

## Nonpolluting fuel from microbes

As the energy crisis deepens, ideas for energy production which were once regarded as highly esoteric and impractical are gaining support.

Carl Lamanna, scientific adviser to the life sciences division of the U.S. Army, says in the July issue of the *AMERICAN SOCIETY FOR MICROBIOLOGY NEWS* that there appears little doubt now that microbial conversion of cellulose into methane or other clean fuels is economically feasible. Combustion of these fuels produces only carbon dioxide and water—which are, in effect, recyclable through photosynthesis. Thus the fuels are renewable “as long as the sun shines.”

Already, says Lamanna, microbiologists have used cellulase, an enzyme from fungi, to convert cellulose to a monosaccharide. Further steps could produce methane, or alcohol, also a clean fuel. Waste cellulose is an abundant by-product of wood and paper industries, and urban garbage contains great quantities of it.

Another possible source of methane might be through microbial action on sewage and on feedlot wastes, says Lamanna.

## Vitamin C blocks carcinogens

There has been growing concern over the formation of nitrosamines from reactions between nitrites or (indirectly) nitrates and various organic compounds known as secondary or tertiary amines. The reason for the concern: nitrosamines have been found to be carcinogens. The nitrates and nitrites are found in foods and water as preservatives or as fertilizer residues; likewise, several commonly used drugs for humans and animals are secondary or tertiary amines, and similar compounds may also be found in nature.

Four University of Nebraska scientists report that work they have done shows that ascorbic acid (vitamin C) almost completely blocks nitrosamine formation. The ascorbate ion apparently has a high affinity for nitrites and thus preempts the nitrosating reaction.

The researchers—Sidney S. Mirvish, Lawrence Wallcave, Michael Eagen and Philippe Shubik of University of Nebraska Medical Center in Omaha—recommend prescribing ascorbic acid along with drugs that are secondary or tertiary amines.

## Hydrocarbon pollution from refueling

Air pollution control officials have concentrated on ways of curbing hydrocarbon vapor emissions from automobiles and from large stationary sources, such as refineries. Relatively neglected as a source of hydrocarbons—which are key components of smog—are gasoline filling stations.

Now, reports the Coordinating Research Council after a study, the evidence is that a driver of a 1972 car releases more hydrocarbons into the atmosphere while getting his tank filled than while burning a gallon of gas along the open highway.

The study, conducted by Scott Research Laboratories for CRC, indicates an average of 4.7 grams of hydrocarbons are emitted for each gallon of gas pumped into the tank of the average car. With an average filling of 11.5 gallons, 55.6 grams of hydrocarbons are released, almost all of it in the form of vapors in the tank displaced by the filling operation.

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## Earthquakes and transportation

The latest in a series of earthquake hazard reports, this one by the National Transportation Safety Board, reiterates that the damage a single earthquake could cause to existing transportation structures far exceeds the amounts that have so far been spent to make them safe.

In the report, the board concludes that existing design codes for bridges and pipelines are inadequate. Unlike many buildings in earthquake-prone areas, transportation structures are sparsely instrumented so there is also a dearth of information on response to motion. The board recommends: coordination of all Federal agencies now involved in earthquake research; development of a greatly expanded program for protection against earthquakes; revision of bridge and pipeline design standards; Federal assistance in modifying existing structures to make them safer; installation of strong-motion seismic instruments on bridges and expanded geodetic, geologic and seismological research.

Two of the board's five members dissented on grounds that since only two lives have been lost as a result of failure of transportation facilities, there are more pressing problems to consider.

## Whither atomic wastes?

The Atomic Energy Commission has been engaged in a long search for a place to dispose of radioactive wastes from its nuclear power plants. A national repository, which may be either underground or in surface tanks, seems some years away. Meanwhile the AEC depends on interim storage at the plant sites. The plan for the Savannah River Plant in South Carolina has been to store the wastes in tunnels in a crystalline rock formation underlying the plant, and the AEC was planning a pilot project of an exploratory shaft and tunnels.

Last week, however, the AEC announced that it has temporarily abandoned that plan. The reason: A study by a National Academy of Sciences panel (SN: 5/13/72, p. 310) had found that another rock formation of Triassic age (180 million to 230 million years) held greater promise of leakproof storage. The pilot project has been postponed, probably for a year, while the AEC does some preliminary coring to decide where to locate the pilot shaft.

## Erosion by wind and water

After a ten-year study U.S. Geological Survey hydrologists have awarded the dubious distinction of “fastest eroding basin” to the Eel River basin in California. Over the period of the study, more than 310 million tons of rock and soil were eroded away from the basin. The average rate of erosion was four to eight inches per hundred years—13 times the national average. This erosion, said the USGS scientists, is caused by a combination of geology, soil type, steep slope and heavy precipitation. A large portion of the yearly erosion occurs during floods.

Meanwhile another report, this one from the Department of Agriculture's Soil Conservation Service, notes a reduction in damage due to wind erosion. This past year, the number of acres damaged by wind in a ten-state area was less than half last year's total. Most of the land damaged was cropland. Texas suffered the most damage.

57