

BIOCHEMISTRY

Danger of Nerve-Gas Type Chemicals Reduced

► THE NERVE-GAS type insecticides, such as Parathion, and probably the nerve gases too, can have their dangerous skin-penetrating power reduced by more than 100 times through a new kind of emulsifier.

Results of tests showing this are announced in *Science* (Aug. 29) by Drs. William B. Deichmann, Patricia Brown and Charles Downing of Albany Medical College, Albany, N. Y. (See p. 172.)

The emulsifier tested by the Albany scientists is known only as Emulsifier 42-1 A. Chemically, it is an aromatic polyglycol ether obtained when ethylene oxide is added to a phenol of high molecular weight. It is unusual because most emulsifiers increase the toxicity of a chemical by making the compound more soluble. Emulsifier 42-1 A does just the opposite.

The insecticide, however, does not lose its poisonous property for insects as a result of the emulsifier's action.

An emulsifier of this type was first made in Germany, but the one Dr. Deichmann and associates tested is being made in this country by the Chemagro Corporation of New York. In his tests, Dr. Deichmann used it with a new insecticide, also made by Chemagro, called Systox. This is a systemic organic phosphate insecticide of the so-called nerve gas class.

The emulsifier and insecticide are mixed and shipped in a concentrated form. It is in this form that the insecticide's ability to penetrate skin and thus cause poisoning is reduced 100 times. But when the emulsifier-insecticide mixture is diluted with water, as the farmer will do when he uses it, the original toxicity of the insecticide is restored.

The emulsifier's protective action is on skin penetration. It is much less effective in case the insecticide is swallowed.

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MEDICINE

Penicillin Treatment For Burns Plus Radiation

► VICTIMS OF atomic bomb attack who have gotten burns as well as non-fatal doses of radiation might be saved from death by penicillin, Dr. Everett I. Evans, professor of surgery at the Medical College of Virginia, Richmond, declared in a report at a Symposium on Trauma held at the Army Medical Service Graduate School in Washington.

A combination of non-fatal burn and non-fatal dose of radiation can be killing, even if neither alone would be fatal, Dr. Evans found in studies of experimental animals.

The addition of 100 roentgens external radiation (400 roentgens or more constitutes a lethal dose) to a standard burn injury resulted in a sharp increase in mortality. A mortality of 12% from the burn

alone increased to 75% with the addition of 100 roentgens total body gamma radiation, and to 20% with the addition of only 25 roentgens total body gamma radiation.

Of the mechanics by which mortality rises, Dr. Evans says, "With combined thermal (heat) and radiation injury, entrance into the blood of non-hemolytic streptococci is shortly followed by invasion with more virulent beta hemolytic streptococci, which brings about a fatal septicemia in 75% of the animals. It appears likely that radiation (radiation well below the lethal level) depresses the phagocytic activity and other defense mechanisms to a point where they are unable to localize the beta streptococci at the wound surface. The beneficial influence of penicillin therapy, in reducing sharply the mortality of experimental animals receiving the combined thermal and radiation injury, points to the need for provision of this therapy for victims of atomic bomb attacks, and provides hope that such therapy may reduce the mortality from such combined injury.

"The studies and results reported here should not be confused with those in which lethal amounts of external body radiation are used," Dr. Evans warns.

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DENTISTRY

Heat-Processed Cereal Causes Rat Tooth Decay

► WHETHER YOU get your protein largely from eggs, meat and milk or from cereal foods, especially the ready-to-eat breakfast cereals, may have something to do with whether your teeth decay.

This new approach to the problem of the relation of diet to tooth decay is suggested by studies by Dr. F. J. McClure of the U. S. National Institute of Dental Research, Bethesda, Md.

He has worked out a diet that causes decay of rats' teeth of a kind very similar to that seen in human mouths afflicted with caries. This in itself is something of an achievement, because heretofore dental scientists trying to solve the decay problem have had trouble getting a laboratory animal to develop a human type of tooth decay for study purposes.

The diet Dr. McClure has worked with is deficient in a number of essentials. In his report to *Science* (Aug. 29), he calls particular attention to the "obvious inadequacy of the cereal protein," especially its lysine content. Lysine is one of the essential amino acids. He also points out that the cereals have been heat-processed, which has recently been reported to change the nourishing quality of protein.

Diet 586, which produced the human type caries in the rats' teeth, is relatively low in sugar and does not involve a coarse particle factor which some other scientists have reported as a factor in bringing on tooth decay.

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IN SCIENCE

SURGERY

Latest Spare Part: Plastic for Human Gullet

► A NEW spare part doctors have developed for the human body is a plastic tube that doubles for the esophagus, or gullet, down which food passes to the stomach.

Thirty patients have been fitted with this spare part in the last two years, Dr. Edgar F. Berman of Baltimore reported at the meeting of the International College of Surgeons in Chicago.

Of these, 28 patients had cancer of the esophagus. The cancerous portion was cut out and a plastic tube from four to nine inches long was put in its place.

Comparing results in these patients with those obtained by conventional surgical procedures, Dr. Berman said that the mortality was considerably decreased and "the comfort of the patients tremendously improved."

Patients will live longer to the extent that the new procedure takes less time and gives the surgeon more time to find and remove glands near the esophagus that might be cancerous and, if not removed, would shorten the patient's life.

The plastic tube may stay in place permanently, or it can be removed after being completely surrounded by a fibrous sheath which forms within 60 days.

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AERONAUTICS

Fighter Plane Firepower In Wing-Tip Rockets**See Front Cover**

► ROCKET FIREPOWER in wing-tip pods gives the Northrop Scorpion F-89D, an all-weather, heavily-armed interceptor plane, a double-barrelled "grand slam" in attacking an enemy invader.

Advantages of the 2.75-inch rockets in the wing tips instead of in the conventional position in the fuselage include:

Greater target area is blanketed.

Large numbers of rockets can be carried.

Firing does not interfere with the vision of the pilot and radar observer at the critical moment of interception.

Jet-engine intakes are not exposed to smoke and debris produced by rocket fire.

In the version of the Scorpion designated the F-89C, fuel-dumping valves are now installed in the wing-tip fuel tanks for use when a quick weight reduction is essential in combat. The fuel tanks of the F-89D are a permanent part of its structure and can not be dropped off as in many jet fighters. They carry supplementary fuel.

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E FIELDS

ASTRONOMY

Double Stars Closer As They Grow Larger

► **DOUBLE STARS** get closer and closer together as they grow larger and larger, Dr. R. A. Lyttleton of St. John's College, Cambridge, Eng., told members of the International Astronomical Union meeting in Rome, Italy.

Stars are growing all the time because they pick up interstellar hydrogen as they make their way through space, according to one of the latest astronomical theories. Double-star systems represent stars that have been gradually drawn together by this accretion, Dr. Lyttleton pointed out.

"Binary stars begin as very widely separated small stars," Dr. Lyttleton said. "As they increase in mass, they are drawn closer and closer till they eventually merge into a single star."

The whole course of evolution of binary stars, as outlined by Dr. Lyttleton, is almost the exact reverse of that visualized by the famous British astronomer, the late Sir James Jeans. His theory, accepted for half a century, pictured double stars as resulting from the break-up of a single rotating star.

Given the slightest disturbance, Dr. Lyttleton reasons, an unstable rotating liquid star would probably break into two unequal pieces. But these parts, instead of forming a close binary system, would be thrown away from each other with such violence that they would separate altogether.

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PHYSIOLOGY

Test Tells Whether Death Due to Drowning

► **A NEW** test to tell whether a person died of drowning or was dead before his body was thrown or fell into the water was announced by Drs. Stanley H. Durlacher and Henry E. Swann, Jr., of the Chemical Corps Medical Laboratories, Army Chemical Center, Md., and Dr. Henry C. Freimuth of the Office of the Chief Medical Examiner, State of Maryland, at the meeting of the American Physiological Society in New Orleans.

In cases of death by drowning, these scientists, find, the blood in the left side of the heart is slightly lighter in weight per unit volume than that in the right side of the heart. Their new test is made by measuring the specific gravity of the serum or plasma from blood from each side of the heart and comparing the two. The specific gravity gives the weight of a substance compared with that of an equal volume of another substance taken as a standard.

More tests in deaths from various causes

are still needed, the scientists said, to be sure the changes in specific gravity are consistent and that the new test is completely reliable for showing death by drowning. But they presented at the meeting final evidence showing that the currently used chloride concentration test is not valid.

This test is based on the difference in chloride concentration in the blood in left and right sides of the heart. Too many changes occur in chloride concentration after death, the scientists found, for this test to give reliable information.

The new test is simpler and quicker than the chloride test. It is based on the fact that when a person drowns, some water must go into the lungs and some, whether salt or fresh, will go to the left side of the heart and then to the right side. At one point, when death comes, there will be slightly more water in the left than the right side. Because of the greater amount of water, the blood in the left side will be lighter in weight per unit volume than that in the right side.

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PUBLIC HEALTH

Do Not Stuff Bird Before Freezing It

► **DO NOT** stuff your turkey before you put it in your freezer. This advice comes from the U. S. Department of Agriculture home economists.

Stuffing the birds before freezing may seem like convenient advance preparation. But it may endanger the health of your family and guests who eat the turkey later.

The explanation is that stuffing inside a turkey takes a long time to reach the freezing point. Meanwhile, germs may start growing and continue their growth later as the bird thaws and then warms up slowly in the oven.

One study made by industry showed that the center of the stuffing in a pre-freezing stuffed turkey did not get hot enough to kill spoilage bacteria until long after the meat of the bird was well cooked. So, to escape the danger of food poisoning, freeze the turkeys without stuffing.

Another point to remember, the Department of Agriculture home economists point out, is that in preparing for the freezer, the giblets, that is, the gizzard, heart and liver, should be wrapped separately and either frozen in a separate container or placed in the cavity of the bird.

Turkeys are reported a good buy now, so early turkey-shopping is suggested for families with home freezers.

These birds used to be considered feast-day or special-occasion food. Part of the reason was their large size and part the fact that they did not come on the market in abundance so early. Now, with the modern small-size turkeys available, housewives can include turkey along with chicken and other fowl, meat, fish, eggs and cheese dishes as main dish protein foods.

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NUTRITION

Flash-Sterilized Milk Keeps Natural Flavor

► **CANNING** OF flash-sterilized milk in sterile containers to replace long heating in a sealed can is perhaps the most exciting event that has taken place in the dairy industry, Dr. Charles Glen King, scientific director of the Nutrition Foundation, New York, said in Chicago recently. Natural flavor is kept by this method, he said.

During the past 20 years, he told the symposium on food of the Centennial of Engineering, much has been learned about what is in foods, how they are formed, and how the nutrients function in protecting human health.

As examples of major improvements in our food supplies, Dr. King said that:

Frozen canned orange juice, lemonade and lime juice have an assured vitamin content roughly equal to that of fresh juice.

Strong competitors to evaporated milk are being developed in the form of canned whole milk, frozen milk, powdered milk and milks with low fat content.

Development of new foods for the future may be aided by a new kind of professional, the biochemical engineer, Dr. King said. His raw materials of today—food—literally make the men of tomorrow.

"It is no simple task," he said, "as we look ahead a few years, to provide the physical means of building the world's three billion human bodies and minds to their respective individual peak levels of vigor and attainment, on a life-span basis."

Although "sales may grow on hot air for a time, children cannot," he stated. There are now about 50 nutrients essential to human life, and the list is growing.

The degree of success of the food industry in meeting its responsibility in health, economy and public confidence, Dr. King concluded, will be an important measure of man's capacity for progress in the century ahead.

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SURGERY

Bone Flap Used to Remedy Groin Rupture

► **A FLAP** of bone with its tough fibrous membrane may be the solution to the problem of the discouraged, often disabled patient with an inguinal hernia, or rupture in the groin, which keeps coming back in spite of various attempts to correct the defect.

The bone flap, measuring about two by one and a half inches, is taken from the patient's pubic bone and attached to the bands of tissue connecting the muscles of the abdomen.

This technique was reported by Drs. William M. McMillan and Robert T. McElvenny of Northwestern University Medical School in Chicago at the meeting of the International College of Surgeons in that city.

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