

Remembrances of Bob Paige

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I first met Bob in 1969. He had just come to New York to join the systems staff at the Courant Institute. We had a CDC6600 back then, but our computing services were in the dark ages. Bob was hired to debug a home-grown time sharing system that didn't work. He turned out to be a perfect hire; Bob thoughtfully discarded the code and built the system afresh.

Our acquaintance was casual for years. I was just aware that he was an outstanding systems implementor who was knowledgeable about music and film. His name also appeared at the top of the Institute chess ladder. That was no mean feat; the Institute had a number of Russian students back then, and most were strong players.

Time passed, and our relationship grew. But we really got to know each other after we both became faculty members at NYU. Somehow, we started having discussions of all sorts: computer science, math, advising students, programming languages, research, chess, parenthood, children and family, growing up, music, film, restaurants, life, and doing the right thing. Whatever the topic, Bob always had something insightful to say.

I have to confess that Bob was a hard study. His interests were broad, and he often used the power of metaphor and literary allusion to make a point. I recall several discussions where I struggled to keep up with what he was saying.

As I came to understand over time, Bob had extremely high standards, and it is fair to suggest that there were times when he himself did not meet them. This was never a reason for him to give up, but rather to work harder. For example, Bob had felt that his mathematics background was inadequate, so he took some math classes. I never completely understood just why he thought that mathematics was so important to his research, but it is fair to say that mathematical ideas and paradigms influenced his work. Bob was especially proud of his programming version of finite differencing, which he invented to maintain program invariants and to generate efficient code.

Very few systems researchers have as mathematical and high a level perspective about programming languages as Bob had. His was visionary. His research pursued very long term problems that almost no one thought could be solved. He started as an army of one, and



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built a system that semi-automatically transforms programs with great power and efficiency. This work covered many areas of expertise, and no matter what was needed, Bob stood ready to accept the challenges. It is no accident that a number of basic algorithms and algorithmic ideas came out of his research. And Bob carried this intensity and passion into his teaching and advisement. I think it fair to say that Bob caringly enriched his students with his uniquely big-picture approach to language research.

You can tell a great deal about Bob from his students. I don't think anyone in our department ever managed to attract a brighter group than Bob's. Jeff Ullman once commented that although he (Jeff) had had a very large number of students, there were very few for whom he can claim to have made a major impact. Jeff was actually commenting about how bright his students were, and how little guidance they needed. With Bob, the circumstances were very different. It is probably a reasonable analogy to suggest that Bob's systems views were to conventional programming perspectives as the ideas of Nimzovitch (whom he greatly admired) were to conventional chess. So it was inevitable that his students would receive something very special. All benefited from his highly abstract perspective and desire to turn idealized possibilities into efficient pragmatic practice. For example, Bob's perspective about the methodology of high level algorithm design is evident in Jiazhen Cai's work with Tarjan on extensions to problems in planarity testing. Similarly, Fritz Henglein's work on the Y2K problem bears eloquent testament to the training Bob provided his students.

I should add that Bob's students also became members of his extended family, and this special relationship has persisted to this very day.

Our conversations covered many topics, and would often drift from research to students to life and matters of family. I remember Bob coming into my office bursting with pride. "My boy," he said. "Johnny has just drawn his first picture. He is so practical; he drew a potato." Bob was like that; a mix of love, good humor and pride. He was also practical. One day he told me how Janie got into trouble in middle school. It seems that she had organized an unauthorized field trip for some friends and classmates. I can guarantee that New York City public school administrators would not let parents plan such an activity without lots of consent forms being signed, and it is a certainty that Janie's actions did not go over very well with the school. But Bob was glowing. He was pleased that Janie had the nerve to plan the adventure, and ever so proud of her strong sense of independence. On the other hand, he knew that she needed no encouragement to become a rebel, so he pretended to be a little upset with her. As for Nieba, whenever I would

comment on Bob's aesthetic observations and his insightful literary interpretations, he would reply, "Oh that's really Nieba's department. She has a much better sense about these things than I have."

Then there were the people, places, and the like. You never know who would be visiting the Paige apartment. Many of their art works came with a story. And there were the deals. My refrigerator came from a Bob Paige contact. The price was unbeatable. My wife and I were once let in at the head of a two-hour line when Paul Prudhomme located his traveling summer restaurant in New York City. The shortcut was a pay-back for Bob's helping the State of Louisiana with some decisions about fostering computer science research. And it was official; Governor Edwards's office had phoned Paul Prudhomme to explain that Bob was a friend of Louisiana. I seem to recall a personally fished (pried?) abalone dinner that Bob never found the time to collect out in southern California. I think it was in return for his suggestions about how to teach some of the more challenging material in Aho, Hopcroft and Ullman.

Bob also knew his wines. I remember being treated to remarkable tastings from places he had visited, and being offered some imports of especially successful vintages. Now Nieba is an excellent cook, but they both enjoyed fine restaurants. Bob, of course, knew where to go and what to order, but there was always a personal element to these things. For example, Bob not only knew where the best nouvelle French cuisine was to be found, but also knew the chef. Similarly, he knew about the best chamber groups in the city, and knew the musicians as well.

Bob was a master musician; he had turned down a professional career in trumpet to work in computer science. He took up new instruments with enthusiasm. I remember when he started playing the cello, which was motivated by his appreciation of Yo Yo Ma. He began studying the piano to learn it with Janie. It was fun to watch him struggling to realize his musicianship and interpretive skills with instruments he could not quite master. You could tell that he enjoyed the challenge, and did not mind that he did not always meet his standards. Curiously, I never heard him play the trumpet. In retrospect, I regret not asking him why he no longer played it. Were the challenges of new instruments more exciting? Was there a sense of loss over skills dulled by the passage of time? I have no idea what Bob's answer would have been, but do know that in his words, I would have learned something new about Bob Paige, about myself, and about the human condition in general.

Our discussions were like that. Somehow, Bob could communicate insights that I cannot recreate despite the unlimited opportunity to revise every syllable of this description of him and his thoughts. The book "Tuesdays with Morrie" was a pale imitation of what Bob had on

offer. I regret not transcribing our conversations to revisit from time to time, and to share with others. On the other hand, I believe that a tape recorder would have been needed to get the job done; his thinking was just too rich to absorb in full detail. Yet the gist of these conversations remain with me. They are alive, and his spirit continues to challenge me even though I cannot give his thoughts the force that he could through extemporaneous discourse.

That kid I had met back in 1969 grew up. Over time, he acquired a wisdom for the ages. Even as his disease progressed and took over his body, Bob's mind stayed sharp, and his words remained uplifting. Bob was like that, and he still is.