

May, 2013

Dear Joyce,

I am still in shock over Stuart's passing. Here I attempt to recall some good times with Stuart.

I arrived at Princeton in the fall of 1972, having had it explained to me by well-meaning friends in Kentucky that even though I had been a star high school student in Louisville, courses would be a lot more competitive at Princeton. But, since I had been strong in math, it seemed natural to try calculus-based physics. And so it was that I took Physics 103 (Newtonian mechanics), which had the unusual format of only one large lecture per week, with meetings the other four days in a class of 20 or so led by our "preceptor" Stuart Freedman, fresh with his Ph.D. from Berkeley. Indeed there were a number of smart people, which was great -- finally plenty of peers as well as some truly exceptional people. During those twelve weeks, I was continuously stretched, but never beyond the breaking point. I remember being impressed that we could ask Stuart to work any problem in the book, and he would just spontaneously write out the solution on the blackboard -- I knew so little that I did not realize that what we were doing was actually quite elementary by the standards of real physics.

In the small class, we all got to know one another fairly well, and on various occasions the students and Stuart experienced mutual culture shock: East Coast vs West Coast, Bible Belt vs, skepticism, etc. One of the classmates was Charlie Slavin, who became a sophomore-year suitemate. Tragically, we also heard the news a few months ago that Charlie, a beloved professor at UMaine, died unexpectedly.

Because everything was so new to me, so much of that first semester at Princeton remains in my memory even now. Stuart gave us a weekly one-problem quiz, and late in the course the question required some knowledge about a topic (tension) from much earlier in the course. I remember getting 2/10, as the quiz problem exposed that I had never really understood tension, even though I had done fine on the earlier quizzes. So I studied up on tension, and eventually we had the final exam, and thanks to the warning shot I was able to work the tension problem on the exam. It was hard to explain to Stuart how grateful I was for the 2/10. In fact, I was incredibly grateful for the whole opportunity of learning in that environment, comfortable in the high-powered but genuinely friendly and non-competitive atmosphere.

At that point, I was undecided (as were many friends) on whether to major in math or physics. In the last week of class, Stuart introduced us to the professor who would teach us Physics 106 (Electromagnetism), A.J. Stewart Smith (who *did* go by "Stew"). By the end of the next three semesters with Stew, I was headed toward physics. I do not recall seeing much of Stuart during sophomore or junior year, but a fateful event was doing my "Junior paper" with Gerry Garvey in the spring of 1975. That went well enough that we agreed that he would be my advisor for my senior thesis on experimental work with the cyclotron in the basement of Jadwin Hall.

I believe that it was upon arriving for my senior year in fall 1975 that Gerry told me that Stuart also had a senior thesis student, John Greenhalgh, and that it would make sense for the four of us to join forces to build an apparatus called the “helium jet recoil transport system” for studying beta decay. That academic year was an incredible experience for John and me, with Stuart (and you) playing a huge role. I had known John only casually, as he had not been in the sophomore courses with Stew Smith, and he lived in the dorms among liberal arts majors and the eating-club set rather than in Wilson Hall among the math-physics crowd.

John and I had a whole lot in common at a deep level, but initially our different styles and personalities were fairly apparent to everyone. We dove into the work at the cyclotron, ignoring much of our coursework. I do not recall exactly the root cause of our famous bickering, but it was probably due to the fact that I was somewhat impatient and in a hurry, while John was deliberate and careful. After continued daily bickering about priorities and methods, one day Stuart announced something like: “The problem with you two is that you are equal -- that neither of you is The Boss. You are both partly right, but you do not make progress simply because a decision needs to be made, but it isn’t made. John, today you are The Boss. Bob is The Flunky, and he will do what you decide. Here are some paper stickers labeled “The Boss” and “The Flunky” for you to wear, so everyone in the lab will know who is The Boss. Tomorrow you will swap roles, and continue to alternate each day,”

Thus we proceeded more smoothly, but alas, with the daily swapping the paper stickers soon started to lose their stickiness. Only you can explain how it was that you soon came to the cyclotron lab with two T-shirts, each emblazoned in big block letters, one THE BOSS and the other THE FLUNKY. As John and I worked hard all year, swapping the shirts every day, I can only imagine looking back now how this was amusing to all in the lab.

That was an amazing year, as Stuart and Gerry oversaw the training of John and me as experimenters. The senior grad students in the lab were Rosemary Baltrusaitis, Tom Bowles, and pony-tailed Bob McKeown. First-year grad student Carl Gagliardi spent time on our experiment. Visiting professor Hamish Robertson was inspirational to us as well. Stuart and Gerry had numerous humorous sayings that captured various notions about experimental physics. One of my favorites was from straight-faced Stuart: “Everyone has their own tricks. (Pause.) Everyone thinks their tricks are the best. (Long pause.) My tricks are the best.”

Throughout the academic year 1975-76, the National Science Foundation remained steadfast in its plans to shut down the Princeton cyclotron and withdraw funding. Late Halloween night, John and I were working late and the loud doorbell for the cyclotron loading dock rang. We answered the door, to find the costumed grad students Rosemary and Bob holding out cups saying “Treat or Treat for NSF!”. The funding so achieved being inadequate, nearly everyone made plans to leave Princeton at the end of the academic year. (The recently tenured Frank Calaprice continued to fight the good fight to keep the cyclotron operating, and remarkably succeeded for many years.) John and I were of course applying to graduate schools, and by

April both of us were set to attend Stanford in the fall. Meanwhile Stuart accepted a position as Assistant Professor at Stanford!

And so it was that the three of us descended upon the Stanford Physics Department in the fall of 1976. I remember sitting by the pool with you and Stuart in your apartment complex in Sharon Heights. Although both John and I were inclined to specialize in high energy physics, in the fall quarter we took Stuart's graduate seminar in nuclear physics, and did a quarter rotation helping Stuart in the nuclear lab -- I remember mainly helping him to set up his new lab space, hauling away junk and putting paper on the table tops, and so forth.

In the fall of 1977, Mel Schwartz gave a colloquium on his recently completed pi-mu atom experiment at Brookhaven (with Anne Hall and Jasper Kirkby). Mel was planning a follow-up experiment at Fermilab. After the colloquium, Stuart told John and me that we should ask Mel about working on the new experiment. Within a few weeks, John and I were both signed up to work with Mel, who gave us a crash course in PDP-11 hardware and data acquisition. By January 1978, we were in my car driving through a snowstorm to Illinois. And as Stuart had predicted, the experience working on Mel's experiment was fantastic.

So partly by design, and partly by coincidence, Stuart had enormously positive influence on my development as a physicist, from the first week of college physics, through my senior thesis, and then extending into the first year of graduate school and my choice of Ph.D. thesis topic. With the help of him and John, I learned so many concrete and stylistic things, including the discipline of careful cross-checking that stays with me to this day.

As the years have gone by, I have not seen Stuart very often, just every few years or so. I have several fond memories of those times, including the "five bridge view" when my wife Lynne finally met you and Stuart at your home over-looking San Francisco Bay. A favorite example of Stuart's deadpan personality came during a visit to LBL for some reason, probably a lab review. I charged into Stuart's office unannounced and gave a cheery, "Hello, Stuart!". He looked up from behind his desk, stared down his nose, and said, "Do I know you?". After some good laughs, he almost convinced me to join the U.S. Kamland collaboration that he was forming, including Bob McKeown.

My last conversations with Stuart were by phone a year ago when I was co-chairing a search to hire a new junior faculty member at UCLA. Amazingly, no fewer than five of our top applicants had worked with Stuart either as a grad student or postdoc, a real tribute to his mentoring. After twelve candidate visits, our committee agreed that the top candidate was Lindley Winslow, who had been Stuart's student on Kamland. It is great for me to have a frequent reminder of him in our department!

Fondly,

Bob