

Science Fair Students Examine Natural Defenses Of Cotton, Eggs

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EPHRATA (Lancaster Co.) — Like the scientist who discovered plastic, researchers — of any age — can turn up some surprising facts.

Just ask Polly Leonhard, 17, a junior at Ephrata High School. The daughter of John and Karen Leonhard, Ephrata, became the grand champion of the recent Lancaster Science and Engineering Fair.

Polly chose an independent science project that involved the use of cotton that contains color from its own natural genetics. What some would consider "organic" cotton, from a more wild origin, according to Polly, has its own pest resistance built in. The more commercial varieties, bred to form the pure whiteness to allow for the use of dyes, don't have the same kind of natural resistance.

Or ask Sarah Woodling, 16, a junior at Hempfield High School,

Landisville. The daughter of Russell and Barbara Woodling, Landisville, Sarah found out some interesting information in the second year of a two-year study, "A Comparison of European and American Egg Processing and Storage Methods." Her second-place project in the biology division discovered that boiling whole eggs for only 7-10 seconds can preserve them for up to 3 months.

But even more revealing was the fact that Sarah found Europeans are forbidden to process eggs like Americans do. And the processes that eggs undergo to make them look completely clean and sanitary to a consuming public actually remove the "cuticle," a natural substance in the shell that serves as a natural defense and anti-spoilage barrier to the egg.

Ephrata's Polly Leonhard and another winner, Gregory Plotner, champion of the senior division for his five-year study on stream water

purification, will voyage with Hempfield High School science instructor Robert Hertzler to the 49th International Science and Engineering Fair in Fort Worth, Texas, May 10-16. There, about 1,000 students and another 1,000 judges will be on hand to look at the country's brightest young scientists.

Here's a description of each of the projects that highlight agriculture and related scientific studies by the best minds at the fair, held at Franklin and Marshall College March 19.

Polly's Studies On Cotton

Polly Leonhard, Ephrata High School junior, came across a copy of Mother Earth News that contained a story on naturally colored cotton. Polly admitted she knew "nothing about cotton" before reading about a grower who discovered some ancient seeds grown in South America.

Originally, cotton had natural colors — pastels such as green, brown, red, and mocha (light brown).

In the magazine was a story about a company called Planet Vision Pure Organic that sold fabric and T-shirts in the naturally colored cotton.

So Polly contacted a grower, Mark Wilkes, from Meadow, Texas, and began growing her own plants in the Ephrata High School greenhouse. She began a study eventually called "A New Crop for Pennsylvania: *Gossypium hirsutum* Research For Improved Strength, Shortened Growing Season, and Increased Wax Content."

This "organic" cotton had a more wild origin and was more pest-resistant than commercial, white cotton. The cotton changes color because of the effects of sunlight.

She planted the seeds for the first colored cotton in January 1996, including nine varieties. She also planted an organic, natural "white" cotton. Polly became intrigued with the notion that, in the commercial industry, a lot of chemical dyes are used to provide the color for cotton. She wondered, could there be a way to find colors without environmental worries?

The cotton was grown in the greenhouse until May 1996. Afterward, the plants were taken outside to grow. At the end of August to early September, the plants defoliated and the bolls opened. Like commercial harvesters, Polly had to return a few times to "harvest" the bolls. By the end of September, 1996, the cotton harvest was complete.

Polly entered the science fair in 1997 and entered again this year. But this year delved more deeply into "qualitative" tests of the cotton grown, including wax content of the cotton (a higher level is beneficial in processing); seed index, or the mass and weight of seeds; germination tests; staple length, which looking into how long the fibers are (Pennsylvania white cotton's staple length went as long as 1½ inches); and a stickiness test, or how much fiber can be expected to stick to machinery or metal.

Other tests looked into fiber strength, fiber elongation, upper length, short fiber content, and micronaire (which measures fineness and maturity). The grower, noted Polly, "wants to have cotton



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with the longest fiber, strongest fiber, and low micronaire (meaning they want it more fine), with good wax content."

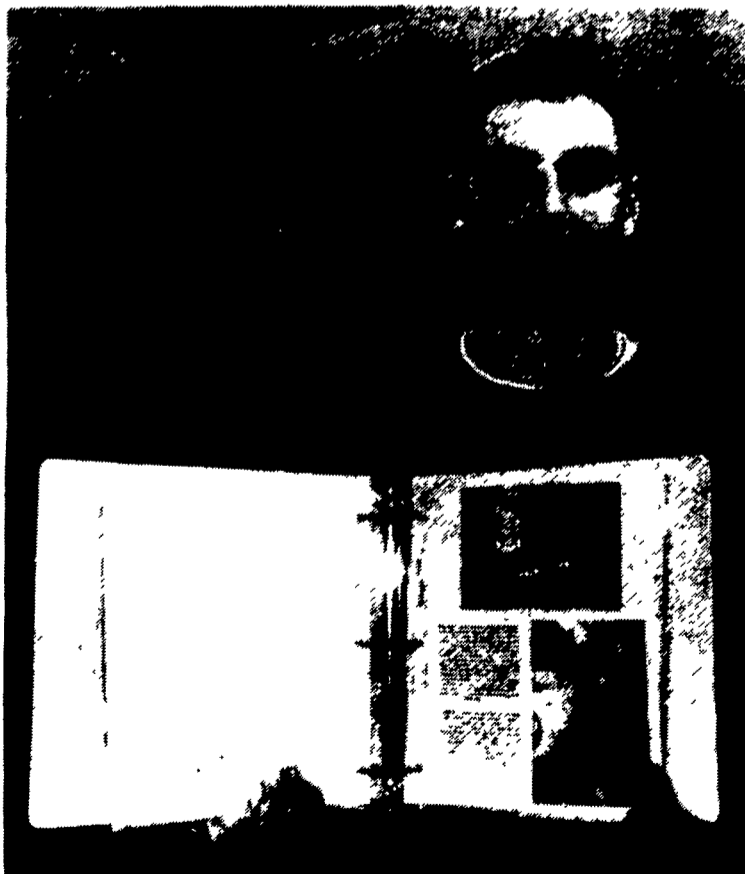
Growers are also looking for improved upper length and unifor-

mity of the fibers — and she found this consistently in the colored cotton from Pennsylvania. Polly wants to try breeding for improved red natural colored cotton, perhaps

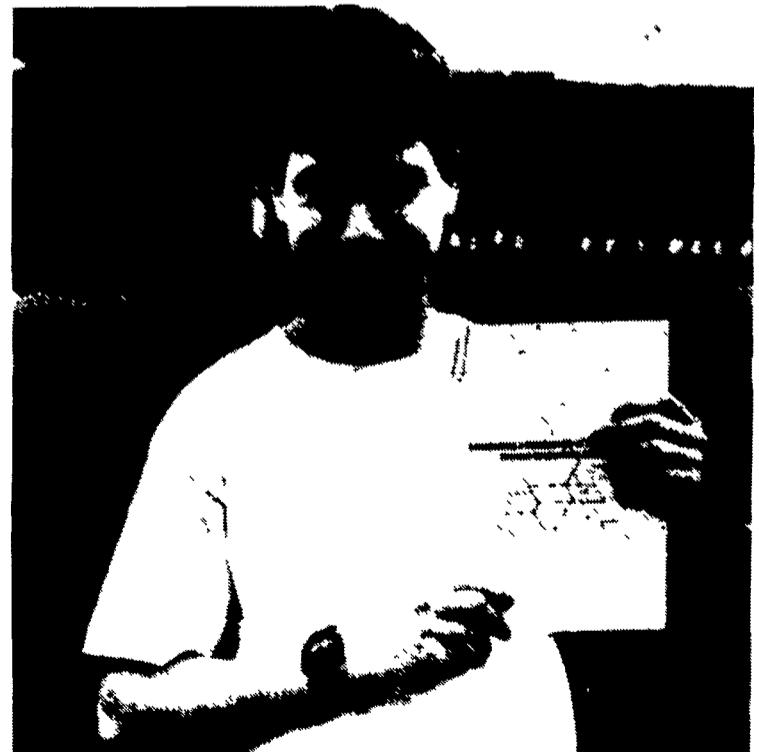
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Patrick McCudden, 16, is a sophomore at Hempfield High School. What he found out that soils with the least uniform particle size have the potential to be the most erosion prone. In his project, "The Effectiveness of Erosion Control Methods On Various Soils," Patrick found out that Duffield and Beddington silt loams can be worrisome for erosion. Patrick, son of David and June McCudden, placed first in the earth/environmental science category in competition at the county science fair.



Ben Newcomer, 17, son of Randy and Jolene Newcomer, Ephrata, came across an article in a science magazine in 9th grade about using electro-osmosis in soil remediation. Simply put, Ben was fascinated by how electrical streams decreased the friction of a rotating drill bit and added to depth of penetration. Ben wondered, could electricity be used to "move" contaminants out of the soil?