Chandler Davis as Mentor

The Mathematical Intelligencer *encourages comments*

about the material in this issue. Letters to the editor

should be sent to the editor-in-chief.

Editor's note: According to the Mathematics Genealogy Project,[1] between 1964 and 1994 Chandler Davis trained 14 Ph.D. students at the University of Toronto and, as of October 2013, has 126 mathematical descendants. What it was like to be his Ph.D. student and what impact did that have on students' lives and careers? Three of Chandler's progeny, representing different decades, agreed to share their memories.—MS

John Benedetto (1964): Chandler arrived in Toronto in 1962. I also arrived in Toronto in 1962 with an M.A. from Harvard and having been raised in a working-class suburb of Boston. So, at that point, we had a little bit of Harvard in common, but not much else. I taught a section of Calculus, and Chandler was the professor in charge. I became his Ph.D. student the very first day that we met—a separate story. It was the wisest, perhaps luckiest, decision of my mathematical life.

Chan seemed old to me. I had just turned 23, and he was in his late 30s. I had already decided on Laplace transforms, topological vector spaces, and Schwartz distribution theory for a general thesis area. We met every week in the adviser/advisee dance. He told and taught me all the things he could, that I could understand; and I, dutifully, as any rebellious child would behave, did nothing about it. This was a real error on my part, since in later years I understood how deep and ingenious and knowledgeable he is; and how much I should have listened about Naimark's theorem, and his creative contributions in this area, and all the wonderful mathematics he did. In fact, all of these things play a major role in the theory of frames that I have been working on for the past 20 years. But, God knows, I knew from the beginning how brilliant Chan was, and I

have kept respecting him more and more through the years. I still try to reconstruct details from our weekly meetings. What certainly stuck were the breadth and overall appreciation and excitement of mathematics—I cannot imagine a better adviser. In any case, he let me run where I wanted to go, and filled in mathematical gaps prodigiously—a protective father.

I found out that he was a legend, and I wanted to know everything about him. The paper written while he was incarcerated during the McCarthy period became a badge of pride and honor for me. *MY* adviser could thank the Department of Prisons (and not the NSF) for their support for his research, and in the next breath assert that said Department of Prisons was not responsible for the results he proved in this research. Wow! Early on, knowing I suppose that I had pried into his past, he told me that his political activism was a thing of the past. Thank goodness he had second thoughts. He was brave and so principled then, and it is his life-long mantra.

Naturally, I met Natalie, and was dazzled. What a couple—beyond anything I had ever imagined.

Chan introduced me to Laurent Schwartz when Schwartz visited Toronto. The three of us had a memorable (for me) lunch together. Close to graduation time, Chan gave some fatherly insights to me. He noted that I was not getting any younger (I was 24) and should therefore work very hard. Lest this body blow was not sufficient, he also noted that an outsider might construe anything in my thesis of worth as a product of my adviser; and therefore I should work very hard. Chan was a very subtle fellow! In those days, his telephone call to NYU got me a tenure-track position. I received my Ph.D. in 1964.

He continues to be my hero, whether it is because of his poetry, his principles, or his mathematics. At a recent mathematical fest at the University of Maryland, where I am "A servan' of 'er Majesty the Queen," he was virtuosic and humble and original and thoughtful as always. I am proud to be his student!

Man-Duen Choi (1973): I completed my Ph.D. thesis at the University of Toronto under the supervision of Chandler Since then, Davis in 1973 and returned to Toronto to teach in 1976. Since then, Chandler Davis, Peter Rosenthal, and I have worked together for more than 35 years to arrange the weekly Toronto Operator seminars (Monday 4 to 6 PM).

I first met Chandler in 1969 when I enrolled in his course MA1100 (Functional Analysis), as I began studying for the M.Sc. degree. In this course, I learned of Operator Theory "in the school of Paul Halmos." One of my pseudo-expository papers, "Tricks or treats with the Hilbert

[1] http://www.genealogy.math.ndsu.nodak.edu/id.php?id=7618.

Matrix'' (*American Mathematical Monthly*, 1983 [vol 90] pp 301-312), may serve as a typical example in connection with that school.

From Chandler, I learned of the techniques of two-by-two matrix manipulations. This technique has become one of the most useful tools in my ongoing research work, including my most recent work on mathematical methods of Quantum Information.

Stephen Kirkland (1989): Rather than trying to summarize the totality of Chandler's effect on my life and career, I will give a small but representative example of his influence. I remember a conversation, fairly early in my time as a Ph.D. student, in which Chandler told me "the best way to learn about a mathematical topic is to write a research paper on it." I was pretty green at the time, and I figured that it would be impossible for anyone to write a research paper without first putting in years of careful study on the topic. To me, Chandler's assertion seemed, well, crazy, although I didn't tell him so at the time. However, in the years since that conversation, I have written several research papers on mathematical topics that were new to me, and those papers were great learning experiences. That conversation with Chandler opened me up to an approach to mathematical research that has served me well throughout my career. I now tell my own graduate students that writing papers is an excellent way to learn mathematics. No doubt they think I'm crazy; no doubt they will discover, as I did, that Chandler was right all along.

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