# HOTWGPS Newsletter

***Volume 1 Issue 6*** ***June/July 2009***

## Presidential Ponderings

We had a very successful 2009 Pond Tour thanks to all of you who made your ponds available for the event.

So far, we have collected over $800 from ticket sales. Our expenses were significantly reduced this year because SPENCO Medical donated the use of their printer to print our tickets. I want to extend a hearty THANK YOU to B. Roscher for spearheading the entire printing process through her bosses at SPENCO Medical. Also thank you to the 5 businesses that helped us sell tickets. They are: **North Waco Tropical Fish, Wild Birds Unlimited, Cameron Park Zoo Gift Shop**; **Hill Creek Water Gardens**; and **Landscape Supply.**

The summer is progressing rapidly and as the weather forecasters are predicting a drier than normal summer we will certainly be challenged with maintaining our water quality and quantity.

Welcome to our new members who joined during the tour. We look forward to getting to know you and for you to get to know us. Again, WELCOME!

*The following Information was extracted from an article in the Science Daily web site for May 10, 2009.*

**Flight of the Bumble Bee Is Based More On Brute Force than Aerodynamic Efficiency**

The old myth that "bumblebees shouldn't be able to fly" was based on calculations using the aerodynamic theory of 1918-19, just 15 years after the Wright brothers made the first powered flight. These early theories suggested that bumblebee wings were too small to create sufficient lift but since then scientists have made huge advances in understanding aerodynamics and how different kinds of airflow can generate lift.

Brute force rather than aerodynamic efficiency is the key to bumblebee flight, Oxford University scientists have discovered. In recent years scientists have modeled how insect wings interact with the air around them to generate lift by using computational models that are relatively simple, often simplifying the motion or shape of the wings.

"We decided to go back to the insect itself and use smoke, a wind tunnel and high-speed cameras to observe in detail how real bumblebee wings work in free flight," said Dr Richard Bomphrey of the Department of Zoology, co-author of a report of the research published this month in *Experiments in Fluids*. `We found that bumblebee flight is surprisingly inefficient aerodynamically-speaking it's as if the insect is `split in



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half' as not only do its left and right wings flap independently but the airflow around them never joins up to help it slip through the air more easily.'

Such an extreme aerodynamic separation between left and right sets the bumblebee [*Bombus terrestris]* apart from most other flying animals. Our observations show that, instead of the aerodynamic finesse found in most other insects, bumblebees have adopted a brute force approach powered by a huge thorax and fuelled by energy-rich nectar," said Dr Bomphrey. "This approach may be due to its particularly wide body shape, or it could have evolved to make bumblebees more maneuverable in the air at the cost of a less efficient flying style."

For more info and photos visit the web site.
http://www.sciencedaily.com/releases/2009/05/090507194511.htm

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*The following information was taken from an article in the Science Daily (Feb. 21, 2006) —*

**If mastering flight is your goal, you can't do better than to emulate a dragonfly.**

With four wings instead of the standard two and an unusual pitching stroke that allows the bug to hover and even shift into reverse, the slender, elegant insect is a marvel of engineering.

Z. Jane Wang, professor of theoretical and applied mechanics at Cornell University, presented her research on flying systems and fluid dynamics at the annual meeting of the American Association for the Advancement of Science. In a seminar "Falling Paper, Dragonfly Flight and Making a Virtual Insect," she said the best way to learn about flight is by first looking at what happens naturally.

Look at how such thin structures as falling paper move through a fluid environment like air, she said, and then examine how insects use their wings to manipulate that environment and stay aloft.

"The major question I focus on is the question of efficiency," Wang said in an interview. "It's the long-standing question: Of birds and planes, which is better? And if we think planes are better -- why?"

Conventional wisdom holds that airplanes (airfoils) are more efficient because they travel from point to point with no wasted up-and-down motion. "But there are infinitely many ways you can go up and down," said Wang. "Of all these paths, are any better than a straight line? Some are -- that's what I found."

The insight came from dragonflies.

"Dragonflies have a very odd stroke. It's an up-and-down stroke instead of a back-and-forth stroke," she said. "Dragonflies are one of the most maneuverable insects, so if they're doing that they're probably doing it for a

reason. But what's strange about this is the fact that they're actually pushing down first in the lift.

"An airfoil uses aerodynamic lift to carry its weight. But the dragonfly uses a lot of aerodynamic drag to carry its weight. That is weird, because with airplanes you always think about minimizing drag. You never think about using drag."

The next question, she said, is whether engineers can use these ideas to build a flapping machine as efficient as a fixed-wing aircraft.

Questions of size and feasibility remain. "To hover well or to fly for a long time is hard, especially at slow speeds," she said. "Power is limited. So finding these efficient motions is very important."

Still, Wang's work moves researchers a step closer to building such a machine.

"I want to build insects on a computer as a way of learning why almost all things that move in fluid use a flapping motion," said Wang. "Whether it's a fish which flips its fins or a bird, they're actually using the same principle.
"The way paper or leaves fall, and how insects fly, may give us some ideas about why animals use these methods at all," she said.

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*The following information was taken from an article in Science Daily (Sep. 27, 2007)* —

According to a Cornell University study of the insect's flight mechanics, Dragonflies adjust their wing motion while hovering to conserve energy. The revelation contradicts previous speculation that the change in wing motion served to enhance vertical lift.

The Cornell physicists came to their conclusions after analyzing high speed images of dragonflies in action. The insects have two pairs of wings, which sometimes move up and down in harmony. At other times the front set of wings flap out of sync with the back set.

The physicists found that dragonflies maximized their lift, when accelerating or taking off from a perch, by flapping both sets of wings together. When they hover, the rear wings flap at the same rate as the front, but with a different phase (imagine two people clapping at the same speed, but with one person's clap delayed relative to the other).

The physicists' analysis of the out-of-sync motion showed that while it didn't help with lift, it minimized the amount of power they had to expend to stay airborne, allowing them to conserve energy while hovering in place.



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## On The Lighter Side

☺ Just when you thought all the words you'd ever need were invented, the Pittsburgh Post-Gazette came up with **orange-barrelest**. In a recent article titled: "Get ready for a Route 28 test" the author wrote:

"Route 28, the region's **orange-barrelest** highway, will throw another challenge at its road-weary captives starting Sunday night. The northbound lanes will close at Etna for six months, sending drivers on the posted detour across the 62nd Street Bridge and on Butler Street to the Highland Park Bridge, or on several unofficial detours…Read more: http://www.post-gazette.com/pg/09153/974354-54.stm#ixzz0HOYPeDL8&B

Does that mean there's also a word **orange-barreler** for comparing two roads? As in: Street A is **orange-barreler** than street B. And if orange cones are involved, the region's **orange-coniest????**…

## And Finally

If you can remain calm, you probably don't have all the facts!!

Amazing!! I can hang something in my closet for a while and it shrinks a size or two!!



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