

Preface

A few years ago I wrote and published a book with the American Mathematical Society called *A Mathematician's Survival Guide* [KRA3]. This volume was intended to help the student learn how to become a mathematician. Feedback from readers has indicated that this book has found an appreciative audience, and it has been successful in mentoring young mathematicians. The book helps the newly minted Ph.D. to find his/her place in the mathematical firmament and to learn how to get along in the profession. My motivation for writing that book was a commonly held belief or observation that mathematics is traditionally a sink-or-swim vocation; there is nobody to tell you what you are supposed to (or are expected to) do in your new position, how you are to learn the ropes, and how you are to advance and realize your potential. There is some truth to this claim, but two comforting facts are that this differs little from the challenge facing most people as they embark on their careers and that there is guidance to be found for those who seek it.

Certainly the transition from the intensity and often solitary activity of getting a thesis written to the sociopolitical structure of an academic or industrial job can be a shock to the system. Nothing in your formal education prepares you for the many nuances and loopholes of your new work environment. You will have many new choices as to what sort of working environment you should select; if you are fortunate, you will find one that suits your interests and proclivities. This could be a first-rate academic/research environment, or it could be a primarily teaching environment, or it could be in a genome lab, or with a computer firm, or with a branch of the federal government. In every instance you will face similar questions: What am I supposed to do (on a daily basis, and also in the long run)? How do I function

effectively and successfully in this new setting? What are my goals? What is expected of me? To whom am I answerable?

On the face of it, the Ph.D. is preparation for a research career. The fresh Ph.D. should be chomping at the bit to prove theorems and write papers. But it is a hard fact that most American Ph.D. mathematicians write very few papers. According to recent statistics from the American Mathematical Society, of those authors who publish anything at all in their careers:

- About 43% publish only one paper
- About 15% publish only two papers
- About 8% publish only three papers
- About 75% publish five or fewer papers

Many authors publish just a paper based on the thesis and nothing more. Why is this? Is the cutting of the (academic) umbilical cord so traumatic that most people just fall off the wagon? Or are the reasons more complicated? Do people just get wrapped up in other duties, or other career pursuits, and decide after a while that “publish or perish” is not part of their credo? Are they perhaps in jobs in which publishing and doing research is not really the thing that is rewarded?

And what about teaching? If you are working for the National Security Agency (as, for instance, three of my Ph.D. students now are), then you certainly will not be teaching classes, grading papers, or giving grades. But you *will* have to give seminars. You *will* have to mentor others. You *will* have to provide guidance to younger staff members. How does one learn these skills?

And, no matter where you work or what you do, you will no doubt work as part of a team. You will have to function in meetings and on conference calls and in interactions with your supervisors and your subordinates.

If you are in an academic job, then your role(s) in life is carefully delineated and described in your institution’s *Tenure Document*: teaching, research, and service are the three branches of an academic’s professional activity. He/she is judged on each of these, and in different ways. For example, if you manage to prove the Riemann hypothesis, then it doesn’t matter whether you spend your time at staff meetings rolling your eyes and humming *The Battle Hymn of the Republic*. If you are a world-class teacher,

then you will probably be granted some slack in your research program. If you are a terrific departmental citizen, seen as a person who holds the ship of state together, then you will perhaps not have to put in quite so much time on the other two portions of your profile.

The bottom line is that there is an awful lot about this profession that you are going to have to figure out for yourself. This book is intended to help you through the process. One of the main messages here is to *talk to people*. Find a senior faculty member who is willing to let his/her hair down and tell you some things about how life works in your department, or your organization, or your company. Bond with others who are your peers and who can share experiences with you. Become friendly with the staff, with the Chair, with the key players in your group or department. I can assure you that—if you are in an academic department—a good deal of the decision of whether to tenure you is based on raw quality, but another good part of it is based on collegiality and whether you will fit in. Is this someone that we want to have knocking about in this building for the next forty years or not? Is this someone whom we would look forward to seeing each day? These are intangibles, not written in any guidebook or *Tenure Document*. But they are facts of life.

The purpose of the present volume is to give you some hints as to how to make your way in the academic world, or more generally in the corporate world or professional world of mathematics. I cannot claim to be expert in every nuance and corner of the profession; but I have had more experience than most. I can certainly help you to avoid most of the pitfalls.

I should perhaps stress that I know quite a lot about the life of a mathematician in the United States. I know very little about that life in other countries. I do know that there can be considerable differences—in culture, in style, and in emphases. I must leave it to another scholar to write a book about the mathematical life in Italy or Sri Lanka.

By the same token, almost all of my professional experience has been of an academic nature. I have done some consulting, and I have collaborated with nonmathematicians. So my communication skills are moderately well developed. But I have never worked for Microsoft, or at the Social Security Administration, or in a genome laboratory. And I probably never will. I know some of the key features of non-academic jobs, and I intend to share them here. But it is a foregone conclusion that the focus of this book will be largely on an academic career.

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careful reading of an early draft of this book, and for contributing many useful and incisive comments. Robert Burckel, in his unbeatable style, studied every word that I wrote and corrected them accurately and mercifully. David Collins painstakingly taught me the chapter and verse of the *Chicago Manual of Style* (or CMS), and many other truths about language and accuracy as well. Ed Dunne, as always, was an encouraging and dynamic editor. He read several drafts of the book and contributed decisively to its form and structure. Ed also engaged five excellent reviewers who contributed incisive criticisms and suggestions that have certainly made the book tighter and more on point.

Mathematics is a highly varied, rich, and rewarding life. Welcome to it. I hope that you spend a very pleasant and productive thirty or forty years making your way through the profession, and that you find many rewards and comforts. May this book be your touchstone as you get started.

— Steven G. Krantz
St. Louis, Missouri