MEETING THE MINDS | MARK WITT

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He made a cheap stove -- for a reason

By Emma Stickgold, Globe Correspondent | May 31, 2005

HARTFORD -- A Trinity College senior in search of a thesis that would do more than gather dust, Mark Witt asked himself an unusual question: "Why hasn't anyone built a really cheap fan stove?"

Witt, 22, had read that the pollution caused by wood cookstoves kills an estimated 1.6 million people a year. After a little research, the mechanical engineering major realized that not very many people were paying attention to this problem -- so he decided he would.

Late last year, he set out to design a stove that would pollute less, but would be affordable to the one-third of the world's population who now cook over open wood fires.

Witt spent his three-week winter break tinkering with models at the Aprovecho Research Center, a Seattle-based nonprofit organization that specializes in testing wood stoves. He brought a stove back to campus, and spent about 20 hours a week working on its design while poring over textbooks and heat combustion theory. Eventually, Witt thought he had worked out the stove's kinks and sent it back to Seattle to be tested.

The results shocked even him: Carbon monoxide levels were down 75 percent compared to open fires, and particulate matter levels dropped by 96 percent. His stove boiled a liter of water 8 percent to 10 percent faster, too.

"Basically what they said when they sent the results was: 'Really good job, good results; congratulations,' " he said.

Dubbed the "Witt Alpha Prototype," Witt's stove model stands out because it uses a simple fan to circulate air, encouraging more of the wood to burn, thereby leaving fewer lung-damaging chemicals in the smoke.

While there are similar woodstoves, sold mostly to people going on camping trips, they cost roughly $100 -- far more than villagers in developing countries could ever dream of paying. Witt's innovation was to design an effective stove that was made of inexpensive, readily available parts.

"One of the biggest worries I had was about the fan burning out," Witt said. In his first model, the fan threatened to melt after running for just 20 minutes. When he had the brainstorm to poke holes into the metal stove pan to relieve the heat, the problem vanished.

Lance Smith, Witt's adviser on the project, said he was impressed with the student's drive.

"He's very self-motivated: He goes out there and tries to make things happen," Smith said.

"It's unusual for someone with engineering training to work on making woodstoves that are low cost and not very profitable. He came in and . . . tried to meet a need and improve on what's been done before."

Witt had always been fascinated in the mechanics of how things work -- or why they don't. Growing up in suburban Chicago, he built all the furniture in his room and, at age 12, took apart his family's electrical pencil sharpener and adding machine.

He went abroad for one semester of college to study civil engineering in Trinidad, learning how to inexpensively design roads that would be crack-resistant. The trip convinced him he was not cut out for a conventional career in mechanical engineering.

Now a college graduate, Witt plans to keep tinkering with his stove -- this time as a hobby -- and will work for Aprochevo, traveling to developing countries to teach environmentally sound burning practices.

The best part of his thesis, Witt said: "For me, it was wrapping my mind around something that's new."

Fact sheet

Hometown: Algonquin, Ill.

Air waves: Witt hosted a show on the Trinity College radio station, playing jazz, hip-hop and "hippie jam bands," eventually becoming the station's general manager.

Air waves, part 2: He founded the college's ultimate Frisbee team**.**

Environmental activism: He organized protests against the war in Iraq and the International Monetary Fund, and wrote opinion pieces in the campus newspapers about environmental issues.

Blending interests: Long term, he'd like to work with renewable energy, and other areas of engineering through which he can combine his love of science with his passion for public policy.

Downside of his newly found focus on stoves: "I prefer working with wood. Sheet metal cuts your hand."

Pet peeve: Engineers who design products for potential customers in developing countries without understanding their needs. ■