Glasscaster with Marcie Davis

Suellen Fowler—

Sharing the Chemistry of Color

Tell us how you stumbled upon flameworking.

I had been taking children's art classes at Chounard Art Institute in Los Angeles, California, for a number of years. In 1969, my father was a public relations consultant, working for Pepperdine College. He was placing articles in the *Los Angeles Times* about programs at Pepperdine and had an interview with John Burton and Margaret Youd. She was John's primary student and was teaching the flameworking class there. My dad suggested that I sit in on the classes and learn a little about flameworked glass. As soon as I saw how wonderfully the light reflects through the molten glass, I was hooked.

I took eight hours of class, five days a week. I did that for two months and got a really good, basic set of techniques under my belt. Margaret also taught me how to mix color. At that time there were no really good commercially available colors in borosilicate. We had tin oxide for a funky white, cobalt for blue, and silver carbonate or oxide for making a silvery, beaded yellow. Silver oxide doesn't incorporate well into boro when it's just by itself.

I always thought that tin didn't incorporate too well, either.

The way we were using it, it was a particulate suspension, so you just had to cram your tubing as full as you could with tin oxide, then try to blend as much of it as you could with the molten glass.

But the cobalt oxide did pretty well?

Yes, cobalt's a very good, standard coloring agent. Then we had chromium oxide for an opaque green that was somewhat unstable, but you could modify it by making sure it wasn't too intense or by adding some tin or silver or cobalt to it. There were no commercial borosilicate colors available at that time, and it was hard to "batch in quantity."

Batching borosilicate in a large quantity is very difficult. The glass has very little viscosity to it, so mixing the oxides in to get a thorough mix is difficult. You have to let it cook for a long time. It's also an expensive process.

Tell us a little bit about John Burton.

John Burton was a lovely Englishman. He emigrated to America in the late 1930s or early 1940s, and attempted to go into acting in Hollywood. He had a beautiful speaking voice and a lovely leonine profile, and he got to work on TV in the 1950s.

John's father had a metallurgical company, where John learned something about scientific glassworking. Then in the '50s, when boro became more widely available for people to work with, he got himself a torch and went back to what he had seen in Murano, Italy. He developed a kind of off-hand flameworking style that's very different from the usual style that's derived from scientific glasswork, where you work on points.

So the biggest difference between what other flameworkers were doing at the time and what he did was that he blew a bubble at the end of a tube, and then he would coil pot around it. He would apply color or rod to thicken it up and give it some mass, and that's what you do today?

Yes.

Tell us more about hand mixing colored rod.

I don't know who really came up with the idea of hand mixing oxides in a little piece of tubing, attached to 1/2" rods for handles. It may well have been John. In his book, *Glass*, he doesn't actually describe that process. A lot of the book has history and philosophy in it, and I love his philosophy. He believed that being creative is healing and that it would liberate your spirit. It would free you, and you could overcome illness and depression by having a creative act that you like to perform, any kind of creativity.

After you spent forty hours a week that summer and you got your basics, when did you start to do something with that?

During the winter sessions, I would go twice a week in the evenings. We had a student in the class named Larry Ward, who was a chemistry major, and he did some research. We didn't have a good, clear red. What we had was a funky copper oxide red that was hard to mix up. and it didn't want to go into solution and change from the green phase to the red phase very well. A "good" red from copper oxide was a really flat, brick red.

Larry came back with the information that if we introduced germanium dioxide into the copper oxide, it would have this wonderful effect of making a heat-sensitive ruby red. It would clarify the red completely—make it mix up much more rapidly and go into solution better. That was the magic bullet.

And that magic bullet worked in a number of different colors?

Yes, exactly. I was actually mixing a lot of color for Maggy and John at that time, too. Half the deal was that if I put in the elbow work, then I could take some of the color home myself, and I could take some oxides home and experiment with them.

What was the first formula that you created on your own?

I said to myself, "What would happen if I took silver oxide?" We loved playing with that oxide, because it has a certain reactiveness to it. "Okay, I am going to add some germanium to this and see what it does." It came up with a wonderful rainbow effect that is the basis for amber purple and all the other derivatives of that combination. I was so thrilled. It was unbelievable.

What colors came next?

I already knew about ruby red, so I immediately thought to myself, "Now we're going to throw in some copper." I learned about how much copper to combine with silver oxide to get my whole range of red palette, which goes from fuchsia to a golden pumpkin color. It was a question of quantifying the proportions, so I continued to experiment, and I wrote down my formulas in a little notebook.

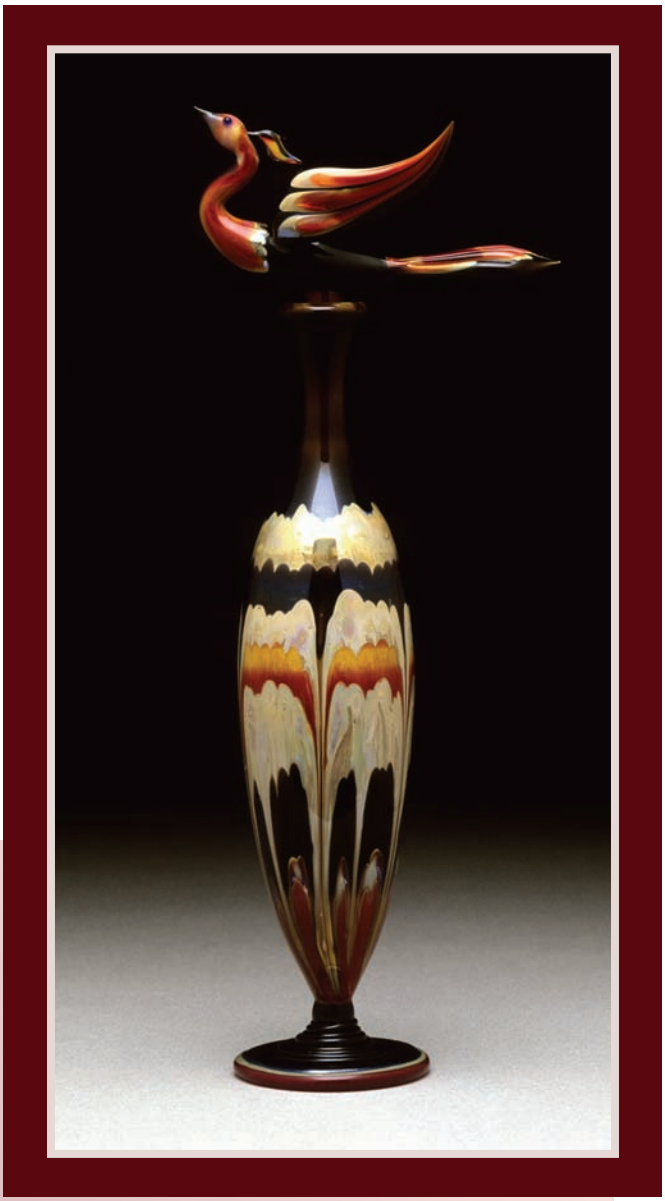
I heard how at some point you were using dimes.

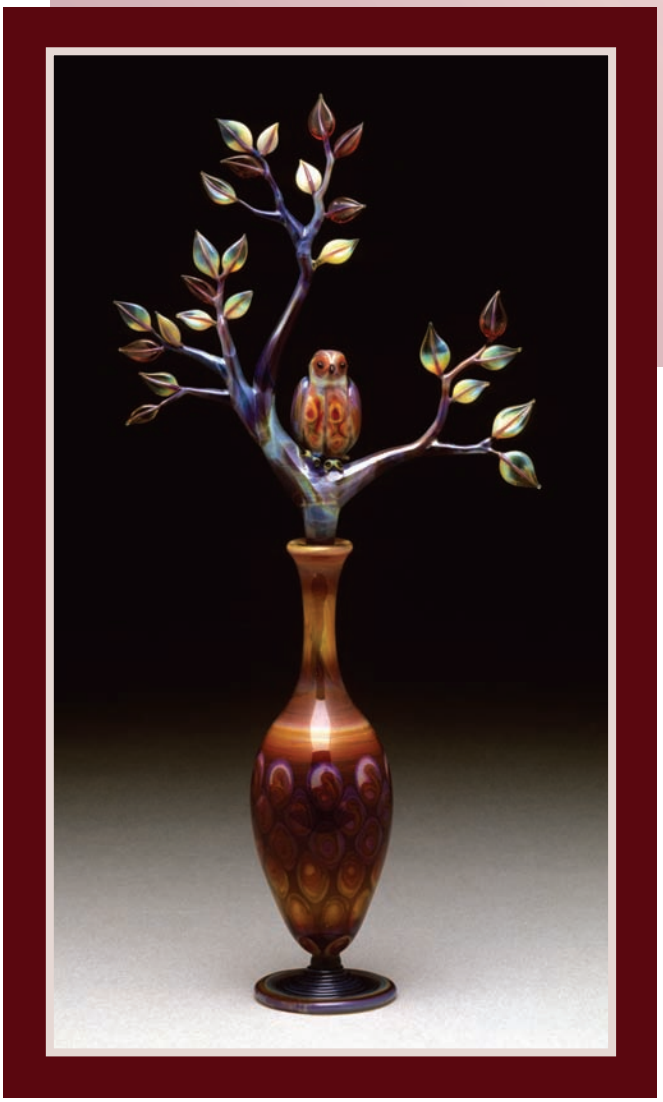
We used to have all-silver dimes before they put copper in them. We would cut them up. We'd take our shears and cut up a little chunk of it and throw it into the little piece of tubing and mix some yellow out of that. It made a nice bright yellow.

I believe everybody knows that you started out making color, hand mixing it from metal oxides, inside clear glass tubing. Then you struck up a friendship in your younger days with Paul Trautman, who later founded Northstar Glassworks. Somewhere in that friendship, your formulas and their derivatives were adapted for mass production. Tell us a little bit about those early days and how that came about?

I didn't have any input in terms of technical commercial production. I met Paul when he was going to Occidental College. I was working in my garage at Eagle Rock, and Paul would drop in, we'd chat, and I shared my formulas with him at that time. He was very interested in making color because he was a ceramicist, and there were a lot of similarities between glazes and this kind of color mixing. For example, nickel oxide produces black in both ceramic glazes and, when mixed with germanium oxide, in borosilicate. I showed him how to mix ruby red, and I shared with him all the different formulas I worked with. I've shared formulas and information with him over the years. When Paul graduated, he wanted to see if he could make a living as a flameworker. It wasn't really turning out to be a viable source of income for him.

People kept asking him if they could buy his color. They'd never seen borosilicate glass that had a good red in it. He began working on the whole problem of how to manufacture borosilicate color in a crucible, in the absence of atmosphere, and other considerations.





It was quite a technical feat that he accomplished. I think he started with three or four colors. He had Ruby Red, he made white from tin oxide, a cobalt blue, and a reactive color called Multi. I had shared the formula with him a few years earlier, and I always called it Serpentine Green. It was a formula that had many oxides in it and was reactive, so he called it Multi. Early on, it was pretty light, but he pumped it up later on. I think the Amber Purple was hard to make. He also had a transparent yellow early on. That was the basic stuff he started with. Paul was the founding father of commercial borosilicate color.

And you continued to make it by hand, even though you had a friend who actually had it premade?

There are some colors that are superior when they are made by hand. There are some colors that you cannot make by hand—the crayon colors, for example. It would be way too dangerous and probably not possible. You can't mix aventurine by hand, because the thing that makes it aventurine burns out. For colors like my fuchsias and my really brilliant reds that I use for my hobnail bottle patterns or on my dragon wings, I still think hand-mixed rods are superior.

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