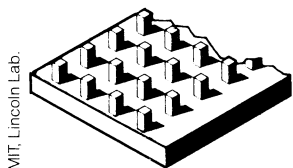


# ENERGY

Janet Raloff reports from Washington at the annual winter meeting of the American Society of Mechanical Engineers

## Advance in solar covers—roughing it up



At a wind speed of five meters per second — roughly the national average — convection may account for up to 83 percent of the heat lost through the transparent cover of a solar-thermal collector. One way to cut those losses, thereby increasing the collector's efficiency, is to deform the normally flat collector cover — literally to roughen it up.

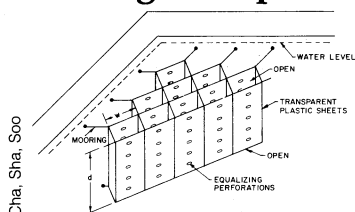
This "concept of roughening a surface to decrease convective heat transfer from it... is a novel one," according to its designer, Pattabiraman Raghuraman, and his colleague Daniel Kon at the Massachusetts Institute of Technology's Lincoln Laboratory. To their knowledge, it had "never been investigated."

In testing Raghuraman's theory, the researchers experimented with Plexiglas plates into which they cut crisscrossed grooves. Various groove widths, spacings and depths were tried. What they found was that these "rectangular island" geometries (see inset) indeed cut losses as long as the ratio of groove spacing to depth ( $\frac{\text{SPACING}}{\text{DEPTH}}$ ) was less than two. And they have yet to identify a "lower limit to this ratio which will maximize heat transfer." The best surface tested reduced convective heat loss "by a factor of four" over conventional flat surfaces, they say, with a groove height of  $1/32$ -inch performing best.

## Corrugation beats the solar flat plate

A solar-thermal collector's absorber must maximize convective transfer of heat collected by its surface to a liquid flowing against its backside. And a team from Purdue University's Heat Transfer Laboratory finds that selectively corrugating the absorber's back permits an otherwise ordinary flat-plate to increase its convective conductance "by a factor of three." Explain K. A. Shockey and colleagues, the material used does not transfer energy better so much as that corrugating increases the total exposed area of surface transferring heat.

## Cutting solar-pond instabilities



It's because pools of water store heat well that solar ponds (SN: 4/22/78, p. 250) are cropping up throughout the South. To minimize convective mixing of these ponds—and the resulting unnecessary heat loss through the top—salt is added.

It creates a series of zones whose densities and salt content increase with depth. However, wind, the extraction of heated water from a pond's warm depths and the replenishment of cool water to a pond's upper layer will eat into a pond's efficiency. All generate perturbations that enhance the mixing of layers.

To thwart such perturbations, Y.S. Cha, W.T. Sha of Argonne National Laboratory and S.L. Soo of the University of Illinois suggest using vertical grid-work barriers (see inset) to increase a pond's internal friction.

Transparent plastic walls, open top and bottom and moored to a pond's side, would subdivide pools into narrow vertical channels. Not only would they reduce convective heat loss, say Cha, Sha and Soo, but also salt loss. However, if the grids are effective enough, salt may not even be necessary. Future ponds might see vertical stabilizers paid for, at least in part, by the savings in salt. But the best savings, their stability analyses show, would probably result from longitudinal heat storage — ponds storing hot and cold pools beside each other within a single pond.

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# BIOMEDICINE

Julie Ann Miller reports on the Interscience Conference on Antimicrobial Agents and Chemotherapy held recently in Chicago

## TB treatment briefer than ever

Tuberculosis treatment through prolonged stays in a sanitarium has long been a therapy of the past. Anti-bacterial drugs have allowed patients to be cured with little disruption of their normal lives. Fewer patients are hospitalized and the length of hospitalization has decreased for those who are. Ken Powell of the Centers for Disease Control in considering current TB epidemiology says, "The normalization of lifestyle is more important than simple enumeration of cases."

Shortening the course of drug treatment for modern TB patients is a goal of physicians today. Currently, at least, two drugs are used for a period of 18 months to avoid relapse of the disease. But many patients stop taking the medication early. Besides getting better patient compliance, a briefer treatment would cost less and produce fewer toxic side effects. William C. Bailey of the University of Alabama School of Medicine reviewed a variety of studies of successful nine-month, six-month and even shorter drug regimens for pulmonary tuberculosis. Data on the nine-month treatment for extra-pulmonary tuberculosis "look good" Bailey says, but not enough cases have received the shorter treatment yet to give a clear result. Some physicians hesitate to decrease the 18-month treatment in compliant patients, but agree the shorter therapy might be useful in alcoholics and others who are difficult to adequately supervise.

## Relief at last to World War II POWs

American military men captured by the Japanese on Java in 1942 were sent to work on the Burma-Thailand railroad under conditions of malnutrition, poor sanitation and exposure to tropical diseases. Some of these POWs became infected with an intestinal parasite that causes recurrent characteristic skin rashes and gastrointestinal problems. Physicians at the American Lake Veterans Administration Center in Tacoma, Wash., this year contacted all 530 known American survivors and found the larvae of the parasite, *Strongyloides stercoralis*, in the stools of 43 of the veterans, almost 40 years after the initial infection. The infected men reported an average of 20 five-day episodes of itchy rash per year. Despite the discovery in 1967 that the drug Thiabendazole is effective in curing the disease, most physicians in the United States are unfamiliar with the parasite, so the veterans were never treated. Now Veterans Administration physicians are administering Thiabendazole to the infected men. Lawrence L. Pelletier Jr. suggests that other veterans who served in Southeast Asia during and since World War II may also have unrecognized *Strongyloides* infections that can be treated.

## Bacteria guard bacteria against drugs

Not only the disease-causing organism but neighboring microbes may be the source of an infection's resistance to an antibiotic. Itzhak Brook and colleagues at the Naval Medical Research Institute in Bethesda, Md., report that penicillin treatment against a streptococcal infection can be foiled by other bacteria that break down the drug. In up to 25 percent of patients, penicillin treatment fails to eliminate Group A beta hemolytic streptococci, an infection that can lead to rheumatic fever and kidney disease in patients with pharyngitis or tonsillitis. Experiments in mice demonstrate that penicillin treatment is more effective in animals infected with streptococci alone than in those infected both with streptococci and strains of *Bacteroides* that produce an enzyme that inactivates penicillin. Brook has identified penicillin-resistant *Bacteroides* in the tonsils of patients with recurrent tonsillitis. Other drugs may be superior to penicillin because of effects on these "protective" microbes as well as on the streptococci.

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