RECENT DEATHS

William S. Barnhart, 58; senior polymer scientist, Pennwalt Corporation; 6 May.

E. Jefferson Browder, 81; professor emeritus of neurosurgery, Downstate Medical Center, State University of New York; 1 May.

Harold Cummins, 82; professor emeritus of anatomy, School of Medicine, Tulane University; 12 May.

Kenneth C. Francis, 53; clinical professor of orthopedic surgery, New York University Medical Center; 17 May.

Wilbur A. Lazier, 76; first director, Southern Research Institute; 14 May.

Thomas M. Reed, III, 54; professor of chemical engineering, University of Florida; 5 March.

John S. Rendleman, 48; president, Southern Illinois University, Edwardsville; 4 March.

Arthur H. Smith, 83; professor emeritus of physiological chemistry, Wayne State University; 19 March.

Guy-Harold Smith, 69; professor emeritus of geography, Ohio State University; 7 April.

Lyle M. Stanford, 65; professor of biology, College of Idaho; 20 April.

Emily L. Stogdill, 82; professor emeritus of psychology, Ohio State University; 14 March.

William S. Taylor, 82; professor emeritus of psychology, Smith College; 12 April.

Ivo T. Thomas, 64; professor of mathematical logic, University of Notre Dame; 2 February.

Kenneth F. Tritabaugh, 52; engineer, Applied Physics Laboratory, Johns Hopkins University; 8 February.

Edward L. Ullman, 63; professor of geography, University of Washington; 24 April.

Miriam E. Urdang, 58; associate professor of education, Queens College, City University of New York; 1 March.

RESEARCH NEWS

Rerefined Oil: An Option that Saves Oil, Minimizes Pollution

Half a billion gallons of oil is small change, less than half a percent of the annual oil consumption of the United States. But considered as a pollutant, half a billion gallons of oil is a staggering amount—more than the combined annual release of DDT's, polychlorinated biphenyls, aldrins, dieldrins, mirexes, and all the other highly publicized chemicals that are commonly perceived to be detrimental to the environment. Yet half a billion gallons is roughly how much used lubricating oil is released into the environment each year. It is applied to dirt roads, dumped into landfills, poured into sewers, flushed down toilets, splashed into waterways, or simply spilled into countless thousands of backyards across the country.

This oil spoils the taste of water, endangers the health of many kinds of organisms, and releases substantial quantities of poisonous metals into the environment. Yet this kind of pollution can be avoided relatively easily. If this oil were systematically collected, it could be rerefined into new lubricating oil or, less desirably, burned as a fuel under carefully controlled conditions. In the past, the government has been indifferent to the prospects for collection and reuse of this oil and, in some cases, has been actively obstructive. Economics have also been a major obstacle in the path of the small entrepreneurs who have attempted to make some use of this potential resource.

But the situation is changing. Several groups, spurred in large part by the energy crisis and the increased cost of virgin oil, have developed new rerefining processes that eliminate many of the environmental pitfalls characteristic of older technology. Federal and local governments have become noticeably more interested in promoting the collection of used oils. And, perhaps most important, the federal government has begun to consider ways of removing some of the hindrances to reuse of lubricating oils. The Federal Energy Agency (FEA) estimates that reuse of the wasted oil would reduce oil imports by about 70,000 barrels per day, or about 7 percent of the Administration's energy conservation goals. More important, according to FEA's Robert Marlay, the achievement would be a highly visible symbol of the nation's conservation effort.

Last year, more than 2.4 billion gallons of lubricating oil were sold in the United States, nearly 2 percent of U.S. consumption of petroleum. About half of this oil was consumed in use, discarded with filter cartridges, or lost through leakage. About 60 percent of the remaining 1.2 billion gallons was recovered from automobile crankcases. The remainder came from industrial and aviation applications.

According to the Environmental Protection Agency (EPA), nearly 600 million gallons of this oil was burned as fuel. Another 200 million gallons was used as road oil or incorporated into asphalt, and 110 million gallons was rerefined into lubricating oil. The remaining 290 million gallons simply disappeared. Combined with the oil used on roads, that makes a total of nearly 500 million gallons released into the environment.

The waste oil itself is still good, but contamination with a variety of materials makes its use difficult unless it is cleaned up first. The most important contaminants are the additives that are used to improve the lubricating properties of the oil and oxidation products of the additives and the oil. Also present are volatile components from gasoline and diesel fuel, carbon, sediment, water, metallic particles from engine wear, and metals from gasoline. The used oil cannot simply be mixed with crude at a refinery and cleaned up there because the metals would poison catalysts and many of the contaminants foul distillation columns. Burning the oil without treatment simply releases most of the contaminants into the air. The best solution is to remove the contaminants before the oil is used, and the need to do so has created a new industry.

At one time early in this century, several hundred companies throughout the country were engaged in rerefining used oils. But that industry has fallen on hard times. Whereas there were as many as 150 rerefiners only 10 years ago, today there are about 30. A number of factors have contributed to the decline. One of them is economics. Higher labor and transportation costs have made it almost prohibitively expensive in many areas to collect used oil. The higher cost of virgin oil has also increased the amount of used oil that is burned for fuel, thereby reduc-