ZOOLOGY

Pesticides Spread, Even to Antarctica

➤ TRACES OF DDT have recently been found in seals, penguins and fish in Antarctica, indicating that pesticides are spreading over most of the world.

Although the ice-covered land is separated by hundreds of miles of water from areas where DDT might have been used, Dr. John L. George of Pennsylvania State University has frequently found small amounts in specimens of Adelie penguins and Weddell seals. Traces were also found in some species of fish.

An interesting mystery, Dr. George reported, was the fact that no pesticide other than DDT was found in any of the samples he analyzed. Dr. George raised the possibility that the seals, penguins and fish with DDT were contaminated while they were away from Antarctica, bringing the pesticide back with them.

His study also supports the belief that traces of pesticides are concentrated in meat-eating animals of the food chain. No DDT was found in polar snows, nor in any such invertebrate organisms, as starfish, mites and shellfish.

DDT was first released for civilian use in 1945. Since then, it has found its way throughout the globe.

Dr. George began his study while on a trip to Antarctica last December and January as part of the United States Antarctic Research Program, conducted by the National Science Foundation. Dr. George reported his findings at a symposium on pesticides and the environment at the Monks Woods Experimental Station in England.

• Science News Letter, 88:56 July 24, 1965

PHYSIOLOGY

60,000 Miles of Tunnels Form Capillary Network

➤ A HUMAN BEING has some 60,000 miles of tiny tunnels inside him to nourish his body and carry off its wastes.

A new theory of how these capillaries function has been developed by Dr. Benjamin W. Zweifach, New York University School of Medicine, and Dr. Marcos Intaglietta, California Institute of Technology in Pasadena, Calif.

Capillaries, the body's smallest blood vessels, are about a three-thousandth of an inch in diameter. They were once thought to be sections of living hose in the circulatory system. Now they have been found to be actually tiny tunnels that form the vast capillary network throughout the body. One end of each tunnel is connected with a very small artery and the other end with a very small vein.

Sensitive pressure-measuring and torsion-measuring devices were used to study the capillaries of rabbits. The scientists found that the tiny tunnels are lined with endothelial cells. It is believed that the fluids move through the capillary "walls" between these cells.

The torsion device measured the elastic properties of the capillaries and adjoining tissue. The measurement showed that the elastic properties of the capillaries and of the tissue were identical. Therefore, they must be the same structurally, Dr. Zweifach concluded, and probably are one and the same thing.

The capillaries feed tissues with oxygen, nutrients and fluids and also carry off wastes such as carbon dioxide. Research on these tiny blood vessels has been limited because they are very fragile and inaccessible.

The scientists also measured the pressure in capillaries by studying the paths red cells take. These studies resulted in a modification of the popular concept of how the vital fluids are exchanged between the tissues and the capillaries.

It is known that there is a lively exchange of fluids at the capillary level. Because the capillaries that are carrying blood cells are observed to lose fluid, but not collect it, any one capillary must be able either to carry blood and feed fluid to the tissue, or to collect waste fluid from the tissue. But apparently no capillary does both at the same time, the researchers reported.

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ENGINEERING

Average Engineer Described in Survey

➤ A TYPICAL ENGINEER in this country is a man about 41 years old, working either in industry or on his own and living in New York or California.

These are a few of the findings from the most thorough study of the engineering profession ever conducted. The study, made by the Engineers Joint Council (EJC) for the National Science Foundation, is based on questionnaires returned by nearly 58,000 members of 41 leading engineering societies.

Industries, educational institutions and Congressional groups alike have emphasized their need for factual information describing a cross section of the engineering profession, EJC officials reported. The survey is expected to serve as a guide for many plans and programs now being studied in the engineering field.

About 71% of the engineers answering the questionnaire are employed in industry or are self-employed, another 15% are employed by the Government and 6% work for educational and nonprofit institutions.

Five percent of the respondents hold a doctorate degree, 17% a master's degree and 63% a bachelor's degree. Five percent have less than a bachelor's or no degree. Another 9% did not report their degree level.

Only one-half of one percent of the group were women. The median age of the respondents was 41 and the median years of experience was 15. Nearly 32% had 20 or more years experience.

The two states with the largest number of engineers are California with more than 13% and New York with more than 10%. Almost 22% of the sample live in the Middle Atlantic region.

Fourteen percent reported their area of technology as methods and work simplification, with 13% in electronics.

• Science News Letter, 88:56 July 24, 1965

IN SCIEN

PUBLIC HEALTH

Warns of More Flu Coming Next Season

➤ SURGEON GENERAL Luther L. Terry of the U.S. Public Health Service warned that more influenza is expected next season than hit the United States last year.

Areas that experienced fairly heavy outbreaks last winter, however, are expected to be less affected in the coming year.

Dr. Terry's announcement was made in connection with recommendations for immunization drawn up by his Advisory Committee on Immunization Practices.

The committee found that the United States got off fairly lightly last year. Therefore, because the disease apparently hits peaks every two to three years, "somewhat increased amounts of influenza may be expected in the coming season." The last major epidemic of Type A influenza occurred in 1962-63 in most of the country, and the majority of these cases were Type A-2.

The announcement reemphasized previous general recommendations that the following groups of persons, especially, have flu shots: those with chronic debilitating diseases, older persons, pregnant women, patients in nursing homes and those living under extremely crowded conditions.

The committee urged that vaccination start in September and be completed by mid-December.

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GENERAL SCIENCE

Foundations Urged Not To Perpetuate Trustees

➤ INGROWN CONTROL is worrying those who know about the big foundations whose millions of dollars play an important part in getting new scientific and scholarly activities started.

There is a new idea from Prof. Burton Raffel, formerly editor of the Bulletin of the Foundation Library Center, now English professor at the State University of New York at Stony Brook. To prevent self-perpetuation which sharply militates against change, he suggested that new trustees of foundations be selected by a temporary nominating committee for new trustees composed of institutional and other experts who themselves would not serve as trustees. Moreover, the terms of the outside electors themselves would be limited to ten years.

There is too much dependence of foundations upon specialists in the universities to which most of the grants are made, in Prof. Raffel's opinion. Most of the money is dispensed to institutions, not individuals, although there are notable exceptions. This puts another screen between the giver and the doer.

• Science News Letter, 88:56 July 24, 1965

CE FIELDS

MILITARY SERVICE

Battlefield Radar Spots Distant Moving Troops

➤ A NEW BATTLEFIELD radar system is so sensitive that it can spot a moving person nine miles away or a moving vehicle 22 miles away.

The system is a pulse radar which uses the Doppler effect for canceling out stationary targets. In the Doppler effect sound waves coming from a moving object appear to have a higher pitch as the source of the sound approaches and lower as the source moves away.

Moving targets appear as bright spots on a cathode-ray screen while fixed targets can be displayed or eliminated as desired. The operator can then use manual tracking while listening to loudspeaker Doppler sounds that identify the objects as vehicles or one or more troops.

More than 50 units of the system, developed by International Telephone and Telegraph Corporation's Laboratoire Central de Telecommunications, Paris, have been delivered to the French, West German and U.S. Governments.

• Science News Letter, 88:57 July 24, 1965

TECHNOLOGY

Desalinization Makes Brackish Water Fresh

➤ USING a new desalinization technique and a new construction method, an experimental pilot plant has started converting brackish water into drinkable water in Coalinga, Calif.

With the installation of the plant, the small California inland community about halfway between Fresno and the Pacific Coast becomes the first town in the world to put a reverse osmosis unit to daily use.

The plant, designed and put together in a University of California at Los Angeles engineering laboratory, reverses one of nature's own methods, osmosis, to filter salt water, separate the brine, and extract fresh water.

In nature, osmosis is a process involving the flow of fluids through special membranes such as cell walls.

Engineers and scientists have been familiar with reverse osmosis for a long time, but it was not until UCLA research engineers Sidney Loeb, Srinivasa Sourirajan, and Serop Manjikian developed a special filtering membrane that the process became practicable.

At full production, the plant will produce 6,000 to 7,000 gallons daily, lowering the salt content of the town's brackish water from 2,500 parts per million to under 500 parts.

Main interest of the UCLA research engineers in the project is to test the pilot unit in the field and gauge costs for building a plant for producing about 500,000 gallons per day. At the same time, the pilot serves Coalinga by supplementing its daily drinking supply.

The reverse osmosis unit, which uses a series of 112 tubes to hold the membranes, has four important advantages over other desalinization methods, says Dr. Loeb:

1. Comparatively little energy is needed to run the unit, just enough to pressurize water to 600 pounds per square inch.
2. All mechanical parts are standardized and can be easily put together, serviced and replaced.
3. The plant is run at ordinary room temperature. Thus many of the common corrosion and scaling problems are avoided.
4. The reverse osmosis process requires no heat, chemical treatment, or phase changes from liquid to vapor (as in distillation) or liquid to solid (as in desalinization through freezing).

Working closely with Dr. Loeb have been Prof. Joseph W. McCutchan and Edward K. Selover of UCLA.

• Science News Letter, 88:57 July 24, 1965

METEOROLOGY

Man-Made Storms Boom Over 'Old Faithful'

➤ ARTIFICIAL thunderstorms booming over "Old Faithful" geyser are showing scientists how lightning affects storm clouds.

Old Faithful was chosen for the experiments because it creates at ground level, once every hour, a super-cooled cloud comprising a wide range of water droplets, reported Dr. Guy G. Goyer of the National Center for Atmospheric Research in Boulder, Colo. Yellowstone Park's Old Faithful discharges some 15,000 gallons of hot water 120 feet high every hour on the average.

In the tests, lightning discharges were simulated by the explosion of a detonating cord, called a Primacord, suspended from a standard meteorological balloon anchored about 300 feet above the ground. The shock wave generated by the Primacord is comparable in theory with that from high-intensity lightning.

The explosions, which took place during the geyser's gushes, were found to shatter the large droplets into many tinier droplets.

"In all cases, the effect of the detonation is to increase the number of droplets collected" from five to 60 times normal, Dr. Goyer reported. After one explosion, the scientists noted heavy precipitation some 2,000 feet downwind of Old Faithful at "Castle" Geyser, a phenomenon not previously observed there.

"This observation could be explained by the shattering of large droplets which were carried further by the wind," Dr. Goyer said.

Miniature hailstones, detected when they bounced off clothes and equipment, were always observed to fall immediately after the detonations.

"These observations constitute conclusive evidence of the mechanical effects of lightning discharges on precipitating super-cooled Clouds," Dr. Goyer concluded in a report in Nature 206:1302, 1965.

• Science News Letter, 88:57 July 24, 1965

AERONAUTICS

Multi-Service Planes Coming in Future

➤ IN A FEW YEARS there may be no such thing as an "Air Force plane" or a "Navy plane," predicted several military officials and aircraft manufacturers.

Within the next 20 years, the Army, Navy and Air Force will have combined into one huge military service, said a U.S. Navy spokesman at the first public demonstration of the Bell X-22A, a tri-service vertical takeoff aircraft.

Only two current aircraft were designed from the ground up for multi-service duty: the X-22A and the variable-sweep-wing, F-111 (TFX). However, officials at the demonstration in Niagara Falls, N.Y., were unanimous in predicting more for the near future.

The F-111 was designed in two different versions, one for the Navy and one for the Air Force, with about 85% of their parts interchangeable.

Secretary of Defense Robert S. McNamara estimated a billion-dollar saving from this "commonality" over two completely different aircraft.

Another plane, the Bell D-188A, was simulated on a computer a few years ago to fit requirements of both the Air Force and the Navy.

"Everything but the paint job was dual service," said Vincent A. Paxhia, project manager at the Bell Aerosystems Corporation for the X-22A.

"Although the two versions carried different weapons," he added, "the fire control system could handle either of them."

Aircraft will not be the only item to adopt multi-service designs, which will ultimately include "everything from belt buckles on up," the Navy man said.

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PUBLIC HEALTH

High Cigarette Taxes Help Curb Smoking

➤ RAISING CIGARETTE taxes has contributed to a decrease in cigarette consumption, at least in the Netherlands.

As part of an intensive anti-smoking campaign, the Dutch Government raised the tax on cigarettes by approximately 25% of their retail price.

The high tax, combined with efforts to influence public opinion brought a 20% reduction of cigarette consumption in 1964.

The campaign, which is being directed by the Netherlands Cancer Information Bureau, has been endorsed by parents, teachers and government officials.

Special efforts aimed at youth are underway to stop smoking before it starts. In 1964 the Netherlands teachers organizations voted not to smoke during school hours, and since then they have been warning their students about the dangers of smoking.

Dr. L. Meinsma, director of the Bureau of Cancer Education, points out that "the Netherlands Government has taken a more positive stand than most governments."

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