East Bay Leonardo
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By Raphael Rosen

A few weeks ago, we visited an artist in Emeryville who might very well be the next Leonardo da Vinci.

His name is Reuben Margolin, and, aside from designing rickshaws and mechanical caterpillars that clomp along a plank of wood as you turn a wheel, he designs and builds large-scale sculptures, often made of wood, that demonstrate wave motion. Or, as he calls them, "geometric constructions flavored by art." Reuben told us that he has been making stuff for as long as he could remember. He received a wrench when he was eight years old, and remembers taking apart a seat while riding on a ferry. He has always been fascinated by tools, as well as mathematics and geometry, and, in fact, sees geometry as a "practical, hands-on approach to math."

But Reuben is also a trained fine artist. After graduating from Harvard College, Margolin attended classical painting schools in Italy and Russia, where he learned how to study nature and create large-scale paintings. One day, however, while observing a caterpillar undulating its way across desert sands, Margolin wondered how he could create a device that would mimic that movement.

His first step was to re-learn calculus, which took about three months. Then, he began building. His third attempt at a mechanical caterpillar was five feet long, and was composed of springs, cables, welded pieces of metal, and mechanical linkages, all attached to a turning plexiglass wheel, which resembled the classic steering wheels found on the tall, masted sailing ships of the 18th century.

As a person turned the wheel, a knob would slide in a curved path cut into the plexiglass. As the knob passed particular points in the curve, it would move cables that would then actuate different parts of the caterpillar. The knob's path was the only part of the creation that caused the caterpillar to move in a caterpillar-like way. The path, in Margolin's words, "uses a really nice integral," which he subsequently named after one of his high school math teachers.

Margolin uses the same procedure to create his mechanical marvels. Usually, he is first inspired by nature (for example, water, or grass waving in wind). Sometimes, he is inspired by the mechanical simplicity of bicycles. Then, he sketches the sculpture in a notebook, noting measurements. Next, he moves to

his drafting table, where he doesn't use computers, but instead compasses and rulers to make a more accurate drawing of the proposed sculpture. He then builds a quick scale model out of cheap materials, to make sure that the proportions are correct. Finally, he begins building the full-scale sculpture.

Margolin has exhibited a large, square, jointed sculpture titled, "Math and the Night Sea," at the Exploratorium, and currently has a piece on view at the Aquarium of the Pacific, in Long Beach. He hopes to continue getting commissions, so he can continue building his jaw-dropping artworks.

When we visited Margolin, he had just completed a new piece. It was a box that enclosed a series of redwood bars, which were balanced over two axles with wooden circles set in them, placed in a spiral pattern. Two wooden handles connected to the axles. When a person turned the handles, the axles would turn, and the wooden circles would cause the redwood bars to rise and fall in a wave-like motion. Turning the axles together would create even more complicated patterns.

Margolin says that his goal, when making sculptures, is simply to "make something beautiful," whether mathematical or not. He certainly has succeeded.