Elisha Moses' lab at the Weizmann Institute of Science in Rehovot, Israel. "It was such a beautiful motion," he recalls.

More recent experiments using that tank showed no clear signs of chaos, report Belmonte (who is now at Pennsylvania State University in State College), Moses, and Hagai Eisenberg, also at Weizmann, in the July 13 PHYSICAL REVIEW LETTERS.

The researchers videotaped and analyzed the falling behavior of rigid strips of plastic or metal in water and other, more viscous fluids. By confining a strip between hoops that hug the walls of the narrow tank, they restricted the strip's movement as it descends. The only motions observed were nonchaotic side-to-side fluttering and tumbling.

The absence of chaos doesn't trouble them, Belmonte and Moses say. Nor does it disprove prior claims. Perhaps the restrictions squelched the behavior, they speculate.

Rather, they draw attention to their ability to calculate accurately, given a few properties such as the strip's shape and the fluid's density, which of the two motions a particular strip will take. Moreover, by modifying Tanabe and Kaneko's theory, the researchers also achieved agreement between experiment and theory in defining these trajectories.

"One of the interesting things about our experiment is that it shows regularities in the fall" of the strips, Belmonte says.

As they did with the Tanabe and Kaneko study, Williams and Brown question the relevance of this experiment and Nori's to actual falling paper or leaves. In both cases, the researchers primarily dropped objects whose relative density to the fluids is, by Williams' calculations, much greater than the relative densities of paper or leaves to air.

"They may have a point," Belmonte says.

In an experiment to be described in an upcoming issue of PHYSICS OF FLUIDS, Mahadevan and Harvard University students William S. Ryu and Aravinthan D.T. Samuel have also found a regularity. By dropping hundreds of long, rigid plastic strips in air under controlled conditions and measuring their tumbling frequency, they found that they could calculate the tumbling rate from just the width and thickness of the strip.

The simplicity of the relationship surprised them, given that the strip is sloughing off complex swirls of fluid with each spin, Mahadevan says. "The solid is somehow in resonance with the fluid so that it slides and rotates in a regular way," he says.

A leaf also sheds vortices of air each time it flutters back and forth. To refine their theories further, researchers must find out more about the interaction between those vortices and the edges where they form, Mahadevan says. "That's the big puzzle that needs to be solved."

Falling leaves seem to hold a researcher's attention for only so long. Belmonte says that he is starting experiments to better understand vortices but with a focus on a different sort of fluttering—insect flight.

Nori has set the falling-leaf problem aside for now, too, but he may take it up again. In a few years, the growing power of supercomputers may allow a full-blown simulation of the currently unsolvable equations for descending objects, he says.

Where the current round of research will lead seems as unpredictable as the flight of an autumn leaf. □

Biomedicine

A sugar averts some ear infections

How sweet it is! A natural sweetener called birch sugar helps to prevent some ear infections when given to young children, Finnish researchers report in the October PEDIATRICS. In the United States, gum made with birch sugar, also called Xylitol, is mainly sold in health food stores. It is more widely available in Europe.

Preschoolers receiving 8 to 10 grams of birch sugar five times each day—in either lozenges or pieces of gum—came down with fewer middle ear infections over 3 months than playmates who daily received gum sweetened with sucrose and containing only a trace of birch sugar, says study coauthor Matti K. Uhari, a pediatrician at the University of Oulu in Finland.

Among 178 preschoolers given the sucrose-based chewing gum, 49 children were diagnosed with a total of 72 ear infections. Among 179 getting birch sugar gum, 29 children had 44 ear infections. Of 176 children receiving birch sugar lozenges, 39 came down with 52 infections.

Five-a-day doses of birch sugar given as a syrup proved less effective in preventing ear infections, but a distinction still emerged between birch sugar syrup and sucrose syrup. Of 165 children who received a sucrose syrup, 68 contracted 114 infections, whereas 46 of 159 children getting birch sugar syrup came down with 69 infections.

Even though it is a sweetener, birch sugar was shown to prevent tooth decay in earlier tests. So the researchers included 0.5 gram of birch sugar per day in the doses of sucrose syrup or gum to offset any tooth decay the sucrose might cause.

Laboratory experiments have shown that birch sugar inhibits growth of *Streptococcus mutans*, a bacterium that causes dental caries. Based on this, Uhari and his colleagues earlier had tested birch sugar against *Streptococcus pneumoniae,* a common cause of ear infections. They reported in 1995 that the sweetener inhibited this bacterium's growth in laboratory tests. The new work is the first large study to gauge birch sugar's effectiveness against the microbe in children.

S. pneumoniae latches onto cells in mucus, apparently riding this fluid up from the mouth and throat via the eustachian tubes to the ears, where it can cause an infection, Uhari says. Birch sugar seems to prevent this attachment some of the time, limiting the disease, he says.

If indeed that is the bacterium's mechanism, Uhari says, the microbe would "have no reason to develop resistance" to birch sugar, since the sweetener isn't killing it. Uhari and study coauthor Tero Kontiokari hold a U.S. patent on the use of Xylitol as a treatment for respiratory infections. —*N.S.*

Survival improving in organ recipients

The success rate of organ transplants has improved in the 1990s. A survey of all 97,587 transplants performed in the United States between 1988 and 1994 shows markedly higher patient survival rates for liver, lung, and heart-lung transplants and slight gains in every other organ transplant category.

Researchers at the United Network for Organ Sharing (UNOS) in Richmond, Va., compared organ transplant operations performed from January 1988 through April 1992 with those done from May 1992 through April 1994. The 1-year survival rate improved between these two eras only slightly for recipients of a kidney, heart, or pancreas. Substantial gains, however, showed up in people receiving a liver (77 percent survival rose to 82 percent), lung (68 percent to 75 percent), or heart and lung (59 percent to 70 percent), the researchers report in the Oct. 7 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

Transplantation "is not an experimental procedure anymore," says study coauthor O. Patrick Daily of UNOS. "Survival rates and the outlook for all organ transplants are quite good and remarkably consistent from center to center."—*N.S.*

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