

I Want to Be a Mathematician: An Automathography. By Paul R. Halmos. New York (Springer-Verlag). 1985. 421 pp. with 43 photographs. \$41.50.

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My first encounter with Paul Halmos was in 1950 when I read his excellent book on linear algebra [Halmos 1942] which enabled me to solve a set of problems assigned in a lecture course on Hilbert spaces which I was taking at the University of Wisconsin. The point of view expressed in this book is standard today, but was very new to me then. My second encounter was in person at a party at Israel Herstein's apartment in Chicago in April 1953 where I heard Halmos defend a controversial review [Halmos 1953] critical of the Bourbaki volume *Integration*. This inspired me to read his book on measure theory [Halmos 1950] and adopt his point of view on the subject. While I have never been his colleague, and my

research interests have only been peripheral to his, our paths have crossed often and I have learned a great deal from him. So I had to read *I Want to Be a Mathematician* almost as soon as I became aware of its existence.

This book confirms my earliest impressions of Paul Halmos as an outstanding research mathematician, a great expositor whose writing is not only clear, but a delight to read, and a man with strong opinions, many of which he expresses eloquently in this book. He bares his mathematical soul, but talks about his private life only in so far as it serves this purpose. This is why the book is subtitled *An Automathography*. (It even takes a small amount of detective work to deduce that his wife's name is Virginia.) It is deeply personal, wonderfully written, and you can almost hear him reading it aloud in the Hungarian accent he has tried so hard to lose.

The book spans more than five decades and is full of vignettes of historical interest. The author tells us first what it was like to attend elementary and high school in Hungary in the 1920s, to come to Chicago in 1929 and finish high school there in less than two years while struggling with a new language, to be an undergraduate and a graduate student at the University of Illinois beginning in 1931. After three years at Illinois he graduated Phi Beta Kappa with a love of both mathematics and philosophy. In 1934, he became a graduate student in philosophy (at which he did not succeed) and then a graduate student in mathematics until he completed a doctoral dissertation under the direction of J. L. Doob in 1938 (making him one of sixty-eight who earned Ph.D.s in mathematics in the United States and Canada that year). Except for one semester, when he was given a class to teach because of an emergency, he received no financial support. His description of the faculty and mathematics curriculum at Urbana in that era is sprinkled with critical opinions and is rich in detail. He stayed an additional year after 120 job applications produced no outside job offer. In July 1939, he turned down an offer of a faculty position (after he had accepted it) to go to the Institute for Advanced Study (IAS) in Princeton, New Jersey, initially at his own expense, to "stay even" with his fellow graduate student, friend, and mentor, Warren Ambrose.

Then as now, the IAS was the Valhalla for mathematicians. There he spent three years playing chess and Go, indulging in his love of literature and music, learning mathematics from the masters, doing research, and writing his first book [Halmos 1942] (which came to my aid eight years later). The reader also learns more about Von Neumann with whom Halmos collaborated, and whom he credits along with Ambrose and Doob for having "made me what I am today."

In 1942–1945, after a semester back at Urbana, he took a job at Syracuse University (where W. T. Martin was head of the mathematics department). Here he taught as many as eighteen hours a week while continuing to write papers. From early 1945 until the end of World War II, Halmos did a brief stint as an applied mathematician at the Radiation Laboratory in Cambridge, Massachusetts, where he learned that there was little relationship between the mathematical problems posed by engineers and what they really want to know, and that one needed little mathematical knowledge to solve their "real" problems once one

spent the time needed to discover what they were. He went back to Syracuse in the fall of 1945 to find that Martin was moving on to MIT and that there were lots of jobs available. He chose to join the mathematics department of the Division of Physical Sciences of the University of Chicago. He stayed there (except for leaves of absence) until 1961, and it is clear that he regards this period as his halcyon days. The mathematics department of this great university was perhaps at its height during those fifteen years before the University of California at Berkeley (among other institutions) began picking off some of its better mathematicians. Its first-rate, enthusiastic faculty attracted some of the best graduate students in the country, so it was just the place for Halmos to indulge in his grand passions: teaching, research, and expository writing. Many of today's famous mathematicians were Chicago students in that era, including several whose doctoral dissertations were directed by Halmos. His research and teaching were frequently intertwined and often resulted in books that are gems of exposition which make it easier for young mathematicians to learn a new field.

Halmos had a wanderlust that took him on visits to the IAS in 1948–1949, Montevideo in 1951–1952 (to which a fascinating chapter is devoted), and the IAS in 1957–1958, not to mention quarters out of residence spent in England, Scotland, Seattle, and Italy. A plan to attend the International Congress of Mathematicians in Amsterdam in 1954 and then visit some English universities for two quarters was aborted when the U.S. State Department denied him a passport for political reasons, probably linked to his refusal to spy on colleagues at the Mathematical Institute in Montevideo. By 1958, however, the red scare had abated enough for him to get a passport again with no difficulty.

In 1961, Halmos accepted an offer from the University of Michigan. He left Chicago without rancor partly because of the impact of an increasing crime rate on living conditions there, and partly because he felt that Saunders MacLane (whom he still respects and admires) had less than the highest regard for his talents as a research mathematician. Despite efforts on the part of Adrian Albert (MacLane's successor as chairman), Halmos went on to become a bigger frog in what he recognized as a smaller pond in a nicer location. For seven years he was on the faculty at Ann Arbor, published papers, taught students, enjoyed his colleagues, and continued to travel. He went on an extensive tour in 1964 beginning in Australia and ending in Moscow, took a sabbatical leave at the University of Miami in 1965–1966, and visited the University of Hawaii for a semester in 1967. He left Ann Arbor in the fall of 1968 to accept the chairmanship at the University of Hawaii. Then fifty-three years old, he felt his best research years were behind him and hoped to build a new mathematical center in the mid-Pacific.

He has strong opinions on what a department chairman should do and be, and decided after three months that he could do the job, but didn't like it. So he announced his intent to resign at the end of the academic year, declined an offer to remain as a professor, and joined the faculty of Indiana University where he stayed until he retired not long after writing this book. He continued (and continues) to be active in teaching, research, and exposition, and presently holds a

post-retirement appointment at the University of Santa Clara. He continued to travel while at Bloomington and was at the University of California at Santa Barbara from 1976 to 1978. He could have stayed there permanently as many of us in Southern California had hoped he would.

As Halmos tells the story outlined by this chronology, the reader is regaled with anecdotes and information about mathematicians, their personalities, activities, and modus vivendi. During this period Halmos was also an editor of books and journals, a referee of papers, and an active member of committees of the American Mathematical Society and the Mathematical Association of America. He took none of these tasks lightly and passes on his opinions on how to do them well.

In fact, three chapters of the book give his opinions on how to do things, including how to teach, how to supervise doctoral dissertations, how to referee papers, how to do research, how to write mathematics, and what to do about rejections of papers. (He tells that editors and referees are not always right and how some of his best papers were rejected initially.) These opinions, filling a large part of the book, are carefully separated from factual descriptions.

The reader gets a clear picture of a man whose life has revolved around mathematics and who makes it clear that any serious mathematician should give mathematics the central place in his life. (Like Halmos, I use "his" in place of awkward artificialities like "his or her.") Most of his harsh criticisms are reserved for himself, but it is not hard to see that he dislikes mathematicians who are irresponsible about their obligations, or who otherwise fail to take mathematics seriously.

To what extent is this book a contribution to the history of mathematics? The author kept diaries throughout the period covered by the book, and made a reasonable effort to check his facts when possible. So I trust what he says. It is what he does not say that troubles me. A few examples of such omissions follow. His visits to Miami and Santa Barbara are written off as the result of weakness that takes the form of sun worship. He devotes a few paragraphs to his one-year visit to the former and dismisses a two-year visit to the latter in even less space. I am left with doubts about his stated reasons for leaving Hawaii, and I know that he has rubbed off the rough edges of the controversy with Louis de Branges and James Rovnyak over their announcement of (an incorrect) solution of the invariant subspace problem. He admired and respected almost all his colleagues at Chicago, but makes some uncomplimentary remarks about one of them whose name is not included in the index. Despite this, the book contains a collection of "snapshots" of mathematicians in action and of their social behavior available nowhere else (in addition to many actual photographs), and will surely have to be examined by any scholar who tries to write a mathematical history of this period.

REFERENCES

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