The yarn of nylon

The Chemical Heritage Foundation's exhibit may be the most authentic and the most complete on the birth and development of the fiber

By PHIL MILFORD
Special to The News Journal

PHILADELPHIA — Tucked in one corner of a century-old bank building near the Delaware River waterfront is an assortment of old paint cans, hypodermic needles, faded photographs and yellowed women's underwear.

But this is no dumping ground. The items are being preserved in the name of history, part of an exhibit recognizing a post-World War II revolution in chemistry that has affected almost everyone's life — the development of nylon.

The DuPont Co. and a North Wilmington resident figure prominently in the exhibit, which opened here on Thursday at the Chemical Heritage Foundation in Independence National Historic Park.

Through May 1998, "Spinning the Elements: Wallace H. Carothers and the Nylon Legacy" will be open by appointment to chemists, engineers and public groups interested in the history of one of chemistry's greatest triumphs.

Many of the photographs, laboratory notebooks, chemical apparatus and memorabilia in the exhibit were donated by Joseph X. Labovsky of Shellburne, in Brandywine Hundred.

Labovsky, now 85, was working as a polymers lab assistant for the team headed by Carothers when they made their historic breakthrough and discovered nylon in the 1930s.

"Joe inspired us to do it," said Marjorie Gapp, picture curator for the foundation. Once foundation curators saw the collection, kept for years in Labovsky's basement off Shipley Road, they knew an exhibit had potential.

"The richness of what he had was incredible ... just astonishing," Gapp said.

Labovsky agrees. "It's the most complete and most genuine documented exhibit about nylon," said Labovsky. "They'll use this exhibit as a teaching tool to show what can be done not only on an individual level, but for the nation," he said.

Opening the exhibit were Carothers' widow, Helen S., of the Methodist Country House on Kennett Pike, Greenville, Del.; daughter Jane Carothers Wylen of Orlando, Fla.; Joseph A. Miller, DuPont's chief technology officer; and Labovsky.

Carothers, who suffered from mood swings, took his own life shortly after the discovery came to fruition.

A personal perspective of Carothers

Carothers was born in Iowa in 1896, and was so enamoured of chemistry that in high school he converted his bedroom into a laboratory, according to historian Roger A. Martin.

Carothers earned a doctorate in chemistry from the University of Illinois in 1924, then did organic chemistry research at Harvard. By 1928 he was working for DuPont, but his bouts of depression deepened.

Research continued among Carothers' group at the DuPont Experimental Station to find the perfect "synthetic silk." In 1937 nylon was ready for patenting and in 1938 the so-called miracle fiber was introduced to the public.

By then, Carothers had died. During an apparent drinking spree in April 1937, he went to a Philadelphia hotel and drank a fatal dose of poisoned lemonade.

"He was manic-depressive. In a group he was very taciturn, he just listened, he was a very quiet person. But in the lab, when I was setting up experiments for him, he

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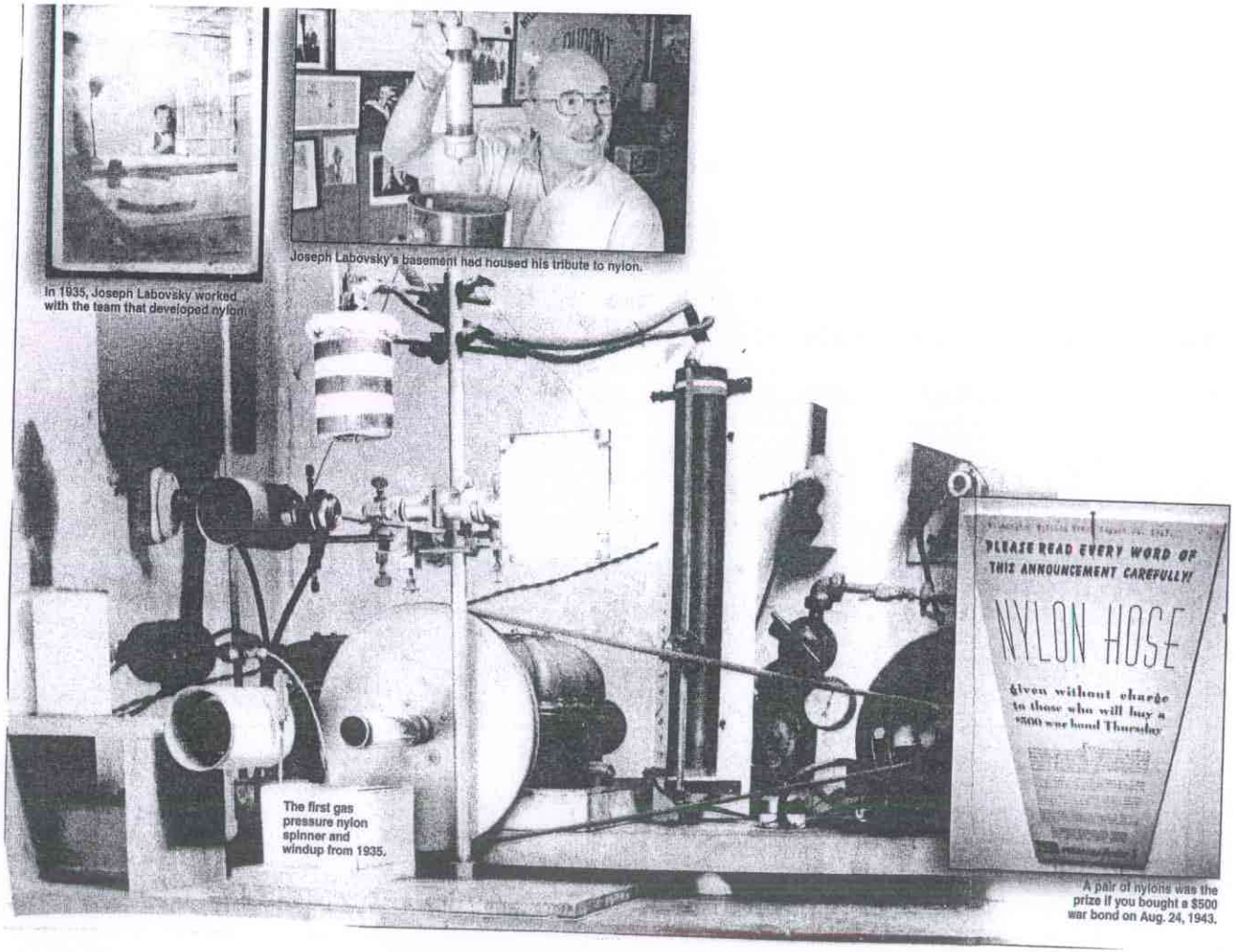

In 1935, Joseph Labovsky worked with the team that developed nylon.

Joseph Labovsky's basement had housed his tribute to nylon.

The first gas pressure nylon spinner and windup from 1935.

A pair of nylons was the prize if you bought a $500 war bond on Aug. 24, 1943.

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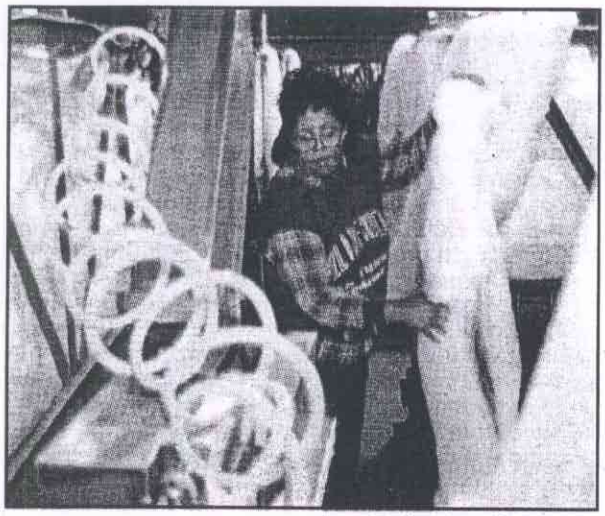


The News Journal/GARY EMEIGH

Stephanie Dukes, of Georgetown, works in the DuPont nylon plant, which opened in Seaford in 1939.

A NYLON CHRONOLOGY

- **February 1935:** Wallace H. Carothers' DuPont team identifies"Polymer 66" from coal-derived benzene
- **April 1937:** DuPont applies for nylon patent
- **October 1938:** DuPont announces nylon to the public and decides to build a nylon plant in Seaford
- **October 1939:** First nylon stockings go on sale in Wilmington stores
- **December 1939:** First nylon produced at Seaford
- **1941-1945:** Nylon is used for war materiel including parachutes, tires and clothing
- **August 1993:** DuPont announces plans for nylon plant in China
- **December 1993:** The Federal Trade Commission approves swap that gains DuPont the Imperial Chemical Industries Ltd. nylon plants in Europe
- **October 1995:** Seaford nylon plant designated National Historic Chemical Landmark
- **October 1997:** Chemical Heritage Foundation launches major exhibit on Carothers and the nylon industry.

IF YOU GO

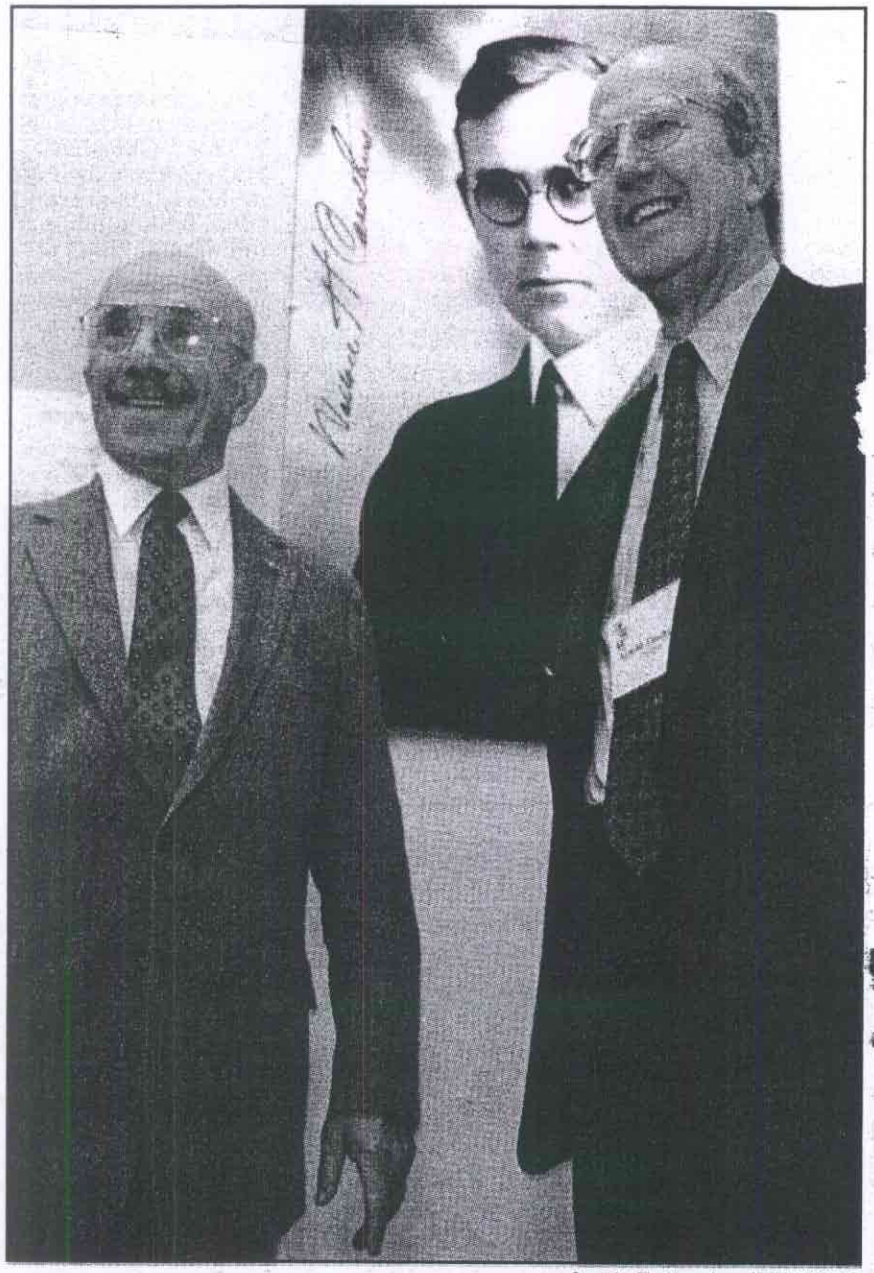
What: Chemistry exhibit, "Spinning the Elements: Wallace Carothers and the Nylon Legacy"

When: Through May 1998

Where: Chemical Heritage Foundation, 315 Chestnut St., Philadelphia

How: Tours arranged by appointment

Information: Call Marie Stewart, director of external affairs for the foundation at (215) 925-2222, Ext. 239.



Special to The News Journal/BILL HUGHES

Joseph Labovsky (left) with Arnold Thackray, president of Chemical Heritage Foundation, at a reception marking the opening of the foundation's nylon exhibit.

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was most charming," Labovsky said.

"We would sit down and talk about music and literature. On a personal basis he was very talkative," said Labovsky.

To preserve his memories of Carothers and the DuPont nylon business, the chemical foundation conducted extensive interviews with Labovsky and compiled a 40-page oral history, which will become part of its archives.

Labovsky said one reason he donated the collection to the Philadelphia-based group was that other historical groups would just store the items, but the foundation will eventually put them on public display.

"They have quite a lot of traffic... visitors from all over the world," in the Independence Mall area, Labovsky said.

But he said the Historical Society of Delaware is also interested in a permanent exhibit, so he may help it put together some materials in Wilmington, too.

The Chemical Heritage Foundation was established in 1982 by the American Chemical Society and the American Institute of Chemical Engineers to highlight the historical role of chemistry.

Two years ago, to recognize the importance of nylon in modern chemistry, the American Chemical Society designated the original Seaford, Del., nylon plant as a National Historic Chemical Landmark.

Including the plant, which opened in 1939, DuPont spent $27 million to develop its nylon business. The fiber now brings in $5 billion a year for DuPont, which makes 20 percent of the world's nylon.

Illuminating nylon's birth

The nylon exhibit is part of a foundation's goal to teach the general public about chemistry and its history. It conducts educational activities, publishes books, magazines and brochures and is developing a museum of the chemical sciences. It also has a 50,000-volume library.

Much of the current nylon exhibit is technical:

A memo from Labovsky dated July 8, 1936, notes that "A series of experiments was performed to determine the practicability of electromagnetic titration...."

But also on display are the upside-down legs of store mannequins wearing the "latest" nylon stockings at the start of World War II; a paint can and hypodermic needle rigged by Labovsky to "draw" nylon and other test fibers from solution; and some early nylon underwear apparently pretested by DuPont Co. secretaries (one item is labeled, "Josephine Osborne") prior to marketing.

And the foundation is also displaying a letter to Mrs. Carothers from DuPont chemist Paul J. Flory, who devised the nylon formula and won a Nobel Prize in 1974. In the letter, Flory says Carothers himself deserved the prize.

Among the items on display are a lab notebook Carothers used in 1927 when he was at Harvard University, before DuPont lured him to Wilmington to head a polymers research group.

DuPont had begun funding basic research in the 1920s, and had no specific products in mind. The exhibit notes that Carothers felt polymers — large chains of molecules — could produce new kinds of fiber.

The team of scientists first synthesized nylon in 1936, but took several more years to perfect the process.

In the exhibit, an October 1938 copy of the New York Herald-Tribune announces the nylon breakthrough. Photographs show the first spinning apparatus at the DuPont Experimental Station; and the Seaford nylon plant under construction.

Other documents refer to the mysterious "Fiber 66," the experiment that showed successful nylon spinning was possible.

The fiber goes high-fashion

Nylon use took off during World War II - for parachutes, flak jackets, aircraft tires and other war materiel. Displays include actual parts or photos of nylon lab machinery, examples of nylon boat sails, and fiber spinoffs such as "honeycomb" aircraft structures and even a polymeric automobile engine intake manifold.

But nylon stockings were what the women of America (and the world) wanted.

A Wilmington Morning News from Aug. 24, 1943, encourages people to buy $500 war bonds — and offers a free pair of nylons for each bond purchased.

The Chemical Heritage Foundation is located in the remodeled 19th-century First National Bank Building at 315 Chestnut St. — next to the back entrance of Benjamin Franklin Court. It is still undergoing renovations and is not yet ready for regular walk-in public access.

It moved from near the University of Pennsylvania in west Philadelphia into the Chestnut Street building last year, "and this is the first time we've had an exhibit on this scale," said Marie Stewart, spokeswoman for the foundation.

"We'd like to get some school groups to come through," said Stewart.

Joseph Labovsky said he's glad his artifacts will be part of it.

"It's just a wonderful memorial for Carothers," said Labovsky after seeing the completed exhibit.