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It's amazing to recall how different things were in 1962. Cars were bigger and houses were smaller. No cell phones; a "long distance" call was a big deal, and expensive. No computers (well, almost – more on that later). If I missed my favorite TV show when it was broadcast (on one of four channels) then too bad; there was no way to see it again. John Kennedy was a pretty cool guy to have as president – his infidelities and ineffectiveness were unknown to me; the Cuban missile crisis would scare me later that fall as nothing else during the Cold War did, and Kennedy's assassination a year after that would permanently change my trust in society. It was no more strange to grow up then than it is now, I'm sure, but it had its own strangeness borne of so much change, compounded in my case by arriving in Berkeley, California in the fall of 1964, just in time for the Free Speech Movement and the other upheavals that emanated from that campus over the next several years. My journey since then has gone through at least four very different careers, a path that has been as unpredictable as it was enjoyable. I got started on that path because of Irwin Hoffman.

I met Mr. Hoffman in the fall of 1962. He taught mathematics at George Washington High School (then only opened for two years) and coached the tennis team. It was hard to tell which was his main job and which was a sideline activity. Maybe it changed from week to week or season to season, and the tennis racquets kept in the classroom didn't help settle the matter. You didn't have to play tennis to know that he cared about both.

His classroom was on the third floor in the east wing of the building, at the north end, with windows facing east. That meant no interesting views, because George Washington High School was at the edge of civilization – or at least of the inhabited part of the city of Denver. There was nothing to speak of south or east of the school. Even if they had let us off campus for lunch (which they most emphatically did not) there would have been no place to go. And that, of course, brings up the memory of 15-cent hamburgers in the cafeteria, which is a whole other topic I don't need to get into (along with why we couldn't talk about coconut shells in the senior skit, and what it was like to be marked truant because of certain benign but illicit festivities during school hours).

Hoffman was well known as a great teacher. (As was his father – my mother was in the older Hoffman's chemistry class at South High School.) Irwin Hoffman's idea of teaching was to let students teach themselves and each other. I don't mean that to sound negative; it was actually brilliant and it worked. I'm sure he guided the class and I know he worked one-on-one, but I don't remember him teaching in the traditional lecture sense. I do remember there was a lot of homework, and I remember passing my homework or classwork to the person next to me while receiving one from the person on the other side and then correcting each other's work. I remember students getting up and explaining their work. I remember Hoffman's enthusiasm for teaching and learning (and tennis) – he was constantly engaged and his attitude invited others to become engaged and enthused with him. What I don't remember is Hoffman doing much explaining, at least to the class as a whole. The more I think about it the more I wonder what his magic was. Because it was magic. Somehow he guided me to understand the formality of geometric proofs, and in doing that I learned how to think logically. I'm sure he knew that the

geometry mattered but the logical thinking mattered more. He was one of the first (among very few) teachers I've experienced who went beyond teaching a subject and used that subject to teach how to think.

Hoffman's neighbor was Bob Albrecht. I think they played tennis together – Hoffman had a court at his house. Albrecht worked for Control Data Corporation, a computer company that was trying to rival IBM. "Computer" in those days meant something the size of several refrigerator cabinets in a climate-controlled room, tended by specialists who were most often found wearing horn-rimmed glasses (actually, many of us wore horn-rimmed glasses back then). Computers were very expensive to buy and to operate. My iPod of today could run circles around any computer of that era.

Albrecht worked in Control Data's education department, teaching those specialists how to use the machines. He had the revolutionary idea that programming computers could be taught to teenagers, and he and Hoffman hatched a plan to do that, using some of us to prove him right. The result got written up in a computer journal of the time (www.rakahn.com/shared/medicine_show_1963.pdf). The principal students in the project were Bob Kahn, me, Al Nelson, and Fred Ris. The "\$90,000 computer" that was loaned to the school for the project was the size of an office desk, had the computing power of a modern \$5 calculator, and had 512Kb (not Mb or GB) of memory.

(As an aside, Albrecht became involved in many well-known counterculture activities, most notably The People's Computer Company and the Whole Earth Catalog.)

Irwin Hoffman started me on my diverse professional paths because he and Bob Albrecht narrowed my college search to Dartmouth (where George Kemeny was inventing the BASIC computer language that made programming much more straightforward for younger students) and Berkeley. Then they told me I should choose Berkeley because it was larger and "more interesting." That was a serious understatement.

At Berkeley I managed to major in Physics and Mathematics and to flunk French (I blame the Free Speech Movement, not Irwin Hoffman, for that). I went to graduate school at Harvard, where I studied astrophysics. I became an expert on the sun, doing post-graduate work at NCAR in Boulder (where Bob Kahn and I had used computers in high school, thanks to Bob Albrecht), then returned to Harvard to teach and do research in Astronomy. In 1982, I returned to the world of computers. It wasn't exactly a return, more of a change of emphasis. Digital Equipment Corporation (then one of the two largest computer companies and now just a memory) hired me because I had set up one of the first image processing systems for my department at Harvard and they needed that kind of expertise. Image processing is what you can do easily now with programs like Picassa or Photoshop, but in 1982 it was pretty cutting edge. I spent sixteen years at Digital Equipment Corporation, running various engineering and marketing operations. When my wife and I moved to California in 1998 I joined a biotechnology startup called Clinical Micro Sensors which was combining molecular biology with computing technology for creating DNA diagnostic tools. We ended up selling that company to Motorola, and I was briefly a Motorola employee. I didn't want to remain with a big corporation again. Teaming up with some academic scientists I had met through the biotech company, I started a

company called ZettaCore that worked to develop semiconductor memory chips (like the memory in your computer) using the chemical properties of small molecules – we called it molecular memory. ZettaCore’s memory technology didn’t succeed, but we did sell some of the technology we developed along the way to another semiconductor electronics firm. I retired from ZettaCore last year.

Throughout my various careers there were two things that defined my opportunities and my choices: understanding how to think ahead logically, and knowing something about computers. You could say that every career decision I made can be directly linked to what I learned from Irwin Hoffman. What a ride! Look at what one inspiring teacher began with his competence, enthusiasm, and humor.

Thank you, Irwin Hoffman, for all of it.

—Randy Levine

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