

Solar-charred rooftops

The Department of Housing and Urban Development is inspecting solar installations that agency has funded and already found instances where wood — usually rafters or sheathing — beneath rooftop flat-plate collectors has been reduced to charcoal, according to the June SOLAR AGE. Charred sheathing loses all structural value and also poses the threat of eventually undergoing spontaneous ignition. Additionally, HUD investigators have found "extreme deterioration of sheet rock (gypsum) in solar attic applications where the temperatures are at least 150°F but probably not more than 200°F," SOLAR AGE reports.

Wood degradation is a function of temperature and time. Even at 350°F, new wood does not ignite instantly. Long-term heating, however, promotes chemical changes. "Basically, the heat breaks a polymer into monomers. Then the monomers break down, releasing volatile products," explains Peter Temple in SOLAR AGE. It appears permanent wood damage does not occur under 150°F, and perhaps not until temperatures above 200°F are reached. But double-glazed selective-surface collectors might achieve stagnation temperatures above 400°F. And a year's exposure to 280°F could "make spontaneous ignition likely," Temple says.

Energy Department experiments may shed more light on the problem. Stagnating collectors (those whose heat-transfer fluid, for some reason, is not circulating) have been sitting in the sun for 8 months now. A single summer (3 months) of stagnation — where peak temperatures of 290°F occurred — caused the wooden back panel to char on one collector. DOE expects to issue a report on the research soon.

Solar collectors mounted flush against building materials represent the greatest hazard, particularly if they accidentally stagnate. Flush mounting reduces cooling from the collector's back, potentially subjecting building materials to temperatures in excess of 300°F. In fact, flush mounting is believed at least partly responsible for a rooftop fire last year in Boulder, Colo.

Relating synfuels cost to oil

Oil prices must climb for synthetic fuels — such as coal derived oils and gases — ever to prove profitable, according to an engineering professor at the State University of New York in Syracuse. "Indeed," says Robert V. Jelinek, "if oil prices stop rising permanently, then no new synthetic-fuels venture can be justified economically in the foreseeable future."

In a report prepared for the House Science Energy Development subcommittee, Jelinek claims that, "as the price of oil rises, projections of the cost of producing synfuels from a new plant using "currently foreseeable technology" will increase proportionately. "No matter how high the price of oil rises—even to \$100 per barrel—a new plant built subsequent to arrival of oil at that price will not be economic as an investment prospect."

As the dominant energy source, oil drives the cost of all modern industry, including synfuels. At least Jelinek found this true in his study. It related the cost of synfuels produced by each of seven different processes to the cost of oil required to build each plant and to supply raw materials for it.

Energy briefs

- A 24 percent rise in residential energy prices over the 12 months ending March 1980 may explain the nearly 9 percent drop in household energy use over the same period that DOE reported last month.
- Solar cells — 16,128 of them — kept the 217-lb. man-piloted Solar Challenger (SN: 6/14/80, p. 373) aloft the 5 hours and 23 minutes it took to cross the English Channel on July 7.

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Syphilis plasmid portends drug failure

The ability of many disease-causing bacteria to resist drug treatments is attributed to the presence of small circles of genetic material. These independently reproducing DNA rings, called plasmids, can carry genes for drug resistance and can move from one type of bacteria to another (SN: 3/26/77, p. 202). Now Michael V. Norgard of the University of Texas Health Science Center at Dallas and James N. Miller of the University of California School of Medicine in Los Angeles report detection of a plasmid in *Treponema pallidum*, the bacterium that causes syphilis. They say in the July 31 SCIENCE that their observation raises concern that syphilis will acquire plasmid-mediated resistance to the antibiotics to which it has been so sensitive.

Call for controls on antibiotic use

Plasmids carrying drug resistance genes are a source of a "worldwide health problem," according to scientists at a meeting on bacterial plasmids last January. The scientists initiated a joint statement by 150 doctors and researchers in 25 countries saying that antibiotics are losing their disease-fighting power because of flagrant overuse. In news conferences in four cities last week, the group urged international action to curb this "global drug abuse." The abuse, as they see it, includes over-prescription, promotion and sale of antibiotics for illnesses, like the common cold, where they have no effect, and also use of the antibiotics in animal feed to promote livestock growth (SN: 6/30/79, p. 422). The scientists claim that growing antibiotic use leads to the emergence of resistant strains of bacteria. Then new forms of drugs must be developed, but they often cost more and have more serious side effects. To stem the tide, the doctors and scientists urge uniform practice in prescription and distribution of antibiotics and proper standards of advertising. Among the signers of the statement are Stuart Levy of Tufts University, George Jacoby Jr. and Walter Gilbert of Harvard University, Ananda Chakrabarty of the University of Illinois and Yankel Kupersztuch of the National Polytechnic Institute in Mexico City.

Baby fat: Not all the same

Amounts of a pump molecule in red blood cells can distinguish between two groups of obese children. Those children with no obvious cause for obesity, except perhaps a family history of weight problems, have a lower level of the molecule that pumps sodium and potassium across cell membranes than do normal children. However, in some children the obesity is associated with abnormalities, such as tumors, in the areas of the brain thought to be responsible for the control of food intake. Children in this group have 30 percent more pump molecules, which is the same amount as the normal controls. These results, reported at a recent meeting of the Endocrine Society by Mario DeLuise, E. Rappaport and Jeffrey S. Flier, follow up on their discovery last year that obese adults have fewer sodium-potassium pump molecules than do normal adults (SN: 11/8/80, p. 295). They proposed that the normal activity of this pump uses a considerable amount of energy, which is derived from food. Thus, in overweight subjects having fewer pumps, more food would be converted to fat tissue. Because the two groups of children examined were similar in obesity, the new results make it unlikely that differences in pump levels are a secondary effect of being overweight. The investigators, who are at Beth Israel Hospital and Harvard University, suggest that the measurement of the pump may be a useful tool to distinguish whether an individual is overweight because of reduced efficiency of calorie use or because of an inappropriate level of food intake, as in the children with brain abnormalities.

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