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## The Qual, by Dana Williams

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Back in the day, Berkeley had more graduate students than it could keep track of. It certainly had more than it could support financially. Oddly, if you didn't have some financial support from the University, it wasn't even necessary to formally enroll, and many didn't enroll to save on tuition. As a result, there were over 400 mailboxes for graduate students and no one had any idea exactly which boxes corresponded to active students. The one exception was if you were supported—and hence had a TA-ship or other monetary support. Naturally, we were all keen to get and/or stay supported. To accomplish this, you had to do well on your qualifying exams. These were one-hour oral exams given at the end of each term. You had to take and do well on three of these selected from a short list of subjects. If you signed up for a “qual,” then about a week or two prior to “Qual Saturday,” a list was posted assigning you to an office and listing who your examiners would be. You got no choice in the matter other than signing up for whatever subject you picked for that term.

In my first year, I was unsupported and had decided that if I couldn't get support, it was time to leave mathematics and get a job and perhaps a life. So, in my second term, I signed up for the algebra qualifying exam. It was my weakest subject, so I wanted to tackle it first.

At the time, the Mathematics Department was housed in the upper floors of Evans Hall. Evans was a hideous cement structure of ten stories with an additional two basement floors underground for classrooms. Hence, our crowded classes were held in the basement and at the end of each period, we would all crowd into elevators to go back up to the upper floors to find some light and our study spaces. Normally, almost everyone would first get off on the ninth floor where the mailroom was. Before email, checking your mailbox was one of the key activities of the day. Many of us were a bit obsessive about it. After seeing that no one had sent you anything, non-teaching students such as myself would slink off to a windowless cubicle to continue studying for our quals.

The elevators were large, and on the day this story starts, I was packed into the middle of one with twenty to twenty-five other students and faculty all waiting to emerge on the ninth floor. I happened to be crushed against the TA for the analysis course I was taking. He wanted to be nice to the nervous first-year student, so he started a conversation. Of course, he led off with “Are you taking a qual this term?” (This is what graduate students primarily talked about.) I said that I was taking algebra. He asked who my examiners were. I answered, “Professor Smith and Jones.” (The names have been changed for reasons that will become obvious.) To my horror—and I am not exaggerating—everyone in the elevator laughed. You may be sure that I was somewhat curious as to why announcing Smith and Jones's names lead to universal laughter. Just at this moment, the elevator doors opened to the ninth floor and everyone filed out. I was very shy back then and rarely even spoke to my professors let alone a random professor. But there was one faculty member who was a little slower than the rest. I almost grabbed him physically and asked, “Why did everyone laugh?” Of course, I now know there was no way I was going to get any real information about his colleagues in a public place like the mailroom. Nevertheless, he did admit, “They are a couple of characters,” before quickly running away.

If I had been stressed about my qualifying exam before, you can be sure that I was over the top now.

I now know that Professor Smith was just a pompous twit fond of asking trick questions that would lead a student into making a fool of themselves. In my experience, one doesn't have to trick nervous students into making missteps. They can handle that on their own. On the other hand, if the rumors were correct, Professor Jones was an alcoholic and tended to be a little out of it on Qual Saturdays. Nevertheless, it will be the presumably hung-over Professor Jones who will emerge as the hero of this story.

As is the way of these things, my obsessive worrying did not prevent Qual Saturday from arriving. At the appointed time, I presented myself at Professor Jones's office. Professor Smith was already there and the blackboard was ready. I had studied the syllabus to the best of my ability and awaited the first question. Unfortunately, Professor Smith started with something that I was not prepared for. While some might say I should have been—and I am not going to embarrass myself by revealing the actual question—it was clear from the onset that I was at sea. You have to keep in mind that I needed to do well on my quals, and the situation is that you only have 60 minutes to prove yourself. However, Professor Smith was not about to switch ships until he had guided me to drive said ship well and truly upon the rocks.

Meanwhile the good Professor Jones had laid his besotted head on his desk and apparently gone to sleep.

After 15 minutes of sheer agony trying to construct something over the complex field of which I did not know the definition, it seemed that we had finally come to some conclusion. I was pretty relieved and excited to get back to the syllabus that I had mastered. But Professor Smith was not satisfied. "What if we work over the reals instead of the complexes?" What I thought was: "What if pigs could fly?" (Well, what I *actually* thought need not be quoted here.) Instead, what I said was, "Well, I guess we could try the same sort of approach." The ever helpful Professor Smith was only too happy to point out, "Oh, but the reals are not algebraically closed, you know." Of course, I knew that. As any idiot watching my qual would have known by now, the problem was that I didn't know what I was supposed to construct. But Professor Smith was not just any idiot.

However, our hero, Professor Jones, had not been completely asleep after all. I am now, some forty-five years later, still grateful that Professor Jones lifted his doubtless throbbing head from desk, turned to Professor Smith, and shouted in way that expressed his irritation at being disturbed, "Can't you see he doesn't know any of this?!"

Now, that may not have been the most flattering thing ever said about my mathematics. (There have been a lot of referee reports over the years.) But at the time, I could have kissed him. Somewhat grumpily, Professor Smith returned to what I considered to be the *actual* syllabus. Despite his trying, unsuccessfully, to lead me astray here and there, I must have done reasonably well. Professor Jones even roused himself to ask a question or two.

Suffice it to say that in addition to passing the qual, I did manage to get some financial support my second year, and in the end, I managed to write a thesis and go on to have a successful career in mathematics.

I am still in Mathematics. Instead of taking quals, I now give them. They are still almost as unpleasant to give as to take—causing anxiety is just as bad as having it—but I don't expect anyone to believe that until they get to give a few. When I give a qual, I keep the good Professor Smith in mind. He managed to teach me what not to do, which I think has been valuable lesson. My goal is to lead the student to the answer and not away from it. Even then, the road can be bumpy.



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