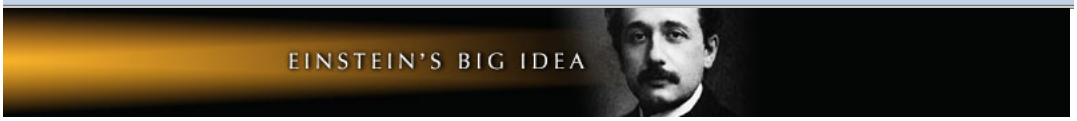

Einstein's Big Idea homepage

Einstein the Nobody

by David Bodanis

13 April 1901

Professor Wilhelm Ostwald
University of Leipzig
Leipzig, Germany

Esteemed Herr Professor!

Please forgive a father who is so bold as to turn to you, esteemed Herr Professor, in the interest of his son.

I shall start by telling you that my son Albert is 22 years old, that ... he feels profoundly unhappy with his present lack of position, and his idea that he has gone off the tracks with his career & is now out of touch gets more and more entrenched each day. In addition, he is oppressed by the thought that he is a burden on us, people of modest means....

I have taken the liberty of turning [to you] with the humble request to ... write him, if possible, a few words of encouragement, so that he might recover his joy in living and working.

If, in addition, you could secure him an Assistant's position for now or the next autumn, my gratitude would know no bounds....

I am also taking the liberty of mentioning that my son does not know anything about my unusual step.

I remain, highly esteemed Herr Professor,
your devoted

Hermann Einstein

—From the collected papers of Albert Einstein, Volume I. No answer from Professor Ostwald was ever received.

It's almost impossible today to imagine Albert Einstein having trouble gaining a foothold in the world of physics, but such was the case for him in his early 20s. Here, he stands at a lectern in the Bern patent office in 1904.

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BEFORE THE MIRACLE YEAR

The world of 1905 seems distant to us now, but there were many similarities to life today. European newspapers complained that there were too many American tourists, while Americans were complaining that there were too many immigrants. The older generation everywhere complained that the young were disrespectful, while politicians in Europe and America worried about the disturbing turbulence in Russia. There were newfangled "aerobics" classes; there was a trend-setting vegetarian society, and calls for sexual freedom (which were rebuffed by traditionalists standing for family values), and much else.

The year 1905 was also when Einstein wrote a series of papers that changed our view of the universe forever. On the surface, he seemed to have been leading a pleasant, quiet life until then. He had often been interested in physics puzzles as a child, and was now a recent university graduate, easygoing enough to have many friends. He had married a bright fellow student, Mileva Maric, and was earning enough money from a civil service job in the patent office to spend his evenings and Sundays in pub visits, or long walks—above all, he had a great deal of time to think.

Even as a boy, Albert, seen here with his sister Maja about 1884, enjoyed physics-related puzzles.

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Although his father's letter hadn't succeeded, a friend of Einstein's from the university, Marcel Grossman, had pulled the right strings to get Einstein the patent job in 1902. Grossman's help was necessary not so much because Einstein's final university grades were unusually low—through cramming with the ever-useful Grossman's notes, Einstein had just managed to reach a 4.91 average out of a possible 6, which was almost average—but because one professor, furious at Einstein for telling jokes and cutting classes, had spitefully written unacceptable references. Teachers over the years had been irritated by his lack of obedience, most notably Einstein's high school Greek grammar teacher, Joseph Degenhart, the one who has achieved immortality in the history books through insisting that "nothing would ever become of you." Later, when told it would be best if he left the school, Degenhart had explained, "Your presence in the class destroys the respect of the students."

SLIPPING BEHIND

Outwardly Einstein appeared confident and would joke with his friends about the way everyone in authority seemed to enjoy putting him down. The year before, in 1904, he had applied for a promotion from patent clerk third class to patent clerk second class. His supervisor, Dr. Friedrich Haller, had rejected him, writing in an assessment that although Einstein had "displayed some quite good achievements," he would still have to wait "until he has become fully familiar with mechanical engineering."

In reality, though, the lack of success was becoming serious. Einstein and his wife had given away their first child, a daughter born before they were married, and were now trying to raise the second on a patent clerk's salary. Einstein was 26. He couldn't even afford the money for part-time help to let his wife go back to her studies. Was he really as wise as his adoring younger sister, Maja, had told him?

He managed to get a few physics articles published, but they weren't especially impressive. He was always aiming for grand linkages—his very first paper, published back in 1901, had tried to show that the forces

controlling the way liquid rises up in a drinking straw were similar, fundamentally, to Newton's laws of gravitation. But he could not quite manage to get these great linkages to work, and he got almost no response from other physicists. He wrote to his sister, wondering if he'd ever make it.

> "The idea is amusing and enticing, but whether the Lord is laughing at it ... that I cannot know."

Even the hours he had to keep at the patent office worked against him. By the time he got off for the day, the one science library in Bern was usually closed. How would he have a chance if he couldn't even stay up to date with the latest findings? When he did have a few free moments during the day, he would scribble on sheets he kept in one drawer of his desk—which he jokingly called his department of theoretical physics. But Haller kept a strict eye on him, and the drawer stayed closed most of the time. Einstein was slipping behind, measurably, compared to the friends he'd made at the university. He talked with his wife about quitting Bern and trying to find a job teaching high school. But even that wasn't any guarantee: he had tried it before, only four years earlier, but never managed to get a permanent post.

THE TURNING POINT

And then, on what Einstein later remembered as a beautiful day in the spring of 1905, he met his best friend, Michele Besso ("I like him a great deal," Einstein wrote, "because of his sharp mind and his simplicity"), for one of their long strolls on the outskirts of the city. Often they just gossiped about life at the patent office, and music, but today Einstein was uneasy. In the past few months a great deal of what he'd been thinking about had started coming together, but there was still something Einstein felt he was very near to understanding but couldn't quite see. That night Einstein still couldn't quite grasp it, but the next day he suddenly woke up feeling "the greatest excitement."

It took just five or six weeks to write up a first draft of the article, filling 30-some pages. It was the start of his theory of relativity. He sent the article to *Annalen der Physik* to be published, but a few weeks later, he realized that he had left something out. A three-page supplement was soon delivered to the same physics journal. He admitted to another friend that he was a little unsure how accurate the supplement was: "The idea is amusing and enticing, but whether the Lord is laughing at it and has played a trick on me—that I cannot know."

But in the text itself he began confidently: "The results of an electrodynamic investigation recently published by me in this journal lead to a very interesting conclusion, which will be derived here." And then, four paragraphs from the end of this supplement, he wrote it out.

$E = mc^2$ had arrived in the world. ■

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Einstein in 1905, the year he published a series of groundbreaking papers that would forever change our view of the world

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Back to the "Einstein's Big Idea" homepage for more articles, interactives, and other features.

David Bodanis is the author of *E = mc²: A Biography of the World's Most Famous Equation* (Berkley Books, 2000), on which the NOVA program "Einstein's Big Idea" is based and from which this article is excerpted with kind permission of the publisher.

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