

Doing Da Vinci

A new series on the Discovery Channel puts the inventions of perhaps the greatest of all makers to the test.

By Jeanne Storck

In an empty lot near a business park just outside Los Angeles, a group of men clusters round a phalanx of breech-loading cannons. Explosions rock the ground. A war reenactment? Not quite.

A crew of special effects engineers, welders, and carpenters are testing a series of full-scale Leonardo da Vinci inventions they've built for Discovery Channel's *Doing Da Vinci*. We spoke with a few members of the team, including da Vinci expert Dr. Jonathan Pevsner, movie engineer Jurgen Heimann, and builder/artist Flash Hopkins.

Jeanne Storck: Which inventions are you building?

Dr. Jonathan Pevsner: His machine gun, self-propelled cart, catapult, siege tower, and tank.

JS: Where do you begin?

JP: I show them the drawings from Leonardo's manuscripts and they ask questions: How big was it? How did the gearing work? What materials would he have used? What was its purpose?

Jurgen Heimann: I'm given the da Vinci artwork and I draw it in Inventor [design software], building it up part by part. Once it's built, I break down all the parts and export them as blueprint drawings to distribute to the team.

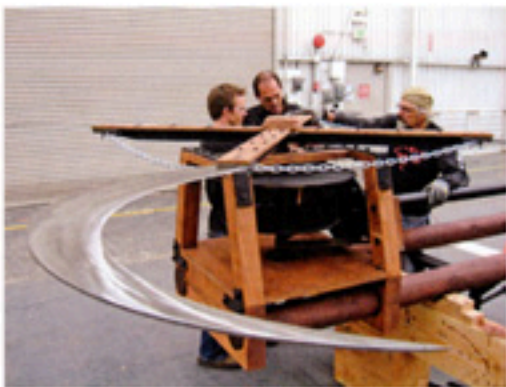
JS: What tools are you using?

JH: For the metalwork, we send stuff out to a company that can blast the part out using a water jet cutter.

Flash Hopkins: For the wood, we're doing this da Vinci style — handsaw, hammer, chisel, and table saw.

JS: How do you determine scale?

JP: Leonardo's designs often don't include a scale. Sometimes you can see a person or a horse nearby,



BLADES OF GLORY: The *Doing Da Vinci* team fine-tunes the scythe chariot, a deadly war machine built to shred the enemy.

For the siege tower, the team asked: "How wide was a moat in Leonardo's time?" I suggested 25 feet. If the moat were wider, it wouldn't be practical to build and maintain. If it were narrower, it wouldn't be effective. We have an idea of scale, and beyond that it often involves some interpretation.

JS: Any troubles interpreting the designs?

JH: With the tank, da Vinci designed this gearing system that links the wheels that drive it. On one of them he's got the gear on the wrong side, so you spin the drive shaft and now the two wheels that are connected are going in the opposite direction.

JP: Leonardo's designs sometimes include mistakes we believe were intentional — typical in the days before patents. If the drawings were stolen, it would be a bit harder for them to be implemented.

JH: His design for the cart shows three pictures and none of them are the same machine. They're variations on a theme, like he was coming up with ideas. So which design do we follow?

JS: Strongest impressions?

FH: The machine gun has 3 racks. Each rack has 11 cannons. Each cannon has a 4-inch breech and takes a 5-pound cannonball and 1 pound of powder. Each rack fires 11 cannons at once. It's earth-shattering.

JP: The tank looks like a spaceship scurrying along the ground. If I were an enemy infantryman and I was going to attack this tank, it would be really scary to see it for the first time, especially in the 15th century. I would want this guy Leonardo on my side.

Jeanne Storck is a freelance writer and interaction designer in San Francisco.