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Book Reviews: *Einstein: A Life*, by Denis Brian, and *The Silver Horse-shoe*, by Javad Tarjemanov

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Einstein: A Life. Brian, Denis. John Wiley and Sons, Inc.

The Silver Horse-shoe. Tarjemanov, Javad. Graham Whittaker, trans. Raduga Publishers, Moscow.

The lives of two deep, unorthodox thinkers who challenged the accepted ideas of mathematics and science of their day are described in these biographies. There are some parallels in the lives of Einstein and Nikolai (Kolya) Lobachevski, the subject of the latter of the books, and their work resulted in profound and monumental changes in the culture. They both had an uncanny ability to focus with great tenacity on a single idea or problem for extended periods of time to the exclusion of all, or nearly all, else. They both had an aversion, if not contempt, for authority and bureaucracy. Of course, they are far from unique in that respect. They were both confirmed nonconformists. As the esoteric philosopher, Roger Miller, would say, they flushed to the sound of a different plumber. They are connected through their work; Lobachevski's geometry played an important part in Einstein's work on relativity.

With all that has been written about Einstein's life, is another biography necessary? Perhaps not, but I think this one is highly desirable. I have read at least five, and in my opinion Denis Brian's is the most comprehensive and best written. It is also the most humanistic with the possible exception of Kenji Sugimoto's delightful *Albert Einstein: A Photographic Biography*, which might be its equal in that respect. Although Einstein cannot be separated from his thought (he WAS his thought), Brian, with information previously withheld by Helen Dukas, Einstein's personal secretary and Otto Nathan, the executor of his estate, and his in-depth interviews with Einstein's colleagues, was able to give a more thorough picture of the human side of the beloved genius.

Einstein did not fit the pattern of the "normal" from the beginning. He was born extremely fat with a mis-

shapen head. His parents showed concern of possible mental retardation because of his lateness in speaking (although it apparently was not as late as some have implied), and his early teachers showed the same concern because of his slowness in responding to questions. He was a very quiet and withdrawn child, but showed a violent temper in the presence of his sister. This and his high strung and emotional adolescence belied the pacifism and humane demeanor that was to rule the remainder of his life. From early on, Einstein ignored the mundane and all things that bored him, but embraced wholeheartedly things that challenged and interested him. He also began, at this time, his ability for deep, concentrated focus.

I don't know whether this focus on and tenacity with mental pursuits affected Einstein's relationships with the ladies, which Brian chronicles effectively (that I will leave for you to peruse if that sort of thing interests you), but it certainly was detrimental to family relationships. Einstein was a very charming and compassionate person in public and was very well liked by all people of both genders, but was apparently awkward and remote in his relations with family members. He seems to have treated both of his wives and his two sons rather shabbily. Also, after professing great love and showing interest in the daughter born to him and Mileva before their marriage, he seems to have abandoned her without ever seeing her. It is unclear what happened to her, but it is assumed that she was adopted. He also apparently abandoned his son Eduard, emotionally if not financially, who spent most of his life in a mental institution. He appears to have had a fairly active social life. However, he abhorred small talk and carried with him pen and paper; he obviously had his mind on his scientific endeavors. He was an accomplished violinist, and he clearly enjoyed performing with others. An anecdote describes Einstein, upon completing a piece of music, indicating that now he had it, referring to a scientific problem he had been working on. The implication was that his mind had been on science, not on the music

he had been performing. I'm not so sure that is the case. It may be, but I think we all have had the experience of a means to a solution of a problem or a way through a stumbling block in a proof of a theorem coming to mind when our mind was totally on something else. I attribute this to the subconscious.

The public has a way of crediting scientific, as well as other, accomplishments to single individuals. Einstein was well aware of and very appreciative of what he had learned from and the motivation he received from others, particularly Ernst Mach, James Clerk Maxwell, and H.A. Lorentz. Scientific thought and developments are chains that wend their way through the culture. Einstein, of course, provided many of the links, but there were a great many others of importance in what Einstein accomplished. Ernst Mach questioned Newton's belief of the absolute nature of space and time (but then so did Leibniz). It was from Mach that Einstein got the idea that empirical statements were statements about sensations. These, of course, were keys to Einstein's thought. Michael Faraday discovered the relationship between electricity and magnetism. Maxwell then put this in precise mathematical form. This was a giant step, and probably the most important link in the development of modern physics. It freed the scientist from the "scientific method" in which laboratory observations were the basis of theoretical work based on induction, and allowed for the use of deduction based on well thought out postulates where the results were then proved (or disproved), sometimes much later, by observation. This was extremely important in the development of relativity theories and quantum mechanics. H. A. Lorentz did the early mathematical work on special relativity, of which Einstein was quick to acknowledge.

Einstein was admired and revered by the public. He was a "pop" hero. Einstein could not comprehend this. How could they have so much admiration and affection for him when they couldn't understand anything he talked about? The only ones who did not have this awe and affection for him were the Nazis and Nazi sympathizers (well, most of them). There was, of course, much discrimination and ill treatment because of Einstein's Jewish heritage. It is ironic that what the Nazis referred to as "Jewish physics," which they denigrated, could have given them a great advantage in the development of the atom bomb, and could have

altered the outcome of the war considerably. Not that Einstein was involved in the development of the bomb, for he wasn't. Of course, it was precipitated by his discovery of the relation between mass and energy (which followed from Lorentz's transformation equations), and he was involved in that he, at the urging of Leo Szilard, wrote to President Roosevelt warning of the danger of the Germans possibly developing a weapon and the importance of the U.S. getting there first. However, key players in the drama of atomic weapon development, Lise Meitner, Otto Frisch, Leo Szilard, and others escaped the Nazi terror. Otto Hahn and Werner Heisenberg remained. Hahn was very much against Germany developing a weapon. Heisenberg, apparently, was more interested and capable in the theoretical aspects and the development of nuclear reactors and didn't believe, at first, that a bomb could be developed. However, he did work with the atomic energy project. There is some evidence that he was against the development of the bomb by the Nazis, and he indicated that they (the physicists) used the military for the benefit of physics, not physics for the benefit of the military, but that is another story.

There is much, much more in this comprehensive biography, e.g., Einstein's political views, his relations with the developing country of Israel, his social life, and his relations with friends and colleagues in Europe as well as at Princeton. He once said that the years at the patent office were his best years; he was not expected to lay "golden eggs." It seems to me the years at the Institute for Advanced Study at Princeton would have been the best, where if he was expected to lay golden eggs, there was apparently little pressure to do so, and he was free to pursue his own agenda at his own pace, which was slow and deliberate but deep and constant.

This was not the case with Nikolai "Kolya" Lobachevski, who was very much overworked with teaching, administrative, and other work while developing his revolutionary non-Euclidean geometry. This book, written by the Russian Javid Tarjemanov, and translated into English, is a gem. It reads like a novel. You are there with Praskovya Alexandrovna, widow of Collegiate Registrar Lobachevski, as she took her three sons, Kolya, Sasha, and Alexie, on their four day trip by horse drawn carriage from their home in Makaryev to Kazan for the purpose of attempting

to get the boys enrolled in the grammar school in Kazan. The descriptive narrative is beautifully done, and the illustrations that appear occasionally throughout the book are superb. There was concern whether the boys would be accepted into the grammar school at Kazan, the only one between the Volga and Siberia, a school attended almost exclusively by children of the aristocracy, which the Lobachevski boys were not. They were accepted. However, Kolya, even though the middle brother, was placed, much to his chagrin, in the lowest class while his younger brother was placed with the oldest in the middle class. Kolya, being the smallest, was assumed to be younger than the others and told to sit down and draw pictures while the others were tested. By the time he was tested, he was understandably upset and was treated as a child much younger than he was. I can relate to his feelings. I had a similar experience. It is amazing how supposedly intelligent educators can mistake small size and physical immaturity for intellectual immaturity. Fortunately, I was not in an autocratic system and could ignore this kind of foolish recommendation.

Kolya's displeasure at his being put in the low class, his ill treatment by the staff, including being put into a detention cell for something he didn't do, and his general unhappiness, motivated him to escape from the school (using a well thought out plan) and run away. He arrived at the home of the family friends in Kazan just as his mother was packing to return to their home in Makaryev. She honored his request and took him home with her. His mother tutored him in various subjects, and his grandfather, with whom they lived, had a vast library of books that Kolya aggressively perused. After a period of time, a letter from his brother, Sasha, telling how well he and Alexie were getting along spurred Kolya to ask his mother if he could return to school. She agreed, and soon they were back on their four day trek to Kazan. After much pleading by Kolya's mother, the administration allowed him to return to school with the proviso that it was to be at her expense, no more state support. Although there was still much that was unpleasant at the school, the twelve year old Kolya had a much better experience this time around due, to a great extent,

to his determination to do so. He had promised his mother not to disappoint her again. He didn't. He spent his student years and much of the remainder of his life at the institution as a teacher and administrator. Well, I am, getting carried away. There is much that is interesting about Lobachevsky's school experience on his non-royal and unconventional road to geometry.

Early on, Kolya's mathematical ability was recognized by many, and early on he was troubled by Euclid's fifth postulate, a trouble that would consume him for a large part of his life. Even though others had tried to reconcile this, and he was advised by others, including Martin Bartels, a former teacher of Gauss who had come to Kazan to teach, not to pursue this; he did.

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Did Nikolai have any love in his life besides geometry? Yes, one Anna Yakovian, daughter of one of the University administrators. Her parents were very much against this because he was not of the aristocracy and forbid her from seeing him. She had astutely stated that however much he loved her, science would always be the first lady of his heart. Her father contrived to have Kolya removed from the institution, but fortunately he failed in his attempt. This book ends in 1826 with his presentation to the faculty of his paper, "A Succinct Exposition of the Principles of Geometry, with a Rigorous Demonstration of the Theory of Parallel Lines." Consequently, there is no information of a love life between this time and his death in 1856. However, in *Men of Mathematics* E.T. Bell indicated that Lobachevski's health was deteriorating with the death of a son, so apparently there was a wife and family after the years spent when geometry held him in its grip.

The presentation of the paper mentioned above was not well received by his colleagues at Kazan. As Einstein has said, "Great spirits have always encountered violent opposition from mediocre minds. The mediocre mind is incapable of understanding the man who refuses to bow to conventional prejudices and chooses instead to express his opinions courageously and honestly." Probably nowhere is this manifested

more clearly than in the reaction of Lobachevski's colleagues to his paper. A dejected Lobachevski felt that they understood nothing about what he said and wondered whether all his effort had been wasted.

As mentioned, the book ends at this point, with the rejection of Lobachevski's work. However, there is an epilogue quoting the message on the coat-of-arms granted to him on 29 April 1838 when he was admitted to the peerage for his outstanding services to science.

One wonders whether geniuses such as Einstein and Lobachevski, with their deep concentration for long periods of time on mathematical and scientific ideas to the exclusion of almost everything else, miss out on a lot of the good things in life. Well, don't we all,

especially those of us with mediocre minds? What could be a greater thing in life than being responsible for creations such as theirs?

One also wonders how much of this interesting book, with its great detail of events in the early and middle life of Nikolai Lobachevski, is fact, and how much is fiction. As the artist formerly known as "Fats" often said, "One never knows, do one?" one probably doesn't care too much either. It is a delightful book to read; I'm sure the essentials are essentially true, and it provides a taste of the academic and political environment under which Lobachevski lived, learned, and created.

What of the silver horse-shoe in the book's title? That's your assignment for tomorrow.

"Numbers Man"

Lawrence Mark Lesser

My father got to know my mother while tutoring her in college calculus; this poem is a "math love song" I imagine he could have written for her.

My mother fed me formula, it prob'ly was a sine
I'd grow up to adore ya, your figure and your mind.
So let's go to dinner; I'll compute the tip.
Then we'll go shopping and find the bargains quick, 'cause

One thing to count on, honey, understand
I can handle your figure; lemme be your numbers man!

Give me 4 crayons and I'll color in the map.
We'll find the fast way to Vegas and win big at blackjack,
It takes 7 shuffles to mix up the pack--
Ask me how I know and I tell you that...

One thing to count on, honey, understand
I can handle your figure; lemme be your numbers man!

Hey, I see you hesitating--do I come across as calculating?
But I can take your heart so high--I know so many ways to multiply!

I love equality, and I know the value of place.
I got love that's unbounded 'round this finite space!
Lemme tie your hair with ribbons that only have one side.
Maybe that way your bad hair day becomes a day that's prime!

I'll never say "take a number"
Lemme be your numbers man!