. Stringent safety regulation and elaborate protective equipment have effectively protected thousands of workers.

Chief danger of plutonium is that, like radium, it destroys the blood-making organisms of the body if it enters the body in appreciable amounts. Employees at Hanford daily work with the equivalent in radiation of tons of radium.

Science News Letter, March 20, 1954

HERPETOLOGY

Dinosaur Relative Is Zoo Resident

See Front Cover

► A MEMBER of the oldest living vertebrate family and a relative of the huge but extinct dinosaurs has been added to the reptile collection of Washington's National Zoological Park.

The tuatara lizard, *Sphenodon punctatus*, shown on the cover of this week's SCIENCE NEWS LETTER, was a gift of the New Zealand government to the zoo. It was flown to this country.

Dr. William Mann, director of the zoo, said the tuatara's family is about 100,000,000 years old. The reptiles are now confined to a few islands off New Zealand where they are given government protection.

A sluggish animal, it varies in length from one to a little more than two feet and is fond of lying in water. They eat living things, being especially fond of worms.

Science News Letter, March 20, 1954