Mary P. Dolciani Award

Henry Pollak
Columbia University

Henry Pollak joined the Mathematics and Statistics Research Center at Bell Labs in 1951. While at Bell Labs, he published thirty-three research papers in fields including complex variables, special functions, operations research, and combinatorics. After becoming director of the Center in 1961, Henry guided the research of the technical staff, famously reading every paper they submitted for publication—about 200 per year—marking typos and providing suggestions on the exposition and the mathematics.

Perhaps uniquely among mathematicians employed in industry, Henry made significant contributions to mathematics education, beginning by the age of 30. His first publication on education, "On the future mathematical curriculum for electrical engineers," was published in 1958. That same year, he joined the writing team for the emerging School Mathematics Study Group (SMSG), becoming chair of its advisory board in 1963. Since the 1960s, Henry has been a leader of the most important groups active in the reform of mathematics education. In addition to SMSG, these included the steering committee of the Cambridge Conference on School Mathematics, original member of the Mathematical Sciences Education Board, chair of the Conference Board of the Mathematical Sciences, executive committee of the U.S. National Commission on Mathematics Education, executive committee of the International Commission on Mathematical Instruction, and chair of the NSF's Advisory Committee for Science Education. After attending all prior congresses, in 1980 Henry chaired the program committee and executive committee for the 4th International Congress on Mathematical Education.

A distinguishing feature of Henry's career is his direct relationship with classroom teachers. He served on the initial Board of Trustees of the North Carolina School of Science and Mathematics (NCSSM), the first state-wide residential high school emphasizing science and mathematics. He helped NCSSM teachers develop a precalculus curriculum that introduced data analysis and mathematical modeling as a fundamental topic of study.

Henry was instrumental in the work of the Consortium for Mathematics and Its Applications (COMAP), an organization that its Executive Director, Sol Garfunkel, says would not have existed without Henry.

Henry championed adding statistics and mathematical modeling to the secondary school curriculum. To this end, Henry and teacher Dan Teague organized the Woodrow Wilson National Fellowship Foundation summer mathematics programs, which ran for nine years. The first summer program in 1984 was on statistics and had an amazing affect on the teaching of statistics in high schools. In fact, every high school teacher involved in the first five years of the AP Statistics program (members of the College Board Task Force who wrote the initial proposal and course description, the members of the test development committee, and the leaders of the initial teacher workshops) came out of that Woodrow Wilson summer program which eventually included about 450 classroom teachers.

Henry published about 74 articles in mathematics education, about half of which were written directly for secondary teachers to enrich their knowledge of mathematics, especially mathematical modeling. He also served on the advisory board of Square One Television (a series that taught children mathematical concepts).

Recently, Henry was a member of the writing team for the 2016 GAIMME Report, Guidelines for Assessment & Instruction in Mathematical Modeling Education, published by COMAP and SIAM. He gave a well-received plenary lecture at the 16th International Conference on the Teaching of Mathematical

Modeling and Applications. Henry continues his work as a Visiting Professor of Mathematics Education at Teachers College, Columbia University where he has supervised five doctoral students.

Teacher Landy Godbold describes an experience in the 1970s with Georgia's Governor's Honors Program, a summer residential program for high achieving high school students, that typifies why Henry Pollak so richly deserves the Dolciani Award:

Throughout his time on campus, Henry listened to students as they described their projects for the summer. His genuine interest in their work—questioning, prodding, probing, complimenting—had each student walking on air for a week. (His "fee" as visitor and lecturer was a basket of Georgia peaches.)

Response

I am very grateful for, and feel truly honored by, this prize. The customary list of "thank you's" needs to be a little different in my case: I owe the most to two organizations, to the Bell Telephone Laboratories (BTL) and to the Mathematical Association of America (MAA). My early years at BTL taught me that "applicable mathematics" included many topics outside of the traditional analysis called "applied mathematics" and that there were innumerable applications of mathematics to areas of interest and importance other than physics and engineering. I also began to learn that mathematical modeling in the real world has many stages both before, and after, the stage beloved by mathematicians called "solve the equation". In 1958, NSF, The National Science Foundation, began to fund a thorough look at mathematics in schools, called the School Mathematics Study Group (SMSG). I was asked to join SMSG and I began to try out some of my thoughts on what was applicable mathematics.

About two years later, the NSF decided that a thorough look at mathematics beyond high school was also necessary for the country's welfare. However, this did not seem to require a new structure, like SMSG had been. The MAA was right there, it already had CUP, the Committee on the Undergraduate Program, which had already produced some very interesting variants of college mathematics and unconventional textbooks. This is not the place to go into the size and comprehensiveness of the resulting effort. But how did it affect me? I had already worked on SMSG, and I was invited to join the new CUPM, (an "M" for "Mathematics" was soon added to CUP), and also CUPM's subcommittee on mathematics for the physical sciences and engineering. It was a wonderful seven years of exploration of all the different purposes and connections of college mathematics. (I might have said "functions" of college mathematics, but that could be misunderstood). All three, Bell Labs, SMSG and the MAA, encouraged my interest in all aspects of mathematics. In particular, my long-standing involvement with the MAA led to so many of my other activities.

I retired from the telephone companies after 35 years, and have now been a part-time visiting professor at Teachers College of Columbia University for almost that long. In recent years, mathematical modeling has really flourished within mathematics education. I regret that at my age I cannot be much more than a spectator and cheerleader. At Bell Labs I used to be paid for what I was going to do; now I live on what I used to do. Thank you again.

Biographical Sketch

Dr. Henry O. Pollak joined Bell Laboratories in 1951 and became Director of Mathematics and Statistics Research in 1961. In 1983, in connection with the breakup of the Bell System, he joined the new laboratory created to serve the needs of the operating companies as Assistant Vice-President for Mathematical, Communications, and Computer Sciences Research of Bell Communications Research. Inc. Dr. Pollak retired in 1986 after years of work being a consultant and a visiting professor of mathematics education at Teachers College, Columbia University since 1987.

Dr. Henry Pollak was born on December 13, 1927. He earned a BA degree from Yale University in 1947. Dr. Pollak then received his MA in 1948 and PhD in 1951 from Harvard University. He was elected a Fellow of the American Association for the Advancement of Science in 1971. For his distinguished service to mathematics he received the Yueh-Gin Gung and Charles Y. Hu Award from the Mathematical Association of America in 1993 and the Lifetime Achievement Award from the National Council of Teachers of Mathematics in 2010.

Since joining Bell Laboratories, he has engaged in mathematical research in communication. He is the author of over 40 technical papers on analysis, function theory, probability theory, and mathematics education. He holds a patent (joint with Dr. R. L. Graham) for his work on Interconnected Loop Digital Transmission Systems.

Dr. Pollak has been an active member of the MAA since 1955 while also serving many other mathematical and educational societies throughout his life.