

## PUBLIC HEALTH

## A-Wastes Stored in Glass

BOTH CANADIAN and Russian scientists have made good progress in their attempts to incorporate highly radioactive wastes into glass in order to store them safely in artificial vaults or bury them underground.

Scientists working with the Atomic Energy of Canada Limited have succeeded in making glass containing up to 50 curies of five- to six-year-old mixed fission products per kilogram.

One of the problems during the infiltration process of the radioactive wastes into the glass, volatility of two fission products, ruthenium and cesium, has successfully been overcome by the use of iron oxide as an adsorber for ruthenium and a silicate for the adsorption of cesium. The experiments also proved that the rate of leaching of fission products depends on the composition of the glass.

Very little leaching occurs and this decreases with time.

The method of ultimate storage depends both on the properties of the glass and the concentration of fission products in it. In case of short decay times of the radioactive isotopes contained in the glass artificial cooling might become necessary in order to avoid an undesirable increase of tempera-

ture in the burying grounds. While artificial cooling would probably be too expensive, adequate cooling can be achieved by burial in dry ground.

L. C. Watson, when presenting these findings of the Atomic Energy of Canada Ltd. to his colleagues during the international meeting in Monaco organized by the International Atomic Energy Agency and UNESCO, also indicated that a demonstration plant is planned to incorporate all existing wastes stored at Chalk River into glass. This glass would then be used for a large scale test of a selected method of disposal.

P. V. Zimakov of the U.S.S.R. said the problem of incorporation of highly radioactive wastes into glass under high temperatures has also been studied in his country.

Soviet scientists, however, have not succeeded in making the product completely insoluble. They consider that any further improvements in the insolubility would depend on a reduction of the size of the crystals in the glass and on other chemical factors. Mr. Zimakov agreed that the fixation of highly radioactive waste into glass before burial of waste products would increase the safety.

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## GENERAL SCIENCE

## Conformism Hurts Science

IMAGINATIVE engineering and scientific research in the United States is being shackled by conformism, and if this country is to compete with Europe and Japan, engineers and scientists must start taking risks "way out in left field."

Dr. B. R. Teare, dean of the College of Engineering and Science at the Carnegie Institute of Technology, said that because of scientific disciplines, scientists fall into ruts.

They often pursue research with an immediate objective in mind—called "hole plugging" at a conference on research goals held at the Worcester Polytechnic Institute, Worcester, Mass.

There is no recognition for the scientist who pioneers in a "risky" area and whose research fails to bear scientific fruit. So the type of research that leads to great breakthrough discoveries commands little attention in the laboratories because of the risks involved.

Dr. Carl C. Chambers, vice president of the University of Pennsylvania, said this is typical of our society—that we are afraid to take risks.

"Our societies have become extremely conformist, and this has permeated the fields of engineering and science."

Dr. John Hollomon, associate director of research for the General Electric Company, said scientists who are willing to take risks should receive recognition simply because

they are willing to take risks, even if the "risky" project fails to bear fruit.

He said U. S. industry must start taking risks especially to find ways of meeting economic competition from Europe and Japan.

Dr. Hollomon also stated that "we spend too much time selling ideas." Whether the researcher is in industry or a university, he must spend so much effort promoting his special idea that he has little chance to work on it.

Dr. Lee DuBridge, president of California Institute of Technology, suggested that some way be found to "get away from the organization man in engineering and research." At present, research frequently falls within the framework of "the project," supervised by the "project engineer." Miles of red tape must be cut by the researcher whose interest lies outside the project.

Failure in the U. S. to foster development of pioneering research-minded scientists, Dr. Teare said, stems from failure to "start early enough with the boys who are interested." At the latest, some effort must be made in the first year of college to develop their scientific research bents, and preferably this should occur as early as at the high school level.

Hitting at the sluggish inspiration a promising student may get, the preface to the conference's program states:

"Many factors contribute to this lack of

originality. Our educational processes are not efficient in developing the creative mind; our graduate study programs often require that students select discreet theses projects, usually along well-trodden paths, and they discourage venturing forth into the unknown; our scientific and engineering societies provide forums for the presentation of reports on accomplished research but seldom attempt to project into the future."

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## ENGINEERING

## Wave-Riding Dolphins Puzzle Scientists

"A GRAVEYARD to our wits"—that is how one scientist describes the dolphin.

These "rascals" are pleasing to watch playing around in the ocean, but how dolphins manage to ride the waves as they do remains an unsolved puzzle, reports Dr. P. F. Scholander of the Scripps Institution of Oceanography, La Jolla, Calif.

So far it has been impossible to show experimentally how the dolphin gets a free ride swimming near a ship's bow, Dr. Scholander points out in *Science* (130, 1657, Dec. 11, 1959).

One theory, described by Dr. Wallace D. Hayes of Princeton University in the same issue of *Science*, is that a streamlined body of neutral buoyancy—the dolphin—can be propelled within a wave at wave velocity. This is not accepted by all researchers, however.

Another problem concerning the dolphin that has "rather worried students of theoretical fluid mechanics: "How can the dolphin swim several times faster than predicted from drag and muscle power?"

Dr. Scholander concludes that until more is known about how the dolphin maintains balance under unstable conditions and better experiments are designed, the scientists "must bow to the dolphin."

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## PUBLIC SAFETY

## Bowlers Can Suffer More Than Pinched Fingers

BOWLING FANS can easily suffer more serious injuries than the pinched fingers or crushed toes that result from mishandling bowling balls.

Citing three injuries which occurred during bowling, Dr. James R. Hoon of Sheboygan, Wis., explains that the bowler can suffer from strained thigh muscles. His report appears in the *Journal of the American Medical Association* (171, 145/2087, Dec. 12, 1959).

While no bowler should follow through to the point that he goes sailing down the alley with the ball, the examples cited clearly demonstrate that trouble can occur when the bowler stops suddenly at the foul line on delivery of the ball.

Proper conditioning and training in the art of body movement during delivery of the bowling ball will help prevent such injuries, Dr. Hoon suggests.

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