scale of years or decades, so it's likely that the differences seen in the study took a long time to develop. "But whether this is half a year, a year, 10 years, or a lifetime—that's difficult to answer," says Künzli.

An important question to investigate now, Pope says, is whether the damage can be reversed. "If we clean the communities up, or if I move to a clean community, will I recover?" he asks. He suspects a reversal is possible because scientists have observed such an effect in studies of atherosclerosis caused by smoking.

To further describe the link between people's exposure to air pollution and cardiovascular conditions, the Environmental Protection Agency is now funding a study in which University of Washington researchers will track 8,700 people for 10 years. —D. SHIGA

STATS

16%

Extra carotid artery thickness in people living in high-smog areas

Swift Lift

Birds may get a rise out of swirling air

Birds do it, and bees do it. But until recently, scientists thought the birds and bees did it in different ways.

We're talking about flying, of course. Researchers have known for years that insects fly thanks to whirlpools of air called leading-edge vortices that form above their flapping wings (*SN: 6/19/99, p. 390*). Those low-pressure swirls create suction that pulls the insect upward.

The new findings suggest that leading-edge vortices play a crucial role in bird flight as well. John J. Videler of the University of Groningen in Haren, the Netherlands, and his colleagues have documented on video such vortices above models of the wings of birds called swifts. The scientists report their findings in the Dec. 10 *Science*.

"From a flight-biomechanics perspective, this is really great stuff," comments David E. Alexander of the University of Kansas in Lawrence. Before this work, he notes, "the leading edge–vortex mechanism was naturally associated with the small scale of insects."

To date, scientists haven't directly measured airflow around a flying bird.

In the new experiments, Videler, his University of Groningen colleague Eize J. Stamhuis, and G. David E. Povel of Leiden University, also in the Netherlands, revealed the vortices by flowing water flecked with laser-illuminated particles over bird-wing replicas constructed from brass plate and resin.

Now that the vortices have been seen, "the current understanding of how birds fly must be revised," the team says in its report. Even a bird's landing on a branch depends on leading-edge vortices, the scientists claim.

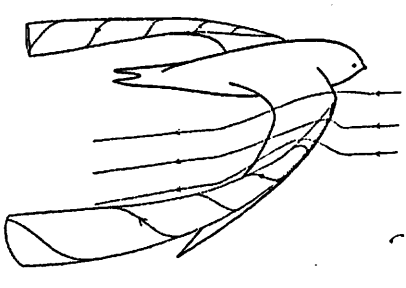
What's more, the new findings might elucidate a feature of bird anatomy. They suggest that the hand wing, one of the two major wing structures, may be specialized to generate leading-edge vortices, Videler says.

Not all researchers of animal flight find the Dutch results novel. After all, notes Anders Henderström of the University of Lund in Sweden, aeronautical engineers have long known that a swept-back wing with a sharp edge—the very shape of wings of fast-flying swifts—creates a leading-edge vortex. Aircraft designers have used that wing architecture to create extra lift in some fighter jets and the now-retired supersonic transport the Concorde.

"What [Videler and his colleagues] are looking at is like the front edge of a delta wing," Henderström says. "The question is whether this works on real swifts."

Even if it does, the claims of the paper are "overreaching," comments hummingbird specialist Robert Dudley of the University of California, Berkeley. "Gliding swifts are not representative of all birds," he says. What's more, "we don't know what's happening with flapping flight," he adds.

Videler agrees that the use of models raises some questions. Even so, having surveyed the anatomy of many birds' wings, he's confident that the new findings will prove universal. He and his colleagues next plan to look for leading-edge vortices above a new wing model that flaps. —P. WEISS



VIDELER ET AL./SCIENCE

Sharp leading edges of a swift's wings may kick up vortices of air (gray cones) that create extra lift.

Color Collective

Polymer self-assembles into light-emitting film

In the past year or so, organic light-emitting diodes have appeared in a handful of products, such as the tiny screens in some cell