PHYSICS

Find Way for Cutting Costs of Heavy Water

➤ A WAY of cutting the production costs of the heavy water, or deuterium, used in nuclear reactors by concentrating the scarce material with bacteria has been discovered.

The method works in the oceans, and should prove feasible for large-scale production if the bacteria can be grown in sufficient quantity.

The concentrating effect was found by chance when four Government scientists were testing the composition of ocean sediments. They found an unexpectedly high enrichment of normal hydrogen.

Drs. P. E. Cloud Jr., Irving Friedman and F. D. Sisler of the U. S. Geological Survey and Dr. V. H. Dibeler of the National Bureau of Standards report in *Science* (June 13) that deuterium is concentrated in one area of the Bahama Banks.

The bacteria responsible are believed to belong to the genus *Pseudomonas*. The deuterium is concentrated in the residual nutrients, in the bacteria or in the water between the grains of the sediment.

The scientists discovered the bacteria's ability to concentrate deuterium by studying the composition of gas generated by bacteria in sediments collected off the Bahama Banks. Since the gas generated was remarkably low in deuterium, the bacteria must have concentrated it.

Dr. Cloud told SCIENCE SERVICE the discovery was an example of a possibly very practical and totally unexpected by-product of pure research. The Geological Survey is conducting a comprehensive study of the ocean sediments in the Bahamas region. He said he hoped other scientists would make further studies to determine exactly where the deuterium is concentrated.

When working with materials as diluted as ocean water, Dr. Cloud said, it is "much easier to find that something is gone than to find out where it is located."

Science News Letter, July 5, 1958

MEDICINE

Percentage of Bottle-Fed Newborn Babies Grows

➤ A CONSTANTLY increasing number of babies are taking to the bottle.

A recent nationwide survey shows the percentage of newborn infants that are bottle fed while in the hospital has nearly doubled since 1946.

The first study of newborn infants made in 1946 revealed 36% were bottle fed, 38% were breast fed, and 27% were both bottle and breast fed.

The second study, a decade later, in 1956, revealed that in 1,904 hospitals, 63% of the newborn infants were bottle fed, 21% were breast fed, 16% were bottle and breast fed.

The only evidence that might contribute to the breast feeding decrease found in this study would be that more than three-fourths (84%) of the mothers and infants leave the hospital on or before the first postnatal day, just when or before the maternal lacation is being established, Dr. Herman F. Meyer of Children's Memorial Hospital and Northwestern University Medical School reported at the American Medical Association meeting in San Francisco.

The committee on maternal and child feeding of the National Research Council has listed some reasons given by mothers who do not wish to nurse their babies. They include: the whole idea is disgusting to some mothers whose natural feelings have been distorted; the mother must work; she will lose her figure; she is prone to be nervous; she will get too fat; her husband objects; suckling is unbearably painful; she does not want to be tied down to routine, or she may not want the child and may reject the whole idea of the close contact involved in breast feeding.

The committee concluded the time to correct such attitudes is not in the lying-in period but during pre-birth instruction.

Of the 1,876 hospitals reporting, 49 nurseries have human milk available. Sixty-five have frozen supplies of "this rare commodity." In all but a few exceptions, this reserve of human milk is used exclusively for premature infants.

Science News Letter, July 5, 1958

NATURAL RESOURCES

U. S. Self-Sufficient in Two of 32 Vital Minerals

➤ THE UNITED STATES is truly "self-sufficient" only in magnesium and molybdenum out of the 32 vital minerals.

The greatest contribution of engineers is to do nothing that will further drain our natural resources, Rear Adm. H. G. Rickover, assistant chief of the Navy's Bureau of Ships for nuclear propulsion, said.

He told young engineers graduating from Stevens Institute of Technology the U. S. is no longer one of the world's richest countries in mineral and fuel resources. Adm. Rickover, who is also chief of the Atomic Energy Commission's naval reactors branch, said this country is now importing many vitally needed materials, whereas it was once a great exporter of raw materials.

This change occurred in the last 25 years and should be taken into account by the engineer in his planning. Adm. Rickover cited an example concerned with building a bridge across a body of sea water with valuable oyster beds. The selected location ruined the beds, but a small change of location would have saved them and the livelihood of many persons.

"Engineers," Adm. Rickover said, "build structures which alter man's supply of pure air and water, of food and soil.

"A poorly designed factory may poison air and water; a dam or highway may needlessly rob our grandchildren of good farm land which by then may well be in short supply.

"Almost everything the engineer does has an effect on our materials base. His work is seldom purely an engineering task, though he sometimes acts as if it were."

Adm. Rickover urged that consultation with other experts by engineers become as common as it is among doctors.

Science News Letter, July 5, 1958

IN SCIEN

ROCKETS AND MISSILES

Report Reason Explorer's Radio Resurged to Life

➤ THE REASON Explorer I's apparently dead radio resurged to life for about four days was reported to the American Rocket Society meeting in Los Angeles.

Dr. Eberhardt Rechtin of the Jet Propulsion Laboratory, Pasadena, Calif., said the resurgence resulted from the internal circuit connections of the two batteries and showed that, when testing for the lifetime length of batteries, "you should do it long after your unit is dead."

Dr. Rechtin also reported on the reception of "ghost satellite" radio signals from Russian sputniks. Under certain conditions the broadcast beamed at 40 megacycles was recorded at a receiving station 180 degrees away on the earth from the satellite's true position. The signal had much the same characteristics as if the satellite had been overhead.

The explanation is that the radio waves were trapped by the earth's magnetic field or that they were trapped in a rather peculiar way by the ionosphere, with the result that they reached the listener in exactly the right phase.

Dr. H. W. Wells of Carnegie Institution of Washington first reported hearing the "ghost signals."

One important fact learned about tuning in on instruments broadcasting from outer space, Dr. Rechtin said, was to "believe the instruments rather than preconceived ideas of physics." As an example, he cited the extremely high counts of cosmic rays made at some stations, which sometimes caused the telemetering channel to appear to be working improperly when actually the instrument had become saturated.

Science News Letter, July 5, 1958

NUTRITION

Mother Dogs Need Three Times More Food

➤ A MONTH or so after their pups start nursing, female dogs need about three times the amount of food they normally eat. Energy, or calories, seems to be the major need at this time. A dog nursing less than five pups does not need quite three times the normal amount of food.

These facts were shown by records kept during nutrition studies by P. H. Philips and J. A. Ontko, University of Wisconsin biochemists. The researchers said the dogs might have eaten even more at that stage of lactation, but their digestive tracts could hold no more.

If sufficient nutrients are not available at this time, the dog must obtain them from stored nutrients or from body tissue.

Science News Letter, July 5, 1958

CE FIELDS

AGRICULTURE

Reclaimed Tidal Basins May Solve Land Shortage

➤ SAN FRANCISCO Bay area may be 159,000 acres of dry land bigger by taking over some of the sea.

Tidal flats and shallows are now under study for reclamation possibilities, V. S. Aronovici told scientists at the American Society of Agricultural Engineers meeting in Santa Barbara, Calif. There is no reason, he said, why Americans cannot salvage submerged land just as the Dutch have done for centuries.

Literally hundreds of thousands of submerged lands and marshes bordering the United States' coast could be reclaimed for farming.

Urban expansion and a steadily growing population have caused a shortage of farmland near metropolitan areas.

Mr. Aronovici, a U. S. Department of Agriculture engineer, pointed out a detailed study of soil conditions of the submerged land is necessary before reclamation can start.

Science News Letter, July 5, 1958

MEDICINE

Alcohol Death May Be Due to Circulatory Failure

➤ THE TREATMENT of severe alcohol intoxication in man will probably be changed as a result of animal experiments.

Treatment had been based on the assumption that death, if it results, will probably be due to respiratory failure.

The experimental animals consumed alcohol either by mouth or injection until they had taken a lethal amount. It is the first time animals have been observed who consumed a lethal dose of alcohol. Previously the biochemical and physiological effects of smaller doses of alcohol have been reported, Drs. Gerda I. Klingman of the Johns Hopkins University and Harvey B. Haag of the Medical College of Virginia in Richmond comment in the *Quarterly Journal of Studies on Alcohol* (June).

Of the animals that took alcohol by mouth, about 65% died within 12 hours and these animals seemed to die of respiratory failure. But with the other 35%, respiratory rate and depth were relatively unchanged but the blood pressure showed a progressive drop so that death was finally due to circulatory failure. These animals lived longer than 12 hours, however.

Alcohol given the animals by intravenous injection always caused death by respiratory failure.

Both oral and intravenous lethal doses of alcohol produce an excess of glucose in the blood. Animals that had only a moderate rise in plasma glucose usually died within 12 hours of respiratory failure. Those in which the rise in glucose was marked usually lived longer than 12 hours and death was preceded by a drop in blood pressure.

One finding in the experiments indicates present knowledge of the blood alcohol levels of men who die of alcohol intoxication may be misleading.

With few exceptions, animals given a lethal dose of alcohol by mouth die at a time when the blood alcohol concentrations are going down. The findings indicate that at the high alcohol levels destructive changes are begun which continue until death even though the body is able to eliminate some of the alcohol in the meantime.

Science News Letter, July 5, 1958

SURGERY

Hypnosis Tests Brain Damage in Heart Surgery

➤ HYPNOSIS has been successfully used during open heart operations.

Two teen-aged patients were hypnotized and then given small amounts of anesthesia. Hypnosis was used in these cases to avoid the depressant effects of anesthetic drugs. Furthermore, by controlling unconsciousness while the patient was on the heart-lung machine, the doctor was able to check on the possibility of brain damage, one of the dangers present in the use of the heart-lung machine.

One of two patients who underwent hypnosis awoke on command while her heart was temporarily by-passed and a heart-lung machine had taken over its work.

The first patient, a 13-year-old boy, received certain posthypnotic suggestions during preliminary interviews and during the operation, Dr. Milton J. Marmer of Beverly Hills told the American Medical Association meeting in San Francisco.

There was a marked absence of complaint of pain during the postoperative period, he pointed out. The boy remained placid, calm, relaxed and cooperative through the postoperative course and was discharged on the 30th day in good condition.

After this first successful attempt with hypnotism, it was decided that the second patient, a 14-year-old deaf girl, would be awakened during the operation, if possible. Thus brain damage could be detected.

She was hypnotized and given a small amount of anesthesia. She was placed on the heart-lung machine, her heart opened, and a hearing aid placed in her ear, so that she could hear instructions.

When told to open her eyes, she responded readily. She also moved her head to indicate that she could hear and understand.

After the defect was repaired and the heart closed, she was given instructions to sleep again. She slept until the entire operation was completed. At that time she was told to awaken.

She was discharged from the hospital 20 days later, in good condition, Dr. Marmer said.

Science News Letter, July 5, 1958

PUBLIC HEALTH

Predict Radiostrontium Bone Levels From Diet

➤ PREDICTION of bone levels of hazardous radiostrontium that might be expected from fallout contamination of food is now possible.

Samples of human rib bones, cow's milk, vegetables and dairy cattle feed were collected from five regions in the United States. They were: 1. Phoenix, Ariz.; 2. Sacramento, Oakland, Fresno and Los Angeles, Calif.; 3. Tulsa and Oklahoma City, Okla.; 4. Philadelphia, Pa., and Albany and Rochester, N. Y.; and 5. Madison, Wis., and Minneapolis, Minn. Regions were selected on the basis of different strontium to calcium ratios in soil.

All samples were analyzed for strontium and calcium. This was naturally-occurring (non-radioactive) strontium. Living matter, however, utilizes the natural and fallout product alike.

From this study the investigators were able to determine approximately the amount of strontium a person may retain from a given diet and thus to predict radiostrontium bone levels from contaminated food supply.

The level at which bone radiostrontium becomes a human health hazard has yet to be determined, the UCLA scientists emphasized.

We receive most of our strontium from vegetables, the investigators point out. Meat and eggs contain very little. Milk contributes relatively little strontium because a cow "filters" out much strontium in converting feed to milk.

The study was carried out at the University of California at Los Angeles by George Alexander and Dr. R. E. Nusbaum of UCLA's Atomic Energy Project.

Science News Letter, July 5, 1958

ENGINEERING

Astronomy Technique Measures Scratches

➤ HOW DEEP is a scratch?

That is a question that long has posed problems for scientists who have needed to measure the depth of tiny scratches on vital metal parts. Astronomy has provided the solution.

Engineers are using an instrument that looks like a miniature telescope and they are measuring scratches the same way an astronomer measures the depth of a crater on the moon.

Boeing Airplane Company engineers have developed a compact optical instrument that directs a beam of light into the scratch at a precisely determined angle. The instrument automatically measures the length of the shadow formed.

The involved trigonometrical calculations needed to relate light angle and shadow length to scratch depth are performed simply by turning a calibration knob on the device.

The depth of scratch is given automatically.

Science News Letter, July 5, 1958