

Vaught Tribute

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I wrote my Ph.D. thesis under Bob Vaught in finite model theory. Interestingly enough, Bob had done very little research himself in finite model theory. However, I'll never forget how on several occasions, he said to me "You seem to be having so much fun doing finite model theory, I wish I were working in the area myself!"

Bob made a major contribution to my research program that he refused to take credit for. I began my thesis work by studying something called "first-order spectra". Bob suggested that instead of focusing just on first-order spectra, I should broaden my view to consider a generalization called "sigma-1-1 over finite structures". I took his suggestion to heart. In fact, the main result I thereby obtained is the single result I am best known for, called "Fagin's Theorem". The theorem says that this very class, "sigma-1-1 over finite structures" is equivalent to the complexity class NP. Years later, in 1990, I wrote a survey paper called "Finite model theory – a personal perspective". In the first draft of this paper, I gave credit to Bob for suggesting that I consider "sigma-1-1 over finite structures". I gave Bob a draft of the paper for his comments, and he insisted that I remove the sentence that gave him this credit. He said that this was a standard kind of comment an advisor might make to his student, and the student should take the credit. I very reluctantly removed the sentence.

Speaking of Bob's criticizing my writing, a very valuable lesson I learned from Bob was the importance of absolute clarity and precision in everything I did. This included my writing, my talks, and even my discussions on the blackboard. This lesson has stuck with me my entire career.

John Addison told me that one of the reasons I was given the honor of speaking today is that I am "a representative of industry". I work for IBM Research. I've found that in recruiting students, more often than I'd like I run into a situation where the student or the advisor is adamant that the student go into academia, rather than to industry. However, Bob fully supported my decision to join IBM. I even remember his telling me that Bill Hanf won major awards at IBM.

My final Vaught story took place near the end of my Berkeley years. Because my Berkeley years were so terrific, I had tried to stay at Berkeley just as long as I possibly could. In fact, I think I set a world record for NSF support. But finally, when it looked like the money was going to run out, I told Bob that I thought it was time I received my Ph.D. I remember his exact words: "I would have given you your Ph.D. last year, if you had just asked me!" This, I think, was typical Vaught. As long as the results continued to come in, he saw no reason to put an end to the process, until I asked for it to end.