My First Forty

Four decades ago, June 14, 1969, I received my Ph.D., becoming an officially certified member of the profession of mathematics. For some things I was prepared: I had been taught how to do research and had carried out some under my thesis advisor's supervision. I was prepared to teach, to the extent people were in those days—even though I had only been a paper grader and a section man as a graduate teaching assistant—by having lectured in seminars and having been a student.

One thing I was not prepared for was membership in the world mathematical community. By this I mean the web of relationships, scientific but also personal, that connect the people who spend time creating, teaching, and publishing mathematics. Exactly who belongs, and exactly how many of them there are, is probably not knowable with precision. I would guess there's about 15,000: the population of a small town (in fact the population of the town I grew up in). Not everyone in a town that size knows everyone else, of course. But distances on the acquaintance graph are quite short. So it is in the mathematical world. As most people find out experimenting with the collaboration graph tool in MatSciNet, there is a coauthorship chain of around length five or less from oneself to essentially every real mathematician one can think of. In fact, when things like having been at the same meetings or visited the same departments are included, the connection web seems to have much shorter diameter. This is manifest in submissions received by the *Notices*. Many contributions simply arrive, over the transom so to speak, from mathematicians I did not previously know, sometimes not even know of. And yet, with a little digging, it turns out that we have friends or experiences in common.

Shortly after receiving the Ph.D., I began a postdoctoral position. One of my fellow postdocs, older and wiser, thought one should consider one's mathematical interests as a solid cone $x^2 + y^2 = t^2$, with t representing time: $t = 0$ being the time of the thesis, $t < 0$ student days and $t > 0$ postgraduate, and the cross section at time t representing the areas of mathematics. Thus, for increasing t, the student focuses on narrower and narrower areas as he/she proceeds through graduate school and into thesis research, while the postgraduate mathematician sees his interests expand into new areas. The cone model has some things wrong with it (the time symmetry, the circular shape of the cross sections, for example), but the basic idea, that the thesis is a point from which mathematical growth expands, or should expand, seems true enough. The interests of the colleague who suggested the image, by the way, expanded to the point that he left mathematics, although not, of course, the mathematical relationship network.

Another colleague I met a few years later, when we were both assistant professors, although not at the same institution, also had an interesting image for the same phenomena: he liked to quip that his professional goal was to slow the increase in the distance between the mathematics he did and the mathematics he appreciated. His point, that as one continues working at learning, areas one thought would always be too difficult to understand can become accessible, if still too hard to be part of one's research agenda. For the record, this colleague was, and remains, a leader in his specialty.

Regardless of the metaphor, the point both colleagues make, that part of being a mathematician is learning mathematics for its own sake, and not only learning to do one's own mathematics, seems correct. That's why mathematicians attend departmental colloquia, participate in AMS national meetings lectures, and read the *Notices*.

Mathematics has grown enormously since 1969. Yet the continuity, of topics, structures, even basic references, over the past forty years is also remarkable. And the doing of mathematics is pretty much the same: individuals and small groups thinking, talking, and writing on a chalkboard or on paper. But of course the preparation for publication has changed dramatically. My thesis was typed professionally by a technical typist paid from my advisor's grant, but a paper I had prepared earlier I did myself, on the Remington portable I used as an undergraduate. That, by the way, was an excellent lesson in notational discipline, an important skill in the days journals were typeset, albeit moot in these times of TEX. Articles that appear in the *Notices* are prepared for production by *Notices* staff, who design layout, figure placement, column and page breaks, and so on, and who have won awards for doing so. Nonetheless, most of the articles you read in the *Notices* are submitted in TEX files, often with author supplied graphics, which streamlines that production process. For many of us, our TEX expertise is fixed—we continue to do what we learned to do the first time we needed to do it. TEX has continued to advance, however, and this year has seen some *Notices* articles and columns designed to help TEX users advance as well. I also note that the *Notices*, like all AMS publications, takes submissions in any format, including longhand.

Students receiving a Ph.D. degree this spring will complete their first forty years as mathematicians in 2049, a date that sounds to me like something out of a doomsday scenario prediction. But the only warning I have for them is simply to pay attention; it'll be there sooner than you think.

—Andy Magid