

CHEMISTRY

Thorium 'Breakthrough' May Cheapen A-Power

➤ A "BREAKTHROUGH" that promises to free the United States from its currently expensive atomic power dependence on uranium was reported to the American Chemical Society meeting in New York by Dr. Dennis D. Foley of the Battelle Memorial Institute, Columbus, Ohio.

The "breakthrough" is a process for the practical production of thorium fuel of reactor-grade purity and a way to get cheaper atomic power for peaceful purposes. Dr. Foley pointed out that presently, uranium-235 is the only naturally occurring fissionable material and "the indispensable element in atomic energy development." Thorium, however, is three times more abundant than uranium in the earth's crust.

For this reason, he said, the procurement of thorium pure enough for reactor applications has been one of the most serious problems in atomic energy programs.

Working under an Atomic Energy Commission program, the Battelle scientists perfected a solvent extraction process for treating thorium nitrate. It is said to be the only practical method developed to date for making thorium fuel of the required high purity.

A recovery of 99.89% of the thorium as a purified product was achieved.

The solvent extraction process was not the main objective of the AEC program. The Battelle scientists were trying to provide basic process design data for the AEC's Feed Materials Production Center at Fernald, Ohio. As a secondary objective, they hoped to produce enough high-purity thorium nitrate by solvent extraction to permit making an analysis of the impurities by actual slow neutron irradiation.

The somewhat "accidental" find means, Dr. Foley said, that "thorium may ultimately play an important role in the world's nuclear fuel supply." Robert B. Filbert Jr. of the Institute was co-author of the report.

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PSYCHIATRY

Addict's Chances Slim Since He Enjoys Illness

➤ DRUG ADDICTS do not suffer from their illness, they enjoy it, and therefore their chances of ever breaking the habit are slim.

This is the belief of Dr. Sandor Rado, clinical professor of psychiatry, Columbia University College of Physicians and Surgeons, who has been studying the mental makeup of addicts for 30 years, as reported in the *American Journal of Psychiatry* (Aug.).

The pleasant effects of a narcotic drug strengthen a person's inner belief that he is all powerful, an idea that begins in infancy when a baby first realizes he can move. After that, the baby attributes unlimited power to his intentional actions and pictures himself as an omnipotent being.

This early belief is the hidden core of an

addict's desired self and under the effects of a narcotic, he regains the early feelings of power.

Narcotics bring a sudden change from pain to pleasure and this proves to the addict that, after all, he is the omnipotent giant he always fundamentally thought he was.

Strangely enough, even the addict's guilty conscience helps to tighten his grip on the drug. To placate his conscience, he turns to self-punishment and his unconscious mind drives him to further self-destruction with the drug. His conscious mind lets this happen because of the typical addict's belief that "Nothing can happen to me."

The mere withdrawal of the drug without other treatment is not enough to free the addict from his dependence on drugs. Available information shows that the majority of patients relapse within a few months and the rest within a few years.

Getting the addict off the drug has to be the first step in rehabilitation but the actual withdrawal is a precarious procedure. The idea solution in the future may come from the biochemists who discover a way to immunize a person against the pleasure-producing effects of a narcotic.

Steps in this direction have recently been taken with the discovery, in animals, of the brain's pleasure-producing centers.

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VETERINARY MEDICINE

Special Odor Makes Trailing Dogs Quit

➤ POLICE DOGS and other canines trained to pursue a man by his scent can be made to flip over on their backs and lose interest in their work if the odor from certain fatty acids are placed in their paths.

This was discovered by a Japanese scientist who used the smell of butyric and other similar acids given off by decaying animal tissue to confuse trained police dogs completely.

The typical reaction to the odor was for the dog to follow carefully the trail up to where the acid odor had been placed. Then the dog would stop, roll over on its back, rub its shoulders on the spot and wholly abandon its pursuit work.

Dog owners or leaders have often noticed that their dogs, while taking a walk, turn upside down on the ground and rub their neck and shoulders against the ground for several minutes. Sometimes they repeat the ritual several times, and on close examination one can often find the decayed corpse of some animal such as a bird.

It was this observation that led Tohru Uchida, Hokkaido University, Japan, to test the effects of butyric and similar acids.

These acids are formed during the decay process and give off odors that smell more or less the same, but are all disagreeable to man.

The dogs, on the other hand, evidently find them more interesting than those of humans.

The research is reported in the *Proceedings of the Japan Academy* (Dec., 1956).

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IN SCIEN

TECHNOLOGY

Automobile "Halitosis" In for a Cleaning

➤ THE AUTOMOTIVE industry thinks it can cure its cars, trucks and buses of what one scientist termed "halitosis"—the unpleasant and unhealthy air pollutants spewed out daily by the nation's millions of vehicles. A special section of the Society of Automotive Engineers meeting in Seattle, Wash., heard the industry's reports on their latest research to clean up exhaust gases. (See p. 196.)

"Bad breath" in motor cars comes from unburned fuel and the smoky burning of engine lubricants. J. M. Campbell of the General Motors Corporation summarized what is being done about it:

A "vacuum limiting" device that cuts down smoky exhausts by holding back the formation of unburned fuel mixture in decelerations has been developed.

Flame-type "afterburners" for attachment on exhaust pipes and oxidizing catalysts for purifying unburned waste to produce an almost perfect exhaust of just water vapor and carbon dioxide are showing promise.

Instruments have been made to sample the components of exhaust gases and check their volume and after-flow. Some test cars carry \$50,000 worth of exhaust-measuring equipment.

Investigators are gathering data on driver habits in cities. In Los Angeles, for example, it has been found that a driver may spend more than twice as much time accelerating as he does idling or cruising.

Scientists have developed improved methods of detecting and removing poisonous carbon monoxide gases from inside of vehicles.

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SOCIOLOGY

Parents' Divorce May Not Be Cruel Blow to Child

➤ DIVORCE of their parents is not always a tragedy for the children, Dr. Judson T. Landis of the University of California at Berkeley told the American Sociological Society meeting in Washington, D. C.

If the children have been kept in the dark concerning the conflict in the family and think their parents' life is serene, then the divorce comes as a painful blow and makes the children acutely unhappy and gives them a feeling of insecurity.

If, however, the children have been aware of the unrest and bitter conflict in the family, the children look forward to the divorce as a relief and a step toward a better life.

These differing attitudes were revealed to Dr. Landis in a survey of 330 children of divorced parents.

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CE FIELDS

MEDICINE

Child-Bearing Lessens Chances of Breast Cancer

► WOMEN who want to lower their chances of getting breast cancer should have children. The more children they have, the safer they will be.

This was indicated by a study of breast cancer cases at Ohio State University Health Center, Columbus, reported by Dr. M. T. Macklin to a joint meeting of the American Society of Human Genetics and the Genetics Society of America at Stanford University, Palo Alto, Calif.

Breast cancer is unduly frequent among single women and among married women who have not borne children. Studies have shown the mortality rate to be 60% higher for single women with breast cancer.

Breast cancer, like many other cancers, is caused by a combination of factors, some environmental and others inherited. A childless woman who is closely related to a woman with breast cancer runs a much greater risk than a woman who has no such close relatives.

But even though close relatives do have breast cancer, a woman may be able to suppress it in herself either completely or until much later in life by having children and nursing them.

"It is not yet clear whether it is the mere having the children which acts as a partial protection . . . or whether it is the amount of nursing that may accompany the child-bearing that is the important factor.

"Unfortunately, although the risk of developing breast cancer decreases with increasing number of offspring, the risk of developing cervical cancer increases," Dr. Macklin said.

The study has shown genetic factors are at least as important as environmental ones and maybe more so, she concluded.

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TECHNOLOGY

Natural Steam Rivals Atomic Energy for Power

► UNDERGROUND steam harnessed to produce electricity will rival atomic energy for power production in New Zealand.

This first large-scale use of an entirely new source of energy is scheduled for completion within a year. By that time, the New Zealand Government expects to feed 69,000 kilowatts of electricity into the country's power grid, Michael P. McIntyre of San Jose State College, San Jose, Calif., reports.

In *Science* (Sept. 6) he notes that only Yellowstone National Park, Iceland and Italy are known to have underground steam that can be tapped. The steam, and also geyser basins, boiling mud pools and hot

springs, are formed when ground water comes into extensive contact with hot subterranean rocks.

Test bores in the center of New Zealand's North Island have shown the natural steam occurs in an area covering more than 3,000 square miles. No "dry wells" have been found.

One relatively small and shallow bore, four inches in diameter at 575 feet, discharges 130,000 pounds of water and steam every hour. The roar of the jet can be heard four miles away.

The steam is free from impurities that could clog or corrode machinery.

The power station is being erected on the banks of the Waikato River near its source at the north end of Lake Taupo. Five 20-inch steam pipes will bring the steam about a mile to the plant.

Most of New Zealand's power is now hydroelectric and most of the practical dam sites have been developed. The country has no significant petroleum deposits and only modest coal reserves, both low in quality and costly to extract.

Since the population there is increasing at the phenomenal rate of two percent a year, Mr. McIntyre said, the demand for power continues to grow in spite of the fact that New Zealand often beats Norway in the largest per capita consumption of electricity.

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BIOLOGY

Large Fish Act Less Like Parents

► THE BIGGER you are the less you have to worry about taking care of your youngsters, that is, if you are a fish.

Large fish can afford to neglect this year's crop of children because they have plenty of time to produce more in later years. Not so the small fish, Dr. George C. Williams of Michigan State University told the American Institute of Biological Sciences meeting in Palo Alto, Calif.

The general impression, Dr. Williams suggested, is that fishes exhibiting exemplary parental traits produce fewer eggs than those that wander off and leave their young to fend for themselves.

This impression probably comes from the comparison made between small fish that exhibit good parental care and large fishes that do not.

"Large fish produce more eggs than small ones, regardless of the presence or absence of parental care," Dr. Williams said.

Generally, small fish expend more of their efforts in family matters than do large fish because their time in the water is limited. Their present breeding season is likely to be their last.

Not so the large fish, it will not only be around for a few more mating seasons, but will tend to grow more after reaching maturity than the small fish and the bigger it gets, the more eggs it can lay.

Thus, concludes Dr. Williams, "such a fish can afford to neglect this year's spawning because it represents but a small part of what it may produce in future years."

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CHEMISTRY

Leaded Gasolines May Threaten Some Workers

► ANTI-KNOCK gasoline additives containing lead may threaten the health of persons whose occupations keep them in heavy automobile traffic, although there is no health hazard to the majority of the population.

A study of lead particles formed from the combustion of gasoline containing tetraethyl lead was reported by a University of Chicago chemist to the American Chemical Society meeting in New York.

Persons who follow average occupations and spend only a normal amount of time in or near heavy traffic inhale only about one-third the maximum allowable concentration of lead particles, Miss Barbara J. Tufts, department of meteorology chemical analyst, reported.

With the small concentrations of lead particles in the atmosphere, no health hazard exists for most of the population, "except possibly to those whose occupations require a constant exposure to highway atmospheres," Miss Tufts said.

She added, however, that "serious consideration ought to be given the matter in view of the expected increase in automobile population in the future."

Air samples were drawn through fine membrane filters that captured all lead particles, then the filters were chemically analyzed for lead content. The greatest number of particles found were of a size that could most easily reach the lung, one to three microns. A micron is about four one-hundred-thousandths of an inch, 0.00003937 inch.

Samples were taken under various traffic conditions, including starting and stopping, rapid and slow speeds.

Miss Tufts undertook the study, she said, for two reasons: the role of the automobile in smog and air pollution problems has aroused interest leading to studies of the gaseous combustion products but not of possible lead particles products, and lead by itself is a toxic agent and its effects can be cumulative.

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DEMOGRAPHY

Idea of Limiting Family Taking Hold in India

► THE IDEA of planning and limiting family size is taking hold in India, both among the city dwellers and country people, Dr. William A. Morrison of United College, Winnipeg, Canada, told the American Sociological Society meeting in Washington.

Sample surveys in three Indian states and in New Delhi showed that a fairly large proportion of both rural and urban populations are favorably disposed toward family planning. Those in the higher social and cultural groups, those who already have large families, and the younger people are even willing to use contraceptives for planned parenthood, Dr. Morrison found.

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