Photo by **D. QUINCY WHITNEY**

Petals, Patters and Pathways

The teasing tessellations of nature

D. QUINCY WHITNEY

"Everything has beauty, but not everyone sees it." – Confucius

Now you see it, now you don't – whether it is a mirror maze or the patterns and pathways of Nature hidden in plain sight. "Numbers in Nature – A Mirror Maze" is a temporary exhibition at the Boston Museum of Science that the curious should not miss.

We human beings are curiosities in the primate world because of the unique nature of human consciousness – we have the ability to tune in or tune out while still remaining in our bodies. We look but don't see; we see but don't notice. In a world in which technology continues to distract us further from ourselves and from our surroundings, it is helpful to see what we do with "seeing" hopefully to help us catch ourselves when we miss something.

As a wordsmith, I steered clear of higher mathematics – physics in particular, which I now love – but I always loved geometry – the mathematics of shapes. One common geometric pattern is a tessellation – a repeating pattern of similar shapes without gaps or overlapping. While you see tessellations everywhere in nature and in our own bodies, nothing quite prepares you for walking through a 3-D tessellation of mirrors. The experience causes you to rethink the idea of direction and immerses you in a repeating illusion.

As I happen to be an identical twin, walking through this hall of mirrors spooked me at first, looking from the inward world, out. I became disoriented, almost upset with the fact that I kept running into walls and images of myself. But the reverse was also enlightening. For the first time, I suddenly saw myself from the outside, looking in. I saw myself as others see me – or saw me and my sister when we were growing up. It is arresting to "see double." The other aspect is the idea that similarities are never perfect replications – a lesson made manifest in the rest of this fascinating exhibition that deals with the Numbers of Nature.

A new revelation for me was the idea that mathematics actually "mirror" nature. Numbers both describe and explain the infinite patterns of Nature. Numbers are the language of nature; mathematics is the bridge between art and science.

Patterns often reveal the function they perform, giving us clues about how nature works in wildly different situations from swirling galaxies to the intricacy of a spider's web. Patterns reveal that Nature is essentially non-linear, prone to curves and irregularities, spirals and tessellations where a multitude – a "community" – of simple shapes create infinite complexity.

Patterns demonstrate the beauty of proportion and balance. The Golden Ratio reveals clues about the relationships between things – the numbers of petals in a flower, the proportions of the human body, or the swirling, serpentine shape of a violin that displays a very specific mathematical ratio between length and width.

Spirals reveal how things grow, expand or respond to physical forces. Some spirals expand evenly with each turn, while others get larger as they grow, like the cochlea inside our ear, a nautilus shell, or a fiddlehead fern.

Voronoi patterns demonstrate the efficiency of Nature in packing things together. Nature will take the shortest path, create the tightest fit or go to the next neighbor. Think of an ear of corn, a honeycomb or a giraffe's skin. The same voronoi pattern is found in the swirl in my latte as in a dragonfly's wing.