engineering sciences

HIGHWAYS

Antiskid road works

Tests completed by the city of London show that roads treated with a blend of epoxy resin, asphalt and processed aluminum ore chips reduce skids. The blend provides good skid resistance through the hard, abrasion-resistant chips, which are embedded in a tough flexible resin. The compound resists becoming slippery under heavy traffic and provides a ready means of restoring nonskid properties to polished road surfaces.

Tests conducted by the Metropolitan Police Traffic Research Branch over a five-month period in high-accident areas show a 62 percent reduction in traffic accidents compared with the same period before treatment.

CRYOGENICS

Tender meat produced

Some unexpected results have turned up in fast-freezing research by Dr. Theodore Wishnetsky and Alan N. Kivert of Air Products and Chemicals, Inc., Allentown, Pa. They found that fast-frozen meat was more tender than slow-frozen meat. Meat tenderness, as measured by the amount of force needed to shear a thawed and cooked meat patty, is dependent on the number of cells that are destroyed in the freezing process. Since slow, or conventional, freezing destroys more cells than does cryogenic freezing, it would ordinarily be expected to produce a tenderer product. The fast freezing method employed liquid nitrogen at an average temperature of minus 150 degrees F. to freeze meat patties to zero degrees. The conventional freezing did the same but over a longer period of time.

Work is continuing to determine why the quick-frozen meat was tenderer.

ISOTOPES

New plutonium process found

An electrometallurgical process for producing biomedical-grade plutonium 238 has been uncovered, reports the Atomic Energy Commission's Division of Isotope Development. The metal is vital to many life-support programs, including heart implantation.

The process, described by Dr. J. A. Leary of the University of California's Los Alamos Scientific Laboratory, allows the plutonium to be produced in extremely pure form so that its external radiation is reduced to a safe level. In the process, impure plutonium is mixed with a molten salt, such as a sodium and potassium chloride mixture, from which plutonium is deposited at an electrode.

In the pure condition, plutonium is ideally suited as the energy source in artificial heart implantations, 10,000 of which could be used each year in the United States when the technology is developed.

In adapting plutonium to meet the requirements of various applications, electrometallurgical processing plays a crucial role because of the economic value of the element. For example, standard plutonium is worth $5,500 a pound, while special isotopic heat-source compositions are valued at more than $250,000 a pound.

VIBRATION ANALYSIS

Warning system for bridges

A way to determine bridge stability based on vibrations has been offered by Wendell V. Mickey, chief of the vibration and engineering projects branch of the Coast and Geodetic Survey in the U.S. Department of Commerce. He regards a bridge's pattern of vibrations as its fingerprints. A change in the usual vibration pattern could indicate a structural weakness.

Vibration meters, normally used to monitor blasting vibrations, could easily be used for this purpose and thus forewarn engineers about bridge collapses.

The present system of using strain gauges is inadequate, Mickey believes, because it fails to cover the entire bridge.

BALLISTICS

Rocket gun patented

A patent for a pistol powerful enough to knock out small armored vehicles has been issued by the U.S. Patent Office to Robert Mainhardt and Arthur T. Biehl of MB Associates, San Ramon, Calif.

It works by a hammer that strikes and ignites a small ballistic missile, at the same time restraining it by a spring so it builds up sufficient thrust. The entire process takes a few milliseconds.

FOOD TECHNOLOGY

Pilot plant for cellulose conversion

A pilot plant is on the drawing board at Louisiana State University for the conversion of cellulose to protein. Cellulose, the indigestible plant structural material which ruminant animals convert into protein, abounds in grass, leaves, sawdust, logs, corncobs and sugarcane residue. Even ruminants, however, cannot convert cellulose into protein without the aid of microorganisms (SN: 8/31/68, p. 218).

The LSU facility is intended to employ the necessary microorganisms as part of a production process to convert the cellulose, or carbohydrate material, to protein. The process begins with grinding the cellulose, then mixing it with an alkaline solution and finally adding the microorganisms.

The plant is expected to turn out an end product which will consist of microorganisms which are more than 50 percent protein.

Dr. V. R. Srinivasan, associate professor of microbiology, who isolated two microorganisms that convert sugarcane waste into protein, says that a mixed fermentation enhances the rate of conversion of cellulose into protein better than a fermentation employing only one type of microorganism.

The plant is expected to be in operation before the end of the year.