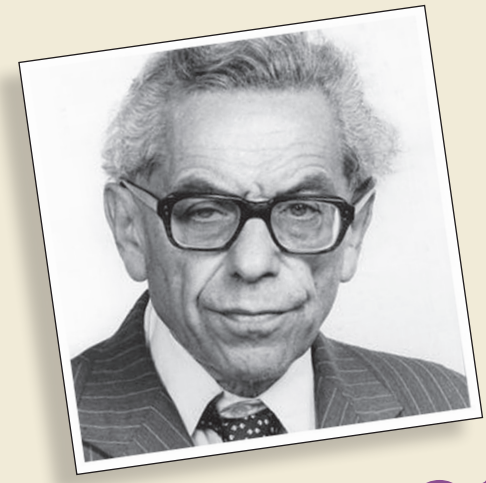


The 100th Birthday of Paul Erdős

Bruce Torrence

Perfection. It's fleeting and fragile, nearly impossible to attain. Physicists tirelessly look for the God particle. Baristas work feverishly in pursuit of the God shot. Rubik's cube aficionados search for God's algorithm. And mathematicians have long sought the hand of God (or prayed for an act of God) as they look for perfection in the form of proof. Not just any proof—what is desired above all else is the best possible proof: God's proof, a proof, as Paul Erdős famously put it, "from the Book."

Erdős would be 100 this year. In his own words: "The supreme misfortune of birth overtook me on March 26, 1913." His long legacy of mathematical achievements and his quirky good humor will live on. A seminal commemorative event will be held in his native Hungary this summer: The Erdős Centennial conference takes place July 1–5 at the Hungarian Academy of Sciences in Budapest. There will be no fewer than 15 plenary speakers, with five sessions running in parallel and a poster session to handle the overflow. Such are the requirements of an event dedicated to the mathematical work of Paul Erdős.

Erdős is remembered for many things. As a mathematician he was among the most prolific of all time. He published more than 1,500 papers in his lifetime, typically with one or more of his roughly 500 coauthors. Even in his 70s he often produced more than 50 published papers in a year—more than many good mathematicians will produce in a lifetime.

Erdős treated mathematics as a social enterprise. With no permanent address, one small suitcase for his belongings, and a briefcase for his mathematics, he traveled the world. Arriving at the home of a colleague, he would announce, "My brain is open," and stay for a few days. He and his host, and any others who happened along, would spend those days working on mathematical problems. Erdős was like a chess master who could manage several games at once; he would sit in a room of mathematicians, sharing problems among them. He had a vast network of collaborators, he knew their respective strengths, and he was careful to match each of them with problems that played to those strengths.

So prolific was Erdős in the universe of 20th-century mathematics that any mathematician can tell you his or her *Erdős numb*er. His 500 or so coauthors have Erdős number one. Anyone who did not coauthor with Erdős but who wrote an article with one of his coauthors has Erdős number two, and so on. Very few living mathematicians have an Erdős number exceeding five.

Looking back at his life, we find in Erdős a man who attained a sort of perfection: He pursued his mathematics doggedly, seeded his fellow mathematicians with ideas and tempted them with problems, and discarded pretty much everything else. As Fan Chung lovingly put it in the preface to her book *Erdős on Graphs*:

> Paul had been doing exactly what he liked and wanted to do until the very last day of his life. Throughout the 83 years that he lived, he had been absolutely true to himself beyond any temptation of money and position. Most of us are surrounded by all sorts of worldly comforts and burdens. Every time I saw him it served as a reminder that it is indeed possible to pursue one's dream regardless of all the trivial details in life. For this, I miss Uncle Paul the most. ■

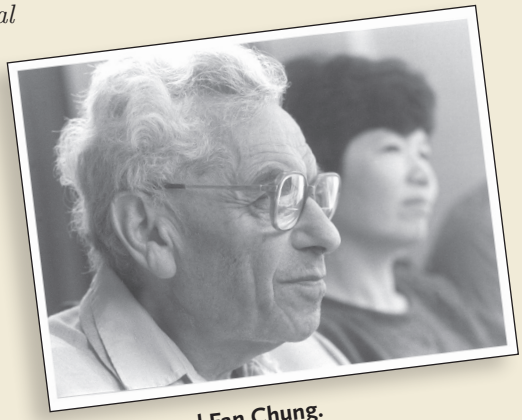
Remembering Erdős

Ronald Graham

Ronald Graham coauthored 28 papers and one book with Paul Erdős and has since coauthored or coedited several books dedicated to Erdős's mathematical legacy, including The Mathematics of Paul Erdős I and II *(with Jaroslav Nesetril) and* Erdős on Graphs *(with Fan Chung). He is an acclaimed mathematician, juggler, and trampolinist, and he has served as president of the American Mathematical Society, the Mathematical Association of America, and the International Jugglers Association.*

We asked Ron to share a few stories about his adventures with Erdős in order to reveal another side of this most extraordinary and unconventional mathematician.

Paul Erdős, Ron Graham, and Fan Chung in Japan, 1986.



Paul Erdős and Fan Chung.

Erdős's Competitive Side

Erdős often wondered in which sporting activities he could come within half of the world's record (such as weightlifting, running, jumping). Once at a meeting in Atlanta, we were staying at a large hotel. Erdős casually conjectured that he could climb up the 20 flights of stairs in the hotel in, at most, twice the time it would take me to do it. I said I didn't believe it, so he said (of course), "Let's see." As it happened I had a watch that had two stopwatches on it, so I suggested the following: We will both start from the bottom at the same time. When I reach the 20th floor, I will stop stopwatch #1. Then when he reaches the 20th floor, I will stop stopwatch #2. We can then check the two times to see if he succeeded or not. Erdős agreed, and off we went. When I finally reached the top, I stopped the stopwatch as planned and waited for Erdős to arrive. When he finally did arrive, he was puffing pretty heavily but still feeling confident. He said, "Well, how did it come out?" I looked at my watch and told Paul the bad news. Not that he had lost but that somehow I had pushed the wrong button on the watch and both of the times had been erased. Consequently, we would have to do this experiment again! Paul immediately said, "We are certainly *not* going to do this again." After an hour or so, we were back on speaking terms!

Up the Down Staircase

Erdős and I were waiting at the baggage claim at Newark Airport one time waiting for Paul's baggage to arrive. He happened to be looking at the escalator going down, and he said, "It is probably quite difficult to go up an escala-

tor going down." I responded that I didn't think it would be that difficult. Paul immediately challenged me to back up my assertion. So I went over to the down escalator and starting running up it. I made it to the top, but it turned out to be harder than I had thought. When I came down, I told Paul that he was right; it is harder than it looks. But Paul instantly said, "No, it looked quite easy when you did it." I disagreed, so Paul said he would try. I warned him that it wouldn't be easy. So Paul went over to the escalator and started rapidly walking up the down escalator. However, by the fourth step, Paul fell forward onto his stomach and was deposited unceremoniously at the bottom of the escalator, much to the dismay of several bystanders. Paul got up, dusted himself off, and said, "I got dizzy." I didn't suggest that he try it again!

Erdős on the Trampoline

Once when Erdős visited me, he saw me practicing on the trampoline in my backyard. (I used to participate in trampoline competitions and later performed in a circus troupe.) Erdős asked if he could try it, and I said, "Of course!" I helped

Paul Erdős in Budapest, 1992.

him climb up onto the trampoline, and I demonstrated some of the basic moves, such as just bouncing and stopping, a seat drop, and so on. Paul (surprisingly) managed to accomplish these quite quickly. He then wondered if he could attempt something more daring, such as a three-quarter forward somersault from the knees. I assured him that wouldn't be such a good idea, and he reluctantly accepted my advice, although I could see that he was still interested in trying something new. I considered asking his mother (who was traveling with Paul) if she would like to try bouncing on the trampoline as well, but thinking it over, I decided not to ask her—she was in her 90s at the time!

Erdős's Language

Many people know that Erdős had his own special language for various terms, such as "poison" for alcohol, "noise" for music, "boss" for a wife (or woman), "slave" for a husband (or man), "Joe" for the Soviet Union (in honor of Joseph Stalin), "Sam" for the United States (in place of Uncle Sam), and "epsilon" for a small child, or also for a small quantity of something (standard parlance in mathematics). However, once at a dinner Paul was tricked by his own code. When the hostess asked Paul how much of a particular dish he would like, he replied, "I'll just eat an epsilon." The hostess (a well-known set-theorist and coauthor of Paul who knew his language well) immediately replied in a shocked tone, "You cannibal! How could you?" Paul smiled when he realized what he had said, remarking how clever this "boss" was! ■

Email: graham@ucsd.edu

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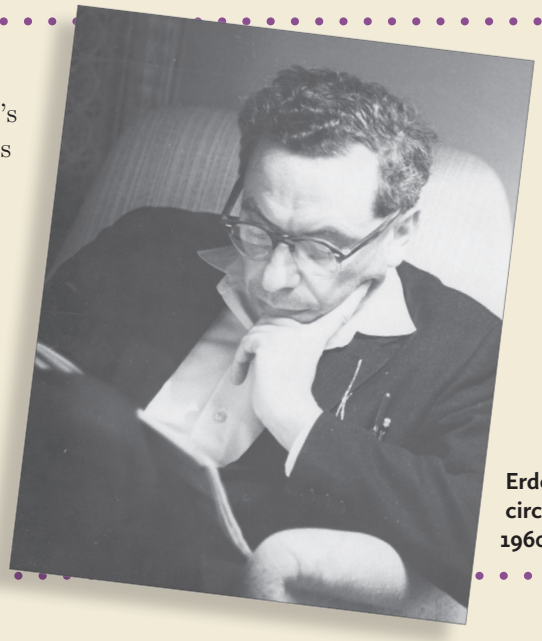
Further Reading

There are two excellent biographies of Erdős: Bruce Schechter's *My Brain is Open* (Simon & Schuster, 2000) and Paul Hoffman's *The Man Who Loved Only Numbers* (Hyperion, 1999).

The documentary film *N is a Number* is a treasure trove of interviews with Erdős and many of his closest colleagues.

Fan Chung maintains an extensive website outlining problems posed by Erdős and the progress that has been made toward their solutions. See *http://www.math.ucsd.edu/~erdosproblems/*.

Information on the Erdős Centennial conference can be found at *http://www.renyi.hu/conferences/erdos100/*. To compute your Erdős number, visit the Erdős Number Project at *http://www.oakland.edu/enp/*.



Erdős, circa 1960.