Erdős did his doctoral work in 1934 at Budapest under Leopold Fejér, concerning the primes between n and $2n$. In 1934 he went to Cambridge, and in 1938-39 he produced major results at Princeton's Institute for Advanced Study, notably working with Marc Kac and Aurel Wintner to found probabilistic number theory, major work with Paul Turán on approximation theory, and with Witold Hurewicz on dimension theory.

It appears that the itinerant life of Erdős began when his fellowship at the Institute was not continued after 1939. In 1954, the terrible days of McCarthyism and anti-Communist hysteria raged in the United States. Erdős was denied entry to the U. S. for nine years. From 1964 till her death in 1971 Erdős' mother travelled with him all around the world in his meanderings.

Sometimes people have the wrong idea that all papers by Erdős are short ones. But there was, for example, the huge paper in 1965 of more than 100 pages in which Erdős, Rado and Hajnal founded partition calculus.

Paul Erdős seems to have had a collection of methods he devised that he used over and over to solve various problems. Such was the case in his 1975 work with John Selfridge to prove that the product of two or more consecutive integers cannot be an n-th power. One of his major contributions in mathematics was to show the power of probabilistic methods.

Erdős wrote more than fifty joint papers with András Hajnal on transfinite combinatorics, and nearly fifty with András Sárközi.

Paul Erdős was a child prodigy, having discovered negative numbers when he was around four years of age! He loved to talk to children, whom he referred to as epsilons, asking people he met how many epsilons they had. He had a sharp sense of humor and referred to God as the 'Ultimate Fascist'. When a mathematician ceased to be creative and productive, Erdős would say that that person was 'dead', and when they died in the usual sense he would say that the person 'left us'. In this sense, then, since Erdős never ceased to be creative, he has not died, he has just left us. He joked that in Heaven there would be a great dream book which would have the solutions of all problems and proofs of all theorems.

译　文:

回忆 Paul Erdős (1913-1996)

自从 1981 年我们的《数学研究与评论》创刊以来, Paul Erdős 一直是学术顾问. 1996 年 9 月 20 日他在华沙的 Banach 中心参加会议时, 因心脏病突发不幸去世. 他的逝世是世界数学界的重大损失. 他在长达六十几年的研究生涯中, 完成了 1500 余篇论文, 其中约有 500 余篇是与其他数学家合作完成的.

Erdős 是位游历世界的数学家, 很少呆在同一地方超过一周甚至几天. 他总是一到某地就宣布他的大脑是开放的, 于是教师和学生们会围绕在他的身旁同他讨论各种难题. 通常情况下, Erdős 都会以他那敏锐的洞察力, 为他的听众给出关键性的提示, 使他们最终得以解出曾苦思良久而毫无线索的题目.

他将毕生献给了数学事业, 而自己除了旅行袋中的随身物品之外一无所有. 邀请他的主人们为他提供食宿和必要的衣物. 除了他的生活必需品之外, 他把旅行中的全部所得都用来帮助别人(除供养他的母亲外). 他还常将大笔钱作为奖金征解数学问题, 根据他评定的题目难度, 奖励一到五千美元不等.

Paul 尽可能地多走路, 不嗜烟酒, 只因热爱运动, 听说近年还曾在一家旅馆的十层楼梯上跑上跑下. 这种简朴的生活方式当然有助于他的健康.

他的主要研究兴趣在于组合数论, 他在这个领域做出了重要的工作, 并在几何、概率、集合论、复分析、群论等多个领域也有所建树. 他在 Ramsey 理论、图论、丢番图分析、堆垒数论和素数理论等方面都做出了重大贡献.

1948 年 Erdös 和 Atle Selberg 在新泽西州的普林斯顿所作的研究引起了全世界的关注. 他们给出了素数定理, 即"表示从 2 到 x 的素数个数的函数 $\pi(x)$ 可以用 $x/\log x$ 来逼近"的"初等"证明. 这是由 Gauss 和 Legendre 于 1790 年至 1800 年间给出的猜想, 1896 年首次被 Hadamard 和 Poussin 用复分析方法证明, 而给出一个不用复分析的证明是一个重大成就. 我记得当时曾传说 Selberg 已给出了一个估计公式, 可以用来证明 Dirichlet 的断言: 在序列 $A_n = an + b$ 中有无穷多个素数, 其中 a 与 b 互素, $n = 1, 2, \cdots$. 这是古代欧几里德关于"自然数中有无限个素数"的定理的推广. Erdös 发现 Selberg 的想法可用来证明素数定理, 于是他俩就写了篇论文给出了这个证明. 但他们的证明一般的数学家很难读懂, 首先清晰地揭示他们想法的我认为是不久后 J. G. Van der Corput 用法语写的论文.

我觉得 Paul Erdös 某种程度上很象 G. H. Hardy, 以善于解特别难的题目而著名. 据说 Hardy 曾评论过普林斯顿的数学研究工作和剑桥的数学研究工作之间的不同之处在于: 在普林斯顿, 数学家们揭示出抽象规律, 在各处打下一个个浅洞; 而剑桥的数学家们则将一个洞钻到地球的中心, 从而彻底解决一个问题. Erdös 到处讲授一些他认为重要的数学问题, 他演讲的非确定性标题通常为"数论中的一些问题". 在讲演中, 他会回溯这些问题的由来、发展及最新进展情况, 常给出一些新的解题线索. 过一段时间, 其中的许多问题就被解决了.

世界上不同年龄的数学家都期望与 Erdös 会面, 因为与 Erdös 的一次会谈常会导致共同发表一篇论文. 如果你与 Erdös 合作一篇论文, 你就会有 Erdös 数 1. 如果某人再同你合写一篇论文, 他就有 Erdös 数 2, 依此类推. 有趣的是成千的人拥有 Erdös 数, 而且这些 Erdös 数都很小(译注: Erdös 数越小表示与 Erdös 的合作关系越密切)! Erdös 曾三次访问过西弗吉尼亚州的摩根城, 有一次我发现在西弗吉尼亚大学至少有三十几人拥有不超过 7 的 Erdös 数. Erdös 也曾访问过中国, 他在中国的影响与在世界其他地方一样广. 他是个真正的世界公民.

我永远记得同 Erdös 的第一次会面. 我给他看了一道关于二项式系数因子的题目, 他给了我一个详细的提示. 在以后的几次会面中, 他总是以"上次我给过你一个提示"作为谈话的结束. 于是乎, 直到我用他的提示解出那道题目之前, 我的 Erdös 数只能停留在 2 上.

Erdös 于 1934 年在 Leopold Fejér 的指导下在布达佩斯攻读博士, 论文是关于 n 到 $2n$ 之间的素数分布问题. 1934 年他去了剑桥, 1938- 39 年他在普林斯顿高等研究所深造期间做出了许多重要的工作, 与 Marc Kac 和 Aurel Wintner 一起创立了概率数论; 与 Paul Turán 合作在逼近论方面, 以及与 Witold Hurewicz 合作在维数理论方面的工作.

Erdös 的游历生涯约始于 1939 年离开普林斯顿之后. 1954 年, 可怕的麦卡锡主义和歇斯底里的反共浪潮席卷了美国, Erdös 被禁止入美长达 9 年之久. 从 1964 年起, Erdös 的母亲一直跟着他在世界上到处流浪, 直到她 1971 年去世.

有时人们有些误解, 以为 Erdös 发表的文章都很短. 事实上并非如此, 例如, 1965 年 Erdös 与 Rado 和 Hajnal 合作创立分拆微积分的论文就长达 100 多页.

Paul Erdös 大概掌握了一整套自行设计的方法, 一次次用于解决各种难题. 比如, 他于 1975 年与 John Selfridge 合作证明了两个或两个以上连续整数的乘积不可能是一个整数的 n 次方, 就是一个很好的例子. 他对数学的巨大贡献之一是向人们展示了概率方法的强大功能.

Erdös 与 András Hajnal 在超限组合论上合作了五十多篇论文, 与 András Sárközi 也合作了近五十篇论文.

Paul Erdös 小时候就是个神童, 四岁时就独立发现了负数! 他喜欢与孩子们交谈, 他称小孩为"ϵ", 问他遇到的人他们有几个 ϵ. 他极富幽默感, 称上帝为"最终的法西斯". 当一个数学家失去了创造性或停止研究工作以后, Erdös 会说那人"死了", 而当他们真的去世时, 他会说那人"离开了我们". 从这个意义上说, Erdös 只是离开了我们, 因为他从未停止过数学研究和创造. 他曾开玩笑说, 天堂上有一本梦之书, 上面记载着所有难题的解答和所有定理的证明, (但愿他能够读到这本书).

(施晓东译, 程生有　于洪全校)

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In Memoriam, Paul Erdős, 1913- 1996*

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Paul Erdős, eminent adviser of our JMRE since our founding in 1981 passed away after a massive heart attack on 20 September 1996 while attending a meeting at the Banach Center in Warsaw. His passing is an enornous loss to mathematics worldwide. For over sixty years he poured out his life in some 1500 papers, perhaps 500 being coauthored with other mathematicians.

Erdős was an itinerant mathemtician, going everywhere in the world, but seldom staying in any one place morn than a few days or a week. He would arrive and announce that his brain was open. Students and teachers would cluster around him and discuss difficult problems, and often Erods, with his keen insight, would proffer some hint that would enable his listener to solve a problem that had remained intractable until that moment.

He devoted his entire life to mathematics, having virtually no material possessions save the clothes on his back and a few necessities carried in a valise. His hosts along the way would attend to his meals and see that he had necessary clothing. Except for the bare necessities of his life, any money that came his way in his travels was rurned over to help others (and for many years his mother), and notably money was frequently offered as a reward for the solution of mathematical problems whose difficulty he graded in amounts from a doller to, I think, US $ 5, 000. 00.

Paul walked as much as possible, did not smoke or drink, and there are stories about his running up and down ten flights of stairs in a hoels not too many years ago just for the love of the exercise. This Spartan lifestyle certainly had sonething to do with his unusually excellent health.

It seems certain that his chief interest was in combinatorial number theory. He did major work in this area, but also in geometry, probability, set theory, complecx analysis, grop theory, probability, etc. He made major contributions to Ramsey theory, graph theory, Diophantine analysis, additive number theory, and primenumber theory.

* Received Dec. 31, 1996.

In 1948 Erdős and Atle Selberg, while at the Institute for Advance Study, Princeton, N. J., attracted worldwide attention when they found a so-called 'elementary' proof of the prime number theorem that $\pi(x)$, the number of primes from 2 to x is asymtotic to $x/\log x$. This had been conjectured by Gauss and Legendre circa 1790-1800, and was first proved rigorously. To give a (long) proof without making any appeal to complex analysis was a remarkanle achievement. I remember that a story current at that time was that selberg had developed an estimtion formula to attact a claim of Dirihlet that there are infinitely many primes in the sepuence difined by $An = an+b$, where gcd(a, b) = 1, n = 1, 2, 3, ⋯, Dirichlet's claim was, of course, an extension of the ancient theorem of Euclid that there are infinitely many primes in the natural number sepuence. The story had it that Erdős saw that Selberg's idea could be used to prove the prime number theorem, and that they each went off and wrote up a paper giving the proof. But Erods and Selberg were difficult reading for the average methematician, and I believe the first fairly good exposition of their idea was given shortly thereafter by J. G. Van der Corput, whose paper was in French.

I think that Paul Erdős was in one way very much like G. H. Hardy, who was remarkable for solving exemely difficult indivdual mathematocal problems. Hardy is supposed to have remarked that the difference between the kind of mathematics done at Princeton and at Cambridge, was that at Princeton they revel in abstract generalities, digging small superfical holes all over the place, whereas at Cambridge they drill a hole straight down to the cnter of the earth and solve a single problem. Erdös lectured over and over on certain problems that he felt were improtant, and the unassuming title of a typical presentation by Erdös when he visited a university might be just 'Some problems in number theory'. In these talks he would go back to these problems, giving an update on their status, often with new hints for their solution. Over a period of time many of the problems were solved.

Young and old mathematicians all over the world loved to meet him since the result of a session with Erdős would usually lead to a joint paper. If you wrote a paper with Erods then you would have Erods number 1. If someone else then wrote a paper with you, then that person would have Erdős number 2; etc. It is curious that so many thousands of persons have Erdős number and small number at that! Erdős visited Morgantown, in West Virginia three times and once I counted at least three dozen people at West Virginia University who had Erdős numbers less than or epual to 7. He visted China for several times, his influence has certainly been felt in China as well as everywhere in the world. He was a true Citizen of the World.

I will always remember my first meeting with Erdős. I showed him a problem about divisors of binomial coefficients and he gave me a detailed hint. At each subsequent meeting he has ended the conversation with the remark that "I gave you a hint last time." Well, until I can resolve the matter with his hint, my Erdős number will have to remain equal to 2.