

Michael's "Speech"

Over the years, they touched others' lives and in many different roles: as scientists, partners, role models, mentors, parents, and colleagues. And for their last two dozen years they took on the role of grandparents, as well.

The thing about growing up as the grandson of Kate and Michael is that, not having seen the alternative, I had little idea just what unusual grandparents they were. Every family is different, of course, but there are some things that really set my experience with Kate and Michael apart. It is not unusual, for instance, for grandparents to greet you with a hug and a kiss, or to ask about your friends or how you are doing in school. They did all of these things. But it never occurred to me that other grandparents might not also quiz me about my science fair project, or pose me a math problem, or brief me on the physiology of muscle contraction. Indeed, it was in one of their many efforts to teach me about muscle contraction that I remember, at a very young age, learning the word "viscous." And why shouldn't a nine-year-old be able to distinguish actin and myosin? Many grandparents send their grandchildren news clippings; few of those clippings are from Scientific American or the newsletter of the Biophysical Society. (Dean Azar's remarks reminded me that while it's a bit unusual to be a third-generation mathematics graduate, it's very unusual for the two prior generations to be one's mother and grandmother. I'm very proud that my younger sister has also continued this tradition of women with mathematics degrees.)

Science was an important part of being Kate and Michael's grandson, but, as everyone here knows, science wasn't everything. When Meena Rao generously offered me the opportunity to speak at today's event, she suggested a title based my own studies and research in the history of mathematics. I have to admit, my first reaction to Meena's suggestion was skepticism; the bio on my website says I study "proofs, rigor, and intuition" in mathematics, but while my parents and grandparents certainly taught me to value mathematics in a way that deeply informs my research, it was hardly a centerpiece in my relationship with Kate and Michael. Nevertheless, as will surprise none of you, Meena's own intuition on the matter proved a perfect provocation. My research considers how generations of mathematicians decided what was important in mathematics and in their lives, how those seemingly distinct values shaped each other, and how those decisions were reflected in their work, their teaching, and their interactions with society. For many people entering the field of history of science, the idea that scientific work and scientists' lives and values are so closely intertwined takes some getting used

to. Not so for me; I had the example of my grandparents.

I grew up in Minnesota, about 300 miles from grandma Kate and grandpa Michael, so my most vivid childhood memories of them are from our annual family vacations. Those who worked with them in the lab or on university committees know how justified their reputation was for being meticulously organized. I can confirm that their work-a-day organization extended as far as their vacations as well. A week before the vacation, Kate would call to check that we were ready to go, having of course already packed herself. (We joked that she was already packed to leave a week before the end of vacation, too---I never did see her suitcase completely unpacked.) On arrival, after the front desk sorted out all the different Dr. Barany's, we'd go over the schedule for the week (there was always a schedule). I'm sure my own taste for well-planned routines owes something to my grandparents' zeal for the same.

There were many constants on our vacations. Swimming---a sign for them of health, stability, and community---was a must. On every visit, vacation or otherwise, if there was a pool nearby the whole clan would be photographed in our swimsuits. Other sports were similarly encouraged: by the time my sister and I had started playing tennis, Michael could still sustain a decent rally, though my grandparents---like most---usually preferred to watch their grandchildren at play.

Then there were the meetings. Consummate didacts, both grandparents were sure to work in a directed briefing on my academic and social progress. You just heard from my cousin Isabelle about grandma Kate's walks. Grandpa Michael preferred to sit across from me with an agenda sketched onto a notepad, where he would record my answers between nods and nuggets of advice. I didn't realize until last year that Michael similarly directed and took notes on our weekly phone conversations begun after I started college. Like lab notebooks, the files he kept for each family member contained a record of their achievements, activities, and past conversations. It helped him convey control in his external interactions even as his personal health was waning.

Within Michael's agendas and notes was a program for living a scientific life. This included, of course, learning science---every scientific interest or accomplishment was greeted with a special kind of elation. But it also included planning, cultivating networks of friends (and later advisors and colleagues), managing sleep and work, balancing personal ambition and health. In remarks at the 1996 symposium here honoring my grandparents, Michael recalled his mentor's advice that one can never have too many friends; in my conversations

with both Kate and Michael, I was often asked just how many I had. (My standard response---that one counts cattle, not friends---always had to be followed by a reassurance that, yes, I had many good friends and knew how important they were to have.)

Another mainstay of family vacations was the family Convention. Baranyorszag, which roughly translates from Hungarian as Barany-land, began as Kate and Michael's private way of mocking Hungary's communist government. After their family arrived in the US, Baranyorszag acquired a Constitution, a naturalization procedure, and a formal voting structure for regular Conventions. My uncle Francis drew it an official seal, and years later my sister Deborah wrote a national anthem. As a small child, I found the promise of voting in elections and holding a cabinet post very exhilarating. As official "constitutional scholar," I typed the old constitution onto the family computer, taking quite a few liberties with the text as I went. Our vacation Conventions, always more than a bit tongue-in-cheek, blended mutual responsibility with the kinds of solidarity built on long strings of inside jokes.

Vacation Conventions were among the times when grandma Kate would dig through her immaculately packed bags for a bag of cookies or a container of nut-cake she had baked for the trip. I gather Kate was known around here for her baking as well. Hers and Michael's were lives filled with recipes: for Hungarian specialties, for logging on to the internet and checking email, for vacation and for Conventions.

Nothing was too trivial or too important for a recipe. Kate prepared my father George for graduate school with a handwritten book including recipe number 4, for tea: "boil water. Put in tea-bag when it reaches full boil, take out in due time." For many years Michael maintained and annually updated a recipe for what to do if he died before Kate did, as he expected to do.

It is not usually necessary, as a scientist or mathematician, to think very hard about what it means to be rigorous---rigor is just something you learn to use in your work to make it more accurate, more reliable, better. But seen historically, rigor is about the choices scientists and mathematicians make about what is and isn't valid---how to govern their work, their ideas, and their lives. What it means to be rigorous is a product not just of one's scientific training but of one's background, culture, and values; it extends not just to one's scientific work but across all aspects of one's experience.

Likewise, while we all learn to value intuition (and sometimes to be wary of relying on it too much), we rarely stop to contemplate just what intuition is. Intuition is a hard thing to define, historically or in the present. On the one hand, it can be the source of ideas not derived from rigorous methods. On the other, intuition is what allows rigorous methods to go forward. Rigor tends to be about restricting possibilities---making one's work rigid and exact; intuition is the opposite---opening new possibilities through leaps of imagination. Science needs both rigor and intuition in order to progress.

It has been poignant for me over the last year to see a side of my grandparents' scientific lives that they hadn't shared with me directly. Whether because I was too young to understand it or (later) because we were more interested in my own life (and research) than in talking about their research, Kate and Michael never told me all that much about the side of them many here know very well---the side present at the lab bench and in the classroom and in mentoring students over many generations, about which we've heard in the previous remarks. But reading about them in their own writing and in the writings of others, I can't say that I was surprised by what I saw. In their lives and in their science they pursued daring ideas with meticulous care, and taught future generations to do the same. They lived rigor and intuition. No wonder that, even though I did not follow them into science, those themes would form a part of my own life and work.

I turned 25 last Tuesday. As I grew toward adulthood, the annual birthday letters and phone conversations from my grandparents turned with increasing explicitness toward how I should live my life and how they wanted me to remember them. (I should say that Kate, perpetual optimist, focused much more on the former than the latter.) They clearly valued their scientific legacy, and they have many research accomplishments to their credit. But it was obvious that it was far more important to them to leave a strong human legacy---in their mentorship of young scientists, and in the lives of their children and grandchildren. They believed their science could better the world, but they knew their values---shared widely---could do so much more.

I would like to end by quoting not from a birthday letter but from a letter they gave me on their 50th anniversary, when I was almost exactly half my current age, for which we timed a special Baranyorszag Convention. "We cannot transfer our experiences to you," they wrote, "but based on them we can list lots of good advice." That advice culminated with what I only much later learned to see as the carefully distilled wisdom of many decades of strife and hope, as they elsewhere put it, as well as a perfect distillation of rigor and intuition in

science and in life:

"Dear Michael, we wish you lots of joy in life, but be prepared to face difficulties. Control the circumstances, though at times the circumstances control the individual. ... Seize every day!"