



UNL expert blows glass

Burning ambition spans 40 years

By Brandon Loomis
Staff Reporter

Even after more than 40 years of experience, a University of Nebraska-Lincoln scientific glass blower has found that he can still burn his hands.

Picking at some dead skin on his finger, Kurt Greiner said he still burns himself frequently. But the burns rarely require more than cold water and a bandage, he said.

But recently, while assembling a small crystal-growing dish by hand, he crossed his arms in front of his bench burner's 1,200-degree Celsius flame.

"I burned my lower arm so bad I had to go to a doctor," he said.

Greiner grew up in Thuringia, East Germany, where he helped assemble skin

massage electrodes in his father's glass shop before World War II.

Greiner escaped from East Germany in 1949. He served as apprentice to master glass blowers in Europe, where, he said, training is more rigid than in the United States.

After decades of working for several glass and researching companies, including Weyerhaeuser in Tacoma, Wash., he brought his expertise to UNL in 1986.

Now he fills his Hamilton Hall lab with anything from test tubes to thousand-dollar researching instruments — items he makes and repairs for the chemistry and other UNL departments.

Greiner has assembled a water distilling system, vital to many chemistry experiments.

Jac-Ho Kim, a graduate assistant in the chemistry department, said Greiner's system is much more valuable than the less expensive purifiers used by most universities.

"We believe this water is more pure," he said.

Greiner said his purifier, which took about 30 hours to make, cost the chemistry department about \$2,500, compared to a \$900 commercial system.

The purifier consists of coiled glass tubing through which impure water is pumped into the system, heated and vaporized. The vapor then is condensed and filtered into a 12-gallon collection jug. One gallon of distilled water is produced every five hours.

Greiner said he starts



with commercial glass tubing and uses a natural gas and oxygen flame to heat the material to a melting point of 1,200 degrees Celsius. He then twists the tubing slowly and carefully because is easy to break the glass by twisting or pulling too hard, he said.

"You have to always be one step ahead of what's going to happen," he said. "You have to think ahead of the glass."

Mistakes are permanent and happen too quickly to be corrected, he said.

When making parts that will be in contact with heating elements, Greiner said, he uses quartz silica, which has a higher melting point than normal glass — about 2,000 degrees Celsius. The quartz silica is more resistant to constant heat within the machinery, he said.

To melt the quartz silica, Greiner uses a hydrogen and oxygen flame because it burns hotter than the natural gas flame.

A ventilation hood such as one above an oven must be used when working with quartz silica because melting silica releases poisonous gases, he said.

When projects require the end of the tubing to be rounded, Greiner hooks a thin rubber hose to the cool end of the tube and blows gently through it as he heats the other end.

Greiner also has made a vacuum manifold for the chemistry department. Kim said the pump is necessary for experiments in drying liquids because heating liquids into vapor can decompose some of the matter.

Greiner also repairs glass instruments on expensive machines such as the chemistry department's mass spectrometer.

Roger Hayes, assistant director of the Midwest Center for Mass Spectrometry, said the machine determines exact mass analysis and structure confirmation of organic, bio-organic and inorganic gas and liquid samples.

Hayes said Greiner saves the center thousands of dollars by sealing fractures in parts that would otherwise need to be reordered.

Having a glass blower around also saves time, Hayes said.

"It takes him a day to fix something that would take us several months to get in," he said.

Greiner said he uses a hand torch burner, smaller than the lab's bench burner, to seal fractures on large machinery such as the mass spectrometer because the hand burner allows him to reach tighter corners.

Hayes said that in addition to repairing commercially made equipment on the mass spectrometer, Greiner has made sample introduction interfaces. These interfaces are glass parts through which samples are

introduced to the machine. He also makes sample storage flasks for the machine. Hayes said this too has saved the university money.

Although Greiner spends about 40 hours a week making and maintaining research equipment for UNL, he said he is sometimes hired through the university to do work for the private sector.

Greiner was preparing to fix a broken seal on a 12-gallon jug from a dairy farm April 1.

He said for larger items such as the jug he uses a lathe burner because it is impossible to hold and rotate the glass over the bench burner's flame by hand.

Greiner said he enjoys helping private businesses. But he will have little time for it once four new chemistry faculty members arrive on campus this summer and fall because they probably will requesting even more equipment repairs, he said.

"My work load will considerably increase," he said.

'You have to always be one step ahead of what's going to happen. You have to think ahead of the glass.'

—Greiner

Greiner did not always want to be a glass blower. As a child, when he had to help his father in the glass shop and was unable to play with other children, he said, he developed a strong dislike for indoor work. He said he dreamed of becoming a forester.

That dream was fused with his glass-blowing background in 1974 when he was hired to make researching instruments for the Weyerhaeuser wood- and paper-product company.

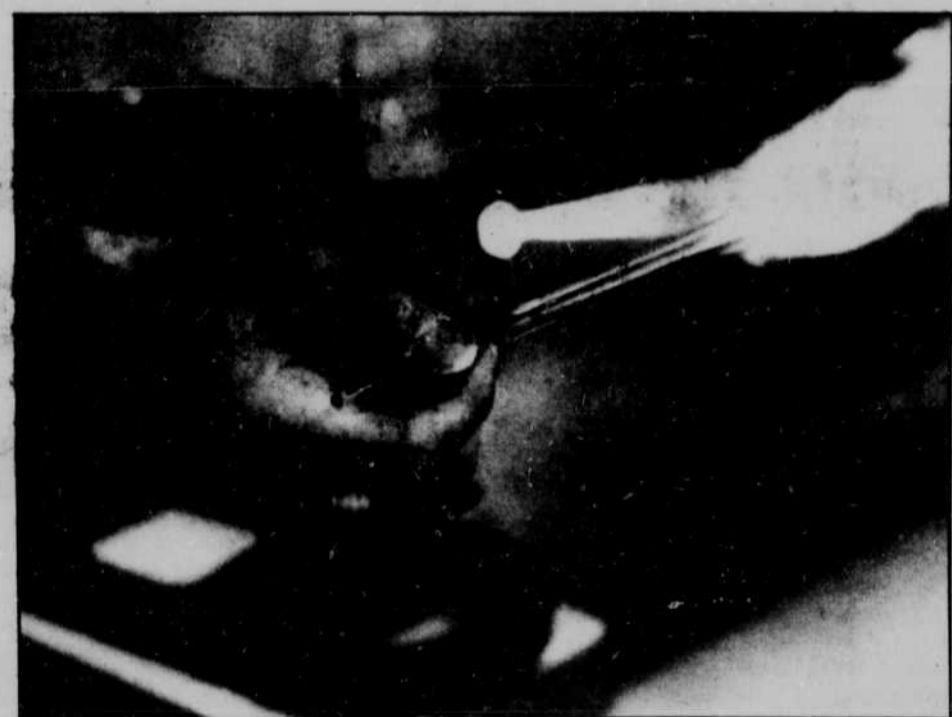
But since his youth, Greiner said, he has grown to love glass.

"I think it is the most fantastic substance in the world," he said, bending a glass coil back and forth to demonstrate its flexibility.

Greiner said his lab, full of lathes, torches and grinders, enables him to manipulate glass in almost any way he wants.

"This is one of the nicest glass-blowing facilities you can find," he said.

Sometimes, Greiner said, he takes advantage of the lab to make a chime, a trinket or Christmas-tree ornaments.



Above: Greiner holds a sample of scientific glass. Upper left: Greiner rounds the glass while he blows through the cool end of the tubing and heats the opposite end. Lower left: Greiner smooths the end of a tube with a bench burner. Photos by J. P. Caruso.