On the Web

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"You needn't feel too badly, Wilbur," she said. "Not many creatures can spin webs. Even men aren't as good at it as spiders, although they think they're pretty good, and they'll try anything. Did you ever hear of the Queensboro Bridge?"

Wilbur shook his head. "Is it a web?"

"Sort of," replied Charlotte. "But do you know how long it took men to build it? Eight whole years. My goodness, I would have starved to death waiting that long. I can build a web in a single evening."   —E.B. White, Charlotte's Web

I am not surprised that E.B. White chose to make a heroine out of a spider. Spiders and their constructions are a source of wonder to me. How, for example, can the know-how and materials to craft a web—such an elegant, cunning structure—be packaged in an organism small enough to hide in the crack of a barn door? Each spider species has its own web-spinning habits (some do not spin webs but use silk in other ways). I am impressed by orb-shaped webs, but they are among the more primitive of spider designs. Cobwebs, funnels, and trap doors mark advances in web effectiveness. Many spiders spin a new web each day since the stickiness of spider silk is of limited duration. Sometimes they will ingest the old web to recycle protein. As Charlotte noted, it doesn't take an orb-weaving spider long to fashion a new one, perhaps no more than half an hour.

One dewy morning, I noticed that most of the webs in a meadow were oriented the same way. To solve this mystery, I decided to learn more about how webs are made. Here is what I learned from the world-wide-web:

A barn spider, the species White modeled his heroine after, begins work on her new web each evening. Like the other orb spinners, she starts by releasing a light line of sticky silk from a spinnerette. When this line makes contact with another surface, the spider reels in the loose silk, anchors it, and sets off across the tightrope, laying a stronger, non-sticky strand beside it. Once she reaches the far side, she fixes the line and heads back across, allowing a third strand to droop behind her. This slack line is anchored at her original perch site. Now she sets out on the drooping line. When she reaches the low point, she affixes a new line and then drops, feeding out another strand. When she encounters something to attach it to, she has made a Y and the first three radii of the many that will form the structure of her orb. Now she climbs back to the center and descends again along the Y, trailing another strand. When she reaches the bottom, she moves a bit to the right or left and makes a new anchor and climbs it to the center again. She repeats this procedure until a number of strands have been set. Then she travels from one outside anchor point to the next, laying connecting lines that can be used to attach additional spokes to her deadly wheel.

Once the framework is ready, she begins to release her sticky webbing. Spiraling from the outside to the inside, she anchors it to each ray. Now, at dusk, her web is fresh, and she waits, suspended in the center, for the luckless insects that will flutter into her snare to meet a sticky end.

From this preliminary research, I was able to craft a hypothesis regarding the orientation of webs in a meadow. How about you? If the web is started on a strand borne by a current of air, most of the spiders within a microclimate will build from an axis oriented the same way. It's simply the prevailing wind. Now aren't there other things you wonder about spiders and webs?

We all know what they say about curiosity and cats. I dare say it has brought humans to tragedy often, as well. Still, I can't help but think curiosity is an asset. Human vanity is what troubles me. So long as we believe oversized brains represent the apex of evolution, we will disregard the needs of other living things. If curiosity ever manages to team up with humility, humans might become better citizens in the community of extraordinary, ordinary organisms. I think Charlotte would agree that admiring spiders is an excellent place to start.

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