

Presentation of the Mineralogical Society of America Dana Medal for 2007 to Frank S. Spear

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Friends and colleagues, it is with great pleasure that I present Frank Spear as the recipient of this year's Dana Medal, of the Mineralogical Society of America. I have been admonished to keep this citation to three minutes, so I've decided to tell you just three stories about Frank. You can think of them as "Lessons I've learned from Frank," or, if this is what you aspire to, "How to become an award-winning metamorphic petrologist."

(1) *Look inside the box before you think outside it.* You're probably expecting science stories, but this one is about Popsicles¹. As a kid, Frank hid half his popsicle inside a box of frozen peas so he could tease his sisters later by eating it in front of them when theirs were gone. They never thought to look inside a box of boring old peas. Frank's research is a little like that. So many times you think you already know the answer so you never bother to look. Major and trace element zoning in garnets, collected by electron microprobe, are a good example. Frank has shown that you can find out a lot about reaction and pressure-temperature histories if you just take a little time to look at the zoning; don't assume you know it ahead of time. I suppose the popsicle also shows that it helps to get an early start on this.

(2) *A sense of humor helps.* One day Frank ran across a regression approach, called Tukey's Biweight, which is a technique for removing outliers (Tukey was a statistician in the mid-1900s.) Later in November I was taking metamorphic petrology from Frank. In the U.S. there's a holiday in November called Thanksgiving. If you're not from the U.S., which I gather is about 95% of this audience, Thanksgiving is a celebration in November, which involves (surprise!) eating a lot; turkey is one of the traditional dishes. Anyway, I said, "So Frank, how do you buy your 'Tookeys'?" to which he immediately responded, "By weight, of course." Get it? Turkey—Tookey—Tukey... hey, I didn't say your sense of humor had to be good! Anyway, Frank remembered that joke when I sprang it on him 10 years later, and he sprang it on me 10 years after that. I suppose that shows two things, first that consistency is good. And second, with a 10-year

repeat interval, I expect that joke will be told only 3 or 4 more times. Now, why is humor important? Resilience. Frank is the most resilient guy I know. You get a bad review or a proposal turned down. Most of us get really depressed. Frank's attitude is a chuckle (that's where the sense of humor comes in) and then a new strategy for getting the work done.

(3) *Be persistent.* GSA meeting—I was sharing a room with Frank. I roll in around midnight, completely exhausted, and get into bed. Frank's light was still on and in those 30 seconds before I'm sound asleep I hear this voice: "I've been thinking about that reciprocal solid solution problem..." and then he goes into some thoroughly incomprehensible monologue about Gibbs free energy surfaces, mixing on sites, biopyriboles... I have no idea what he said. I won't tell you what I said. You know, maybe this is more about tormenting students than persistence.

Of course to win an award, maybe you don't need all these qualities, maybe you just need to be brilliant. And maybe that's what you've all been waiting for, so I'll just mention that, yes, Frank is truly brilliant. After finishing at UCLA, Frank was instrumental in starting quantitative thermobarometry and *P-T-t* path analysis, which are now taken for granted in petrologic and tectonics studies and shape our paradigms of the Earth. Throughout his career as a professor, first at MIT, then at RPI, he has thoroughly investigated the phase equilibria of metamorphic rocks. And he's leading the charge in understanding trace element zoning in metamorphic minerals, and accessory mineral stabilities that are so critical for interpreting ages and rates of metamorphism. He has a real knack for anticipating what's important. Arguably, the three most highly cited contributions in metamorphic petrology, summing to more than 2000 citations total, were written or coauthored by Frank—his experimental study with John Ferry on garnet-biotite Fe-Mg partitioning; his book, "Metamorphic Phase Equilibria and Pressure-Temperature-Time Paths" (available for purchase through MSA—yes you, too, can help support your local mineralogical society!); and his study with Kip Hodges of schists at Mount Moosilauke.

So, it gives me great pleasure again to present Frank Spear as this year's Dana medalist: A brilliant metamorphic petrologist, and, as you no doubt realize by now, my dear friend for 20 years.

¹A *Popsicle* is a trademark name for a frozen juice dessert, usually on two flat sticks that can be broken apart. Apparently in England it's called an "ice lolly."