

## MILEVA EINSTEIN-MARIĆ

### The Woman Who Did Einstein's Mathematics

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**Synopsis**—At the ETH in Zurich, the Swiss Federal Institute of Technology, it is common knowledge that Einstein said about the mathematical side of his work: "My wife solves all my mathematical problems." There is no hint of that in the *Collected Papers of Albert Einstein, Vol. 1* (Princeton University Press, 1987) which covers the time to 1902. We can be fairly certain that there won't be a hint in the second volume, which will cover the most crucial time of Mileva Einstein-Marić's cooperation with her husband, the time of "his creative outburst," when the papers were written for which he would win the Nobel Prize.

I want to take a close look at the only existing biography of Mileva Einstein-Marić, written by a Yugoslav mathematician and physicist, which appeared in German translation in 1983. I want to show some of the mechanisms at work in the lives of the two people who met as students at the ETH, studied and worked together, got married, had children, and then followed each their own life path: The man became famous and is numbered among the great; the woman became invisible, unknown, and unheard of. The man achieved; the woman worked to support herself and their children. We see in the two life stories the familiar patterns that lead to the construction of success for men and the deconstruction of success for women. It is not surprising that the editors of the *Collected Papers of Albert Einstein* have nothing more to say about Mileva Einstein-Marić than: "Her personal and intellectual relationships (sic!) with the young Einstein played an important role in his development."

I also want to show, to the extent to which it is possible from the biography of Mileva Einstein-Marić and from the correspondence in the *Collected Papers of Albert Einstein, Vol. 1*, what is the scientific contribution of Einstein-Marić to her husband's work.

If it were not for the cultural imperialism of the U.S. academic establishment, it might be known in Princeton what is known in Novi Sad—Einstein-Marić was the scientific collaborator of her husband.

The fourth edition of a book has just appeared in German whose content deserves to be known more widely than the prohibitive price of the hardbound Swiss edition would allow.

The book, *Im Schatten Albert Einsteins: Das Tragische Leben der Mileva Einstein-Marić (1988) (In the Shadow of Albert Einstein: The Tragic Life of Mileva Einstein-Marić)*, was published by Paul Haupt in Bern, Switzerland. This edition took quite a while to appear, probably because of the deletions and additions to which the male editor subjected the earlier edition.

The original appeared in 1969, published by Bagdala, a Yugoslav publishing firm in

Kruševac. Its author is Desanka Trbuhović-Gjurić (1897–1983), a Serbian mathematician and physicist who taught at the Institute of Technology and the University of Belgrade. After she retired, she researched and wrote the biography of Mileva Einstein-Marić, the first wife of Albert Einstein. Because the book appeared in Serbian, its content remained totally unknown in Western Europe and the United States, even to persons who were interested in Einstein's life. The 1983 German edition was intended to redress this situation, but I have never met a mathematician or physicist, not even at the ETH, the Swiss Federal Institute of Technology, Einstein's alma mater, who knew the book or cared about its content. But at least Einstein's admission, "My wife does my mathematics," is general knowledge at the ETH in Zurich, although it serves only as a

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starter for jokes along the same lines and never as a starter for serious questioning about this mathematician. Who was she? Why do we not know anything about her and her work? Why was she not offered academic positions in Prague, Berlin, Princeton, or Pasadena? How did it happen that she only got the money from the Nobel Prize and was not named winner together with Einstein? What was her life like? What became of her?

The Yugoslav author answers some of these questions. She gives an account of a life and fate that is moving to everyone and that touches a deep chord of recognition in readers who know about the silencing of women's voices and the annihilation of women's work. Ever since I first read this book, it has haunted me. I haven't been able to put it aside. I just had to reread it; I just had to talk about it again and again in private conversations and in public lectures.

Its author is now dead; I should have liked to talk with her. I do not trust the German version of the book, which states no translator but admits to "redaktionelle Bearbeitung" (editorial reworking) by the same person who has now in the fourth edition advanced to become "the editor" and who has changed the original book not only by unmarked<sup>1</sup> and marked<sup>2</sup> additions, but also by a deletion of over three pages and the substitution of a 17-page text of his own. How are we to know what changes he made through his first "editorial re-working" on the German translation—Trbuhović-Gjurić may have translated her book herself into German—or, if he was also the translator, by his very translation?

The editor justifies his changes by reference to new material that has come to light, especially in *The Collected Papers of Albert Einstein, Vol. 1* (1987). However, he may have unintentionally given away the real motivation in an addition to his postscript (unmarked). There he quotes a passage by Trbuhović-Gjurić (which he had deleted from the text of the new edition) in which the author described Mileva Einstein-Marić as supporting Albert Einstein at a time when none of his professors wanted to do anything for him, and when he was being turned down repeatedly when applying for jobs. Trbu-

hović-Gjurić writes that Mileva Einstein-Marić supported him:

with her infinite love which allowed her to believe in him and fully understand him. She was the source of his hope and of his confidence in his own ideas. She was the only one who stood by him not only emotionally but by virtue of her scientific understanding, in which she was his equal. This support was stronger than all hostile forces in the world. She also helped him to fight against his own nature, for he made decisions quickly but changed them just as quickly. Her decisions took time to mature but then they were irrevocable. Truthfulness and integrity of word and deed were part of her harmonious character. (Trbuhović-Gjurić, 1983, pp. 58–59)<sup>3</sup>

The editor takes issue with what he defines as "the provocative core of that characterization," the equal scientific understanding, and notes that:

whatever may have been the case regarding her being his scientific equal, Einstein felt the same way at the time he made his fundamental discoveries and expressed it with these words that have now come to light: "How happy I am to have found in you an equal creature who is equally strong and independent as I am." (Trbuhović-Gjurić, 1988, p. 213)<sup>4</sup>

But rather than taking Albert Einstein's own statement as evidence for Trbuhović-Gjurić's hypothesis, he did not let her description of Mileva Einstein-Marić stand, but simply eradicated it. Still he concludes in a truly hypocritical manner (Trbuhović-Gjurić, 1988, p. 213):

One cannot imagine a more beautiful coincidence: the fact that there is an agreement in the idea and the choice of expressions used by Einstein and Trbuhović-Gjurić speaks very well of the book as the author has left it.

This is nicely ambiguous: does he mean the Serbian original, which we cannot read, or the edited version he is now offering us

and for which, due to his deletion, the agreement no longer can be claimed? It is a superb example of irony that he is acclaiming a book he could not leave untouched, acclaiming an author whose words he did not approve of and had to tamper with while he is forcing on us a version of the book the author *did not* leave us!

Since the original is not accessible to me and the fourth edition does not have the credibility of the book I originally read, I will now stay with the second edition of 1983 which, by the way, is listed as a biographical source in *The Collected Papers of Albert Einstein, Vol. 1*.

Desanka Trbuhović-Gjurić writes in her foreword, dated Fall 1982, that she attempted to collect memories, details, and small events in the life of Mileva Einstein-Marić, about which she learned from people who knew her—relatives, friends, acquaintances—or from letters, diaries, documents, to form “a mosaic of the life from the still existing pebbles.” This was certainly not an easy task, especially because, as she said, the literature contained only few observations about Mileva Einstein-Marić and those contradicted each other and were possibly tendentious to her disadvantage. But also, in contrast to Albert Einstein, Mileva Einstein-Marić was, like her mother, taciturn about her life and her experience to the point where she asked people to not talk about her.

Trbuhović-Gjurić’s motivation was to focus on the unknown, unacknowledged, and on what was “unjustly put aside into oblivion . . . without disputing the indubitable merits of the other side” (Trbuhović-Gjurić, 1983, p. 5). The reader is left to draw her or his own conclusions.

Throughout the book she carefully sticks to this objectivity—she never evaluates, comments on, or judges Albert Einstein’s behavior. She only wants to make Mileva Einstein-Marić’s life visible by collecting facts about it *and* she wants to make her scientific contribution known. She is uniquely qualified for this endeavor through her own biography, as a Serb with similar upbringing and identical fields, as a mathematician and physicist, and as a person with ties to Zurich. But, especially, she brings her female perspective to the task and the result is a book written with the

kind of empathy a man could not have mustered. She wanted to rescue Mileva Einstein-Marić from oblivion and write her into Serbian and scientific history. She knew that no man would do that job for Mileva Einstein-Marić, whose own husband failed to give her the public recognition she deserved.

She was interested in Mileva Einstein-Marić as a mathematician and a woman whose life had taken a different route from that of most women, leading to a university career. I am sure Trbuhović-Gjurić was aware of the impediments facing women in this career, of the mechanisms militating against women’s contributions to the areas of mathematics and physics. As a mathematician and physicist, she knew that without the fundamental contribution of Mileva Einstein-Marić, the theory of relativity would not exist, yet this contribution had never even entered the history of the field. It was immediately eradicated. She must have pondered again and again the following issue: Why did the relationship between Mileva Einstein-Marić and Albert Einstein secure world fame for the man and not even a university teaching job for Mileva Einstein-Marić? Why was that relationship fatal for Mileva Einstein-Marić? Had she not met, had she especially not married Einstein, would we know of her as a prominent mathematician? Had she at least not had children, could she have had her own professional life and recognition, would her marriage have endured?

I am sure the author, born only 25 years later than Mileva Einstein-Marić, compared her own life with that of Mileva Einstein-Marić; I am sure she thought of the many women mathematicians and their life conditions which keep them from gaining recognition. She did not blame patriarchy, the system which bestows privilege on men, she did not even blame Einstein himself—she only points to the modesty of Mileva Einstein-Marić, who asked for no recognition but was happy for, and content with, Albert Einstein’s successes. Her explanation of Mileva Einstein-Marić’s fate ends there because she does not want to cast aspersions on the character of Albert Einstein. She wrote the book when she was close to 70; it appeared in 1969 when she was 72. Her deep interest in Mileva Einstein-Marić and her aim in writing the

book would be termed feminist today. Only we would not stop where she did. We cannot but see universal connections and patterns in the female condition when we read the book today. In the meantime, we have uncovered, and become clear about, the mechanisms that suppress the contributions of women, and we cannot help seeing them at work in a particularly shocking way in the careers of both Einsteins. We cannot be content with "Mileva Einstein-Marić's modesty, her willingness to sacrifice, her kindness, her fear of publicity and avoidance of personal recognition, the unconditional devotion to the work of her genius husband and to her family" as an explanation of why Mileva Einstein-Marić is not known today, as the fourth edition suggests in its rather Christian blurb. For us, the mere fact that Mileva Einstein-Marić did not want to talk about her own merits, and her mathematical work for Albert Einstein, does not relieve Albert Einstein of the responsibility for his silence in this matter. He could have talked about it, but he did not.

What kept him from giving her full name when he published a patent which appeared under the name Einstein-Habicht?

Why did he not immediately insist on a correction when Mileva Einstein-Marić's name was dropped as an author of the articles that appeared in 1905 in the Leipzig *Annalen der Physik*? Later on he received the Nobel Prize for one of those articles.

Why did he not acknowledge in public that it was she who came up with the idea to investigate ether and its importance (Truhović-Gjurić, 1983, p. 69)?

Why did his recognition of her work remain private, for example, he told Mileva Einstein-Marić's father (Truhović-Gjurić, 1983, p. 76):

I didn't marry your daughter because of the money but because I love her, because I need her, because we are both one. Everything I have done and accomplished I owe to Mileva. She is my genial source of inspiration, my protective angel against sins in life and even more so in science. Without her I would not have started my work let alone finished it.

He told a group of Serbian intellectuals in 1905: "I need my wife. She solves all the

mathematical problems for me" (Truhović-Gjurić, 1983, p. 75).

Of course we know that women's names as authors and co-authors, as givers of ideas, as collaborators often disappear or take second place; their work is simply appropriated by men,<sup>5</sup> at most—if they are fortunate—their names may appear in the dedication.

I am not sure of this, but I think it unlikely that Albert Einstein even so much as dedicated a book to Mileva Einstein-Marić. But let us look at how her name was dropped in the two incidents I have mentioned.

In the middle of 1902, Albert Einstein, through the connections of the father of a friend of his, Marcel Grossmann, got his first regular position in the Swiss Patent Office in Bern. On January 6, 1903, Mileva Marić and Albert Einstein were married. Together with friends (the brothers Habicht, Maurice Solovine, Angelo Besso, and his wife), they met regularly to read philosophical and scientific works which they discussed and studied. They called their group *Academia Olympia*. Mileva Einstein-Marić continued to collaborate with Albert Einstein as they had been doing since they first studied together, and she was also responsible for the household chores. Desanka Truhović-Gjurić writes (1983, p. 65):

Together with Paul Habicht she worked at the construction of a machine for measuring small electrical currents by way of multiplication. It took a long time, not only because she had so much to do [Einstein's mathematical problems, ST-P], but also because of her thoroughness and perfectionism. She had already distinguished herself in the physics lab in Zurich. When both she and Habicht were satisfied with their results, they left it to Albert Einstein, as a patent expert, to describe the apparatus.

Albert Einstein published an article about it in his own name: It appeared in the *Annalen der Physik* in 1907, under the title "Eine neue elektrostatische Methode zur Messung kleiner Elektrizitätsmengen," and then he gave a detailed description of this method in an article, again using his name only, in the *Physikalische Zeitschrift*, No. 7, 1908. And he had the apparatus patented under the

name *Einstein-Habicht* (Patent No. 35693). Truhović-Gjurić comments (1983, p. 65):

When one of the Habicht brothers asked Mileva Einstein-Marić why she had not given her own name in the application for the patent, she answered: What for, we are both only ONE STONE (=Einstein). Then Paul Habicht also decided to give only his last name.

Not giving the full name, however, had different results for the woman and the man because a last name is usually associated with a man. Mileva Einstein-Marić lost her authorship entirely and it was automatically bestowed on her husband. Therefore, the question why she didn't give her own name instead of her full name was correctly formulated: *Einstein* in *Einstein-Habicht* meant *Albert Einstein*. Soon after they were married, Einstein profited from the Swiss law about names which forced women to put their husband's name first in their double names and which, incidentally, was only changed in 1988.

It was the patent under the name *Einstein-Habicht*, plus the absence of any protest about the misrepresentation of authorship, which made it easy for Einstein to publish two articles on the method in his name, and thus appropriate for himself all of the work his wife had done.

Much more disastrous and devastating, however, is what happened to the five articles that appeared in 1905 in the Leipzig *Annalen der Physik*. Two of them, including his 21-page dissertation, were written in Zurich. It's an open question how much Mileva Einstein-Marić contributed to them. I will talk later about Albert Einstein's evaluation of himself and that of his professors and only mention here that during their common student years his own view of Mileva Einstein-Marić was that she would make a better physicist than many men (Truhović-Gjurić, 1983, p. 41); also the friends of Mileva Einstein-Marić felt that Albert Einstein was exploiting her too much (Truhović-Gjurić, 1983, p. 55). This was between 1899 and 1901, the time when he wrote his thesis (Diplomarbeit) and his dissertation (submitted in Fall 1901, later apparently withdrawn, degree received 1905).

The other three articles published in Vol.

XVII of *Annalen der Physik* were written in Bern while Albert Einstein was at the Swiss Patent Office and were written together with his wife. He later received the Nobel Prize for 'Einen die Erzeugung und Verwandlung des Lichtes betreffenden heuristischen Gesichtspunkt.' "Elektrodynamik bewegter Körper" contains the special theory of relativity. Abram F. Joffe, the famous Russian physicist who was then an assistant to Röntgen (a member of the editorial team that examined the articles sent to *Annalen der Physik* for publication) wrote in his *Erinnerungen an Albert Einstein* (Joffe, 1960) that the original manuscripts for these two and also for a third paper were signed Einstein-Marić (Truhović-Gjurić, 1983, p. 97). Would the male editors have dropped the name of a male co-author, or that of a woman who was not the author's wife? Would not a male co-author have protested against his name being dropped in the publication and would he not have asked for some form of reparation? The manuscripts, together with all the notes for these three papers, are no longer extant. The *New York Times* of February 15, 1944, wrote about the manuscript of the theory of relativity that Albert Einstein "had destroyed the original after the theory had been published in 1905. An \$11,500,000 reward was promised to the person who could bring the original manuscript to the Library of Congress" (Truhović-Gjurić, 1983, p. 72). It is perhaps impossible now to show the extent of Mileva Einstein-Marić's contribution and that of Albert Einstein. But there are voices and countervoices: Desanka Truhović-Gjurić (1983, p. 158) quotes Albert Einstein's friend, David Reichenstein: "It is strange how fruitful that short period of his life was. Not only his special theory of relativity but a lot of other basic papers bear the date 1905."

Leopold Infeld, one of his biographers, remarked on "the irony of fate and the external contradictions" in Albert Einstein's life (Truhović-Gjurić, 1983, p. 158): "His most important scientific work he wrote as a little civil servant in the Patent Office in Bern."

Peter Michelsmore, who had much information from Albert Einstein, said (Truhović-Gjurić, 1983, p. 72): "Mileva helped him solve certain mathematical problems. She was with him in Bern and helped him

when he was having such a hard time with the theory of relativity.”

Hermann Minkowsky, a great mathematician and a former professor of Albert Einstein, who knew him well and was his friend, is said to have remarked to Max Born: “This was a big surprise to me because Einstein was quite a lazybones and wasn’t at all interested in mathematics” (Trbuhović-Gjurić, 1983, p. 74).

Bogdanovich, a mathematician in the Ministry of Education in Belgrade who was well acquainted with Mileva Einstein-Marić, is reported to have said that she had always known that Mileva Einstein-Marić had helped her husband a great deal, especially with the mathematical foundation of his theory, but Mileva Einstein-Marić had always avoided talking about it (Trbuhović-Gjurić, 1983, p. 164).

Mileva Einstein-Marić told her father during a visit by Albert Einstein and herself in 1905: “A short while ago we finished a very important work which will make my husband world-famous” (Trbuhović-Gjurić, 1983, p. 75).

And the author, Trbuhović-Gjurić herself, said the following about the paper (1983, p. 71):

It’s so pure, so unbelievably simple and elegant in its mathematical formulation—of all the revolutionary progress physics has made in this century, this work is the greatest achievement.

Even today when reading these yellowing pages printed almost 80 years ago, one feels respect and cannot but be proud that our great Serbian Mileva Einstein-Marić participated in the discovery and helped edit them. Her intellect lives in those lines. In their simplicity, the equations show almost beyond a doubt the personal style she always demonstrated in mathematics and in life in general. Her manner was always devoid of unnecessary complications and of pathos.

and (p. 72):

In her work, she was not the co-creator of his ideas, something no one else could have been, but she did examine all his ideas, then discussed them with him and gave mathematical expression to his

ideas about the extension of Planck’s quantum theory and about the special theory of relativity . . . Mileva Einstein-Marić was the first person to tell Albert Einstein after the completion of his paper: this is a great, very great and beautiful work, whereupon he sent it to the journal *Annalen der Physik* in Leipzig.

When Albert Einstein received the Nobel Prize in 1922, he had been separated from his wife, and living with another woman in Berlin for eight years; he had been divorced and remarried for three years. However, he travelled to Zurich and gave the full financial award, which came with the Nobel Prize, to his first wife.

Many interpretations are possible, of course. People say he turned over the Nobel Prize to his wife. This is simply a harmonizing euphemism. *He* was the one who received the prize with all the honors, he did not renounce it in her favor, and it was *he* who gave the lecture in Göteborg at the congress of Nobel Prize winners. Perhaps he only gave the money to his first wife because for eight years he had hardly supported her and the two children at all financially.

The *Collected Papers of Einstein, Vol. 1*, suggest a different reason. I was amazed to read there that Mileva Einstein-Marić was given the Nobel Prize money in accordance with the divorce agreement (*Collected Papers, Vol. 1*, 1987, p. 381). I asked myself whether the divorce agreement of 1919 anticipated Einstein’s Nobel Prize of 1922. But let us assume that he was giving her private recognition for her contribution which he had not given her publicly. By then, he must have been aware of how much he owed her mathematical genius; his own genius was on the decline and he did not achieve anything comparable after what is defined as his “creative outburst of 1905.” Again and again people remarked on the fact that none of his later work, after the age of 26, surpassed or even reached the same level of his earlier research.

Since his second wife was chosen for different reasons, (“I’m glad my second wife doesn’t understand anything about science because my first wife did”), he needed at various points someone “to solve his mathematical problems.” He chose students or friends: “I encountered mathematical difficulties

which I cannot conquer. I beg for your help, as I am apparently going crazy" (Trbuhović-Gjurić, 1983, p. 96) he wrote to his friend Marcel Grossmann, who then helped him.

In 1920, he wrote to Paul Ehrenfest as follows (Trbuhović-Gjurić, 1983, p. 155): "... I did not make any progress in the general theory of relativity. ... Also on the question of electrons I didn't come up with anything. Is it my hardened brain or is the breakthrough really that far off."

Whatever the case may have been, to quote the editor of the fourth edition who doubted the intellectual equality of Mileva Einstein-Marić to the "century genius" Albert Einstein, it is interesting to look at some self-evaluations of Albert Einstein before he had to play the role of genius of the century.

He said of himself that his intuition in mathematics was not strong enough to differentiate the essentially important from the more or less superfluous (Trbuhović-Gjurić, 1983, p. 44). Besides infinitesimal geometry,

higher mathematics didn't interest me in my years of studying. I wrongly assumed that this was such a wide area that one could easily waste one's energy in a far-off province. Also, I thought in my innocence that it was sufficient for the physicist to have clearly understood the elementary mathematical concepts and to have them ready for application while the rest consisted of unfruitful subtleties for the physicist, an error which I noticed only later. My mathematical ability was apparently not sufficient to enable me to differentiate the central and fundamental concepts from those that were peripheral and unimportant. (Trbuhović-Gjurić, 1983, p. 47)

Others agreed with his evaluation. An ETH professor, Jean Pernet, advised him to study something else other than physics (Trbuhović-Gjurić, 1983, p. 46): "Studying physics is very difficult. You don't lack diligence and good will but simply knowledge. Why don't you study medicine, law, or literature instead?"

Professor Weber, another physicist and ETH professor, for whom he did his thesis for the diploma, refused categorically to give Albert Einstein an assistant post while giving all his co-students assistantships after their exam.

A former student of Einstein recalls that Albert Einstein got stuck in the middle of a lecture missing a "silly mathematical transformation" which he couldn't figure out. Since none of the students could either, he told them to leave half a page empty and gave them the result. Ten minutes later he discovered a small piece of paper and put the transformation on the blackboard, remarking: "The main thing is the result not the mathematics, for with mathematics you can prove anything" (Trbuhović-Gjurić, 1983, p. 88).

He did not have to worry about the proofs because Mileva Einstein-Marić was doing them. So perhaps it was not so funny when he joked at a congress: "Ever since the mathematicians have taken up my theory of relativity, I don't understand it any more myself" (Trbuhović-Gjurić, 1983, p. 88).

The only person who believed in him and in his great talent was Mileva Einstein-Marić. She believed in him more than he did himself and so he went his way, studying physics, getting through exams, producing papers. He had her support and he had her opinion and judgment, which was more important to him than his own. Moreover, he had her financial help when he did not earn enough, he had the physical comfort provided by her in a home which she kept up, later on he had children whom he did not have to take care of and could simply enjoy. As to his work, he had her companionship, her diligence, her endurance, her mathematical genius, and her mathematical devotion. He had someone he needed, as he had told her father, someone who gave herself up to working only for his success, someone who was only interested in developing his abilities and who was content with his success. She was the ideal female partner for the years of his greatest creativity, from about 1900 to 1910. This is abbreviated by the male editors of Volume 1 of the *Collected Papers* in the following way: "Her intellectual and personal relationships (sic!) with the young Einstein played an important role in his development" (*Collected Papers, Vol. 1*, 1987, p. 381).

I will talk now about Mileva Einstein-Marić's life as it is depicted in Desanka Trbuhović-Gjurić's book.

Mileva Einstein-Marić was a highly gifted woman who came to study at the ETH, then Polytechnikum, in Zurich, the fifth woman

who had ever studied in the Department VI A: Mathematics and Physics, and the only woman in her year.

She was born in 1875, in what is now Yugoslavia, to a mother who is characterized by Trbuhović-Gjurić as modest, quiet, and very serious, who came from a wealthy family, and to a father who was an autodidact, employed in the Austrian-Hungarian military and the civil service. Although her father supported her strongly from the beginning when he realized her exceptional talent, her family could not provide the intellectual climate and stimulating environment into which, for example, Sonja Kovalevskaja, Sophie Germain, Marie Curie, and other women were born. People around Mileva Einstein-Marić reacted to her with astonishment and resistance and she had to go her own solitary way.

She attended several secondary schools in Yugoslavia, all of them with exceptional success, and was then admitted as a private student to an all-male Obergymnasium in Zagreb. After her first year there, she was permitted to enter the physics class of that elite school. At the age of 19, she decided to leave home for a country that allowed women to attend university. She went to Zurich to prepare in a girls' school for her Matura, the exam which qualifies students to enter university. She studied medicine for one term and then changed to mathematics and physics. To enter the ETH she had to do an additional entrance examination in mathematics.

Today we cannot imagine how lonely Mileva Einstein-Marić must have felt during all her schooling. Not only was she alone from the beginning because of her unusual giftedness, because of her academic interests and determination, but she was also alone as the only girl in the elitist male Gymnasium and the only woman in the mathematics and physics department of the elitist male ETH. Even today the ETH, with its one female full professor hired not too long ago, is not a hospitable place for women students. There are hardly any women studying mathematics and physics, and even fewer becoming assistants. We cannot imagine what the atmosphere must have been like for Mileva Einstein-Marić when she arrived to study there in 1896. The general attitude was, and is, that women do not belong there, so there are

no positive expectations for them in the heads of their male professors and they are not promoted and mentored as the young bright male students are, who immediately become members of the male institution and begin to profit from their privilege. I am sure none of her professors gave as much as a thought to the possibility she might succeed and pursue an academic career to the same point they had reached themselves. They tolerated her at best; she had to look out for herself. I do not believe that even the physics professor, Weber, for whom she wrote her Diplomarbeit, which she wanted to extend into a doctoral dissertation, thought about taking her on as his assistant.

In a letter to a friend, Mileva Einstein-Marić wrote that Professor Weber was very satisfied with her topic and that she was looking forward to her research. She also mentions that Albert Einstein had chosen a very interesting topic. Later on, Albert Einstein said that both their Diplomarbeiten were on the topic of thermoconduction, and were of no interest to him. It is interesting that he received a better grade, namely, 4.5 for something which did not interest him in the least, while Mileva Einstein-Marić received a 4 for something she was excited about (grades ranged from 1 to 6, 6 being the highest). But it does not disagree with what we know today about the way women and men are evaluated.

"It is a prevalent finding," write Gruber and Gaebelein (1979, p. 299) "that men and women are not evaluated equally (Rosenkrantz et al., 1968; Elman, Press, & Rosenkrantz, 1970) even when they produce objectively the same results (Goldberg, 1968; Pheterson, Kiesler, & Goldberg, 1971; Mischel, 1974; Starer & Denmark, 1974)." It begins very early. Condry and Condry (1976) showed that the same baby's behavior was perceived differently when it had been given a girl's name from when it had a boy's name. The difference was in the eye of the beholder. Identical texts were evaluated more negatively when they carried the name of a female author (Goldberg, 1968). What is in a name? Everything seems to be in a name. Evaluation of identical scholarly work apparently changes if the sex or race of the authors deviate from the norm, that is, white male, preferably of Anglo Saxon, Protestant back-



ground.<sup>6</sup> The 19th-century writers—George Eliot, George Sand, Anne, Charlotte, and Emily Brontë—who wrote under male pseudonyms knew that the expectations of, reactions to, and evaluations of women's writing were not neutral and were not advantageous to them. Evaluation of content and of source are inseparably interwoven. Our perception and evaluation is different for women and men (Nieva & Gutek, 1980; Geis, Carter, & Butler-Thompson, 1982). Why else would it have been necessary to change the practice of evaluating abstracts for conference participation and articles for publication together with authors' names? Deleting the names of the authors had as an interesting consequence that more women and minority authors are now participating in conferences and more of their work is now being published in professional journals. But even today, professional women cannot expect to be granted the same credibility and authority when they speak. Women news readers especially are faced with the problem (Whitaker & Meade, 1967). The reasons for the disastrous experience of the first BBC women news readers (Kramarae, 1984) are still working against women today (Kramarae, 1988; Mills, 1988; Sanders & Rock, 1988).

Many researchers show that the attention and interaction of teachers in the classroom focuses on boys (Thorne, Kramarae, & Henley, 1983; Spender, 1982); these results must hold all the more for college and university teaching because the sex-role expectations are stronger for adult women than for little girls. Treichler and Kramarae (1983) attribute the chilly atmosphere in the college classroom experienced by many women today to typical male patterns of interaction. Additionally, we have research on the general bias against competent women (Hagen & Kahn, 1975; Piacente et al., 1974; Seyfried & Hendricks, 1973) and the specific bias against women in the academy (Farley, 1982; Spencer, Kehoe, & Speece, 1982; Rossi & Calderwood, 1973; Abramson, 1975; Howe, 1975; DeSole & Hoffman, 1961; Haber, 1981).

The consequences of such bias severely influence the evaluation of women as students today. How much harder must the first women to enter university have been bombarded by prejudice against them. I wonder what grades the first women received who came

from all over Europe to study in Zurich and then returned to their own countries to open the first medical practices run by women, or to found the first medical and law schools for women. I wonder how much the attitude that they did not belong to the university was reflected in their evaluations, male professors confirming their own prejudice against women by giving them the corresponding grades. It is only very recently that a tendency has been reported—unfortunately, only in women—that negative evaluation of women is changing. Some women, it seems, are beginning to accept women's work and may judge it as equal to a man's (Chabot & Goldberg, 1974; Mischel, 1974; Levenson et al., 1975).

It is amazing that we still fail to apply the knowledge we have, knowledge about the unfair evaluation of women, knowledge about discriminatory mechanisms in academia, to the women we read about in the history of science or literature or to the live women we see as our colleagues or students.

If I apply some of these findings, and some of what I know about the Swiss university system then and today, to what I read about Mileva Einstein-Marić, I am not surprised that she did not receive either a Diplom or a doctorate.

The Swiss university before the turn of the century, and that means the Swiss academic men, let their first woman lawyer, who had the highest qualifications for an academic career, starve rather than give her a professorship. Dr. jur. Emilie Kempin-Spyri (1853–1901) was the first woman in the world to study law. She received her doctorate, *summa cum laude*, in 1887, from the University of Zurich. After that, she found that she could not practice law because it was bound to active citizenship. She went to court and was told that her interpretation of "Every Swiss is equal before the law" to mean every Swiss man *and* every Swiss woman was just as new as it was daring. The only route left was an academic career. She tried Habilitation, but it was refused by all the university authorities and by the state (1888). She emigrated to the United States where she founded the First Woman Law College, but since her family was not happy in the United States, she returned to Switzerland and made a new attempt at Habilitation. This time, the

faculty agreed, the senate voted *no* but was overruled by the state educational committee, and she received the *venia legendi* for Roman, Anglo-Saxon, and American Law (1891). However, she was not taken seriously by colleagues or students: her lectures were not attended enough and she did not receive a professorship. Her family did not have enough money to live since her husband's career as a journalist did not flourish. The family moved to Berlin where she opened a consulting office for international law. Her husband left her—a familiar pattern—and she had to take care of herself and their two children. She worked herself to death, but could not make a living and incurred debts. In 1899, she was admitted to a psychiatric institution in Basel with a nervous breakdown; friends had to pay for the expenses. When she felt better, she applied for a position as a household help (Woodtli, 1975, p. 98):

In spite of my studying, I have not forgotten the abilities of a housewife; . . . I only began to study at a later age when I already had children, then three and four years old. Therefore I can also cook, sweep, sew, especially make new clothes from old ones; I love all children and like to be with them, and I am willing to do any work whatsoever, including doing the dishes and cleaning the house. I will also take care of the garden if you desire me to.

She then writes that she is extremely modest in what she wants and needs for herself, that because of her financial situation, she will suffer anything willingly. She would be satisfied with a monthly pay of 10 Swiss francs, but would not insist on it. If they wanted to hire her by trial and without pay for a month, this would be fine. Signed: Dr. Emilie Kempin.<sup>7</sup> Fortunately, she died of cancer before she could accept the position as a maid—the first woman lawyer in the world literally starving for recognition of her achievement, not left a morsel of success by, I do not know how many, mediocre and bad male lawyers in Switzerland and Germany, dying in a psychiatric institution at the age of 48.

A requiem based on her letter was composed recently by Patricia Jünger, the first

requiem for a woman by an Austrian composer, performed at the Donaueschingen Festival for Avantgarde Music and honored with the Karl Sczuka Prize. If we looked at the lives of women studying at that time, perhaps almost every woman having studied then would deserve a requiem.

As for Swiss universities today, suffice it to say that in 1983 Switzerland could count 40 women full professors (compared with over 2,000 men full professors), which is certainly an achievement in the 150 years since the first woman appeared as auditors at the university. At this rate, Swiss universities may actually reach 10% in another 600 years.

But going back to Mileva Einstein-Marić, there is another factor which we should consider (and which not surprisingly is also at play in Emilie Kempin-Spyri's life). Mileva Einstein-Marić most certainly would have gotten both her Diplom and her doctorate had she not met Albert Einstein. When she fell in love, she worked together *with* him. Or rather, when they worked together, she fell in love with him. Once she was committed to him, however, she worked *for* him instead of for herself—out of love. She may not even have noticed the difference at first because she kept working more than ever, but her love did change her very strong dedication to her studies in that she no longer pursued them in the interest of her own career, but rather of his. At that time, as a matter of course, the other women at the Swiss institutions of higher learning immediately dropped their scientific interests and their work once they got married, so as to take up their duties as housewives and mothers. They had come as the most brilliant and gifted women from all over Europe, they had gained access to the Swiss universities as auditors because they were deemed harmless enough, then as regular students with the help of some German male professors, expatriates from the German university for political reasons, thus opening for Swiss women students the way to the university. All of them willingly gave up their academic inclination once their "real calling" began. Those who wanted to combine their academic life with a family were literally destroyed, like Kempin-Spyri and Mileva Einstein-Marić. Women today still have to choose and do choose between children and professional life in Switzerland,

and in Germany as well.<sup>8</sup> And even in the United States today, a scientific career and marriage cannot be combined completely unproblematically. Reskin (1978, p. 17) states:

Possibly the best situation for a female scientist is marriage to a professional in another discipline. Her marital status would facilitate her social and professional integration, and the disciplinary difference would reduce the chance of her husband's receiving credit for her research contributions.

From Truhović-Gjurić's book, it seems that Mileva Einstein-Marić jeopardized her promising collaborative relationship with Professor Weber because she fought for Albert Einstein when he, as the only student out of four, did not receive an assistantship after the Diplom examination at the ETH. Weber had categorically declared that he did not want Albert Einstein as an assistant. I do not know whether one of the three men students also fought for Albert Einstein and by doing so risked his relationship with Weber. One of them, Albert Einstein's friend Marcel Grossmann, at least later on, got his father to use his connections and get Albert Einstein his first full-time position (at the Swiss Patent Office, Bern). Mileva Einstein-Marić, in any case, had conflicts with Weber because she wanted him to see his unfairness to Albert Einstein who, in his final exam, had an average quite a bit below that of the other three men candidates. Did she ever give any thought to the possibility of fighting for an assistantship for herself? Did any one of her fellow students fight for her? Would Albert Einstein, had he been in her position, have fought for her at the expense of his career? I think we can answer the last question because Albert Einstein did not do anything for her, never mind any fighting for her, even when it would no longer have harmed his career.

Truhović-Gjurić writes (1983, p. 59): "She went so far to eventually withdraw her excellent Diplomarbeit, stopped her research with him [=Weber, ST-P], and in August, 1901, left the Polytechnikum for good." Again, the consequences for the woman were different from those for the man. Albert Einstein, who had the primary conflict with We-

ber, got his Diplomarbeit (which he was not interested in) graded better than hers, he got his degree (Diplom), he even started his doctoral dissertation with Weber and when that did not work out, someone else (Kleiner) was found with whom he continued. Even when Kleiner refused it or advised him to withdraw in 1901, it did not keep him from getting his doctorate four years later.

Mileva Einstein-Marić ended up without any degree whatsoever, although Albert Einstein had envisaged her as a PhD when he would still be "ein ganz gewöhnlicher Mensch" ("a totally ordinary human being") (*Collected Papers, Vol. 1*, 1987, p. 260). While she was working on her dissertation and preparing for her exam, she also had other duties. Mileva Einstein-Marić's friends thought that Albert Einstein was exploiting her too much. This was said just at the time when both of them were writing their Diplomarbeiten and before the final oral examinations. After the exam, from the middle of 1900 to the middle of 1902, a very difficult time began for both of them. Albert Einstein could not get any position he applied for, although he tried again and again. Mileva Einstein-Marić was pregnant with a child by Albert Einstein, gave birth to it in 1902, out of wedlock, and evidently had to give it up for adoption. Albert Einstein's parents objected to Mileva Einstein-Marić as a person, and to the planned marriage. Mileva Einstein-Marić stuck with him, struggling against the external world, be it Weber or Albert Einstein's parents, supporting him when he got rejected and, above all, working with him (*Collected Papers, Vol. 1*, 1987, p. 275): "Wir leben und arbeiten immer noch wie früher (we are living and working the way we did earlier, meaning: as students).

This collaboration is reflected also in Albert Einstein's letters:

In September 1900, almost immediately after his exam, Albert Einstein writes to Mileva Einstein-Marić: "Ich freue mich auch sehr auf unsere neuen Arbeiten" (I am also looking forward very much to our new papers) (*Collected Papers, Vol. 1*, 1987, p. 260).

In a letter of October 1900, the letter in which he calls her his equal, he again refers to common work on capillarity, which they will send to the *Annalen* if it should turn out

to be successful (*Collected Papers, Vol. 1*, 1987, p. 267).

In a letter of March 1901, Albert Einstein writes to Mileva Einstein-Marić: "How happy and proud I will be when both of us together will have brought our work on relative motion to a successful end" (*Collected Papers, Vol. 1*, 1987, p. 282).

In a letter of April 1901, he is talking about "our research" and "our papers," referring to what was published under only his name as "Folgerungen aus den Capillaritätserscheinungen" in *Annalen der Physik* 4 (1901) (*Collected Papers, Vol. 1*, 1987, p. 286).

In a letter of May 1901, he is referring to the same paper again by "our paper" and says, "If only we had a chance soon to continue together on that beautiful road" (*Collected Papers, Vol. 1*, 1987, p. 300).

In a later letter of the same month he writes: "Think how beautiful it will be when we are able again to work together without any disturbance and interference from outside! Your present sorrows will be brilliantly replaced by sheer pleasure and our days will pass quietly without any hectic" (*Collected Papers, Vol. 1*, 1987, p. 304).

Albert Einstein's wish would come true even though the time was not so quiet and unhectic for Mileva Einstein-Marić. Their collaboration became even more intensive beginning in 1903, when they got married. Whereas before, they had to spend some time apart, they now had uninterrupted time together.

Trbuhović-Gjurić writes (1983, p. 68):

The marriage of these two very different, highly gifted people was very happy at that time. She was happy with him—content to work for him and around him. She carried the full burden of everyday life; he could spend his time on his work and she helped him not only with her knowledge but also with her confidence in him, and her stimulating energy. She was overjoyed that he valued and loved her for these characteristics which distinguished her from other women. She made it possible for him to have a quiet, ordered life, free of worry. The congenial sides of her personality caused resonances of harmony in him.

Things changed slightly when their first child (in wedlock) was born in May 1904. Mileva Einstein-Marić's work increased, but she still supported, and worked with, Albert Einstein. When her brother studied in Zurich, he became her helper, babysitting for the child, and this allowed her time to check her husband's computations.

In 1909, Albert Einstein received a professorship at the University of Zurich. His income was better than in Bern but, to give him more financial independence, Mileva Einstein-Marić took in student lodgers who lived and ate with them. Mileva Einstein-Marić strained her physical limits. A student of Albert Einstein reports coming to his apartment (Trbuhović-Gjurić, 1983, p. 87): "The door was open, the steps and the hallway were wet from cleaning, and his wife, after all this work, was standing in the kitchen cooking the midday meal with her sleeves rolled up."

A mathematician of the University of Zagreb recalled that Albert Einstein every now and then helped his wife doing the household chores because he felt sorry that after her housework was done, she had to do his mathematical problems till way past midnight (Trbuhović-Gjurić, 1983, p. 87).

But Mileva Einstein-Marić did not tire and was happy about her husband's success. She wrote to her friend Helene on September 3, 1909 (Trbuhović-Gjurić, 1983, p. 87):

My husband is at a congress of German natural scientists in Salzburg at the moment where he is to give a talk. He is considered among the first German speaking physicists now. I am very happy about his successes because he really deserves them.

The birth of their second son, July 1910, meant even more work. She had already given up all her personal interests. Her health was deteriorating. A doctor predicted she was ruining her health and suggested that Albert Einstein should earn a bit more money. From then on, Mileva Einstein-Marić's contribution to the mathematical work of her husband diminished (Trbuhović-Gjurić, 1983, p. 89). Albert Einstein began to ask advanced students and friends for help.

In 1911, they moved to Prague where Albert Einstein had been offered a professor-

ship in theoretical physics. Their marriage was no longer happy. In 1912 they returned to Zurich; this time the ETH offered Albert Einstein a professorship. The hopes that Mileva Einstein-Marić might have had for repairing their marriage in the city where they had studied together and fallen in love, after Albert Einstein's wish to teach at his alma mater had been fulfilled, did not materialize. Her health became worse. She writes her friend Helene Kaufler on March 17, 1913, that her husband did not have time for his family any more. Albert Einstein tells Max Born about his interest in going to Berlin; half a year later, Max Planck comes to talk with him about the specific conditions of the position. They are so good that Albert Einstein cannot resist. By the end of the year, he is a member of the Prussian Academy of Science and has accepted the offer to become director of the Kaiser Wilhelm Institute for Physics. Mileva Einstein-Marić did not understand why they should move to Berlin. Although they became more and more estranged, she did not want to be an impediment to him, and so they moved to Berlin in April 1914. Mileva Einstein-Marić had no friends there and disliked Germany. Albert Einstein, however, had close relatives with whom he kept in close contact. Mileva Einstein-Marić had no access to these circles, they did not acknowledge their marriage and objected to her. In July, Mileva Einstein-Marić left with both children for the summer holidays in Zurich; Albert Einstein stayed in Berlin. The First World War started. Albert Einstein advised his wife to stay in Switzerland; he refused to join them, saying that the war had no influence on his work. Mileva Einstein-Marić thought his work was the only reason keeping him in Berlin—in reality, he had found another woman, a second cousin and an appropriate partner for him now, and he quickly moved in with her. Mileva Einstein-Marić had to take care of the two children (now 4 and 10) by herself. She had no regular income. Albert Einstein did not send money regularly or in sufficient amounts. She was too proud to ask her family for help. Also, her children were not supposed to know that there was no money to pay for the lodging house or for their clothes. She went hungry. She wanted to give music lessons but could not leave the chil-

dren alone. She finally asked a friend, who had to promise utter discretion, for a loan. When Albert Einstein eventually sent money, she could rent an apartment. He promised to take care of his family. She started to give private lessons in mathematics and Italian. She sent birthday gifts to Albert Einstein in Berlin. One year after she had left Berlin, Albert Einstein came to Zurich. He gave no answers to his wife's and his older son's questions about his plans for the future of the family. When back in Berlin, he again sent money irregularly and, due to devaluation, it was worth less and less. Mileva Einstein-Marić refused help from friends. She heard that Albert Einstein had moved in with his cousin, who loved luxury and fame, and fitted his present stage of life as a famous physicist. Mileva Einstein-Marić still hoped for his return. Common friends of the Einsteins in Zurich stood by her side, advised him against a divorce and reminded him of his responsibility to the family he had founded, his responsibility as a father. He asked his wife for a divorce, not without promising her that "he would remain faithful to her in his way." She kept that letter. Truhović-Gjurić writes that when Albert Einstein failed to be moved at all by the suffering of his wife, Mileva Einstein-Marić knew that the separation was final, that she had lost for good the man to whom she had subordinated all her abilities, dreams, and aspirations (Truhović-Gjurić, 1983, p. 119).

Mileva Einstein-Marić became sick, had to give the children to her friend Helene, had heart attacks and was admitted and readmitted to three hospitals. The younger child, Eduard, aged 7, stayed with her in one hospital, the other with Professor Zangger, who tried to get a position for Albert Einstein again at the University of Zurich. Finally, her sister came from Yugoslavia to take care of her.

The divorce was on February 14, 1919. That year brought Albert Einstein a stomach ulcer and his first heart attack. It also brought him a return to the University of Zurich to teach one class, visits with his family, trips with his sons, and when he got married to his cousin, the turning away from him by his older son who was 15 years old.

In the following years, Einstein kept visiting Zurich and his family, but he could not

take care of his family in Zurich financially because of the devaluation of the German mark.

In 1929, the younger son, Eduard, now 19, became psychotic. From then on, Mileva Einstein-Marić had to take care of him, taking him to doctors, paying for the enormous psychiatric expenses because he was in and out of the Burghölzli, a psychiatric hospital in Zurich, and especially dealing with the outbursts in which he destroyed furniture, tried to strangle her, wrote of his hate to his father whose fault it was, so he thought, that he had lost his mind.

In Albert Einstein's family, there was certainty that he had inherited this disease from his mother's side.

Albert Einstein stopped talking about his first marriage. His money came irregularly. Mileva Einstein-Marić taught physics in a secondary school. Eduard needed a constant male caretaker. He complained about constant ear aches. He had bouts of schizophrenia. Mileva Einstein-Marić could not help him. Having him at home took all of her remaining strength. The fate of her family in Yugoslavia brought her additional suffering: her gifted brother never returned from Russian military imprisonment; her younger sister slowly became mentally ill; her father died of heartbreak; her mother died at 88; her sister died young in 1938. Mileva Einstein-Marić had remained attached to her homeland throughout her life, and loved the Bačka. Her son, Hans Albert, had done the static computations for a bridge over the Danube, built in 1929. During her last visit to Novi Sad, after her sister's death, she asked to be taken to the bridge, part of the reparations paid by Germany after WWI. She was very moved when she saw it, but did not say a word. For her, writes Trbuhović-Gjurić, this bridge was more than a means of connecting the wide banks of the Danube, it brought to realization an idea of her son in her motherland. She was not to see that son again, and the bridge was destroyed in WWII (Trbuhović-Gjurić, 1983, p. 171).

Mileva Einstein-Marić's health deteriorated further, and so now, at times, she lifted the veil of her proud silence and talked with friends about the fact that Albert Einstein did not care about his sick son. A friend, Dr. Ada Broch, reminded Albert Einstein in a

letter of his responsibility and asked him to send money. Mileva Einstein-Marić visited Eduard in the Burghölzli, in walking across town in snow and ice, she broke her leg, had to stay in hospital and felt death coming on. She worried about what would become of Eduard, by himself, with his father and brother far off in the United States. On January 3, 1948, she was notified that she would have to leave her apartment in the house she had once owned. She had thought she had the right to live there until she died.

In May 1948, Eduard had another schizophrenic attack. Mileva Einstein-Marić broke down and was taken to a clinic. She was paralyzed on the left side of her body. She wanted to visit her son in the Burghölzli and kept ringing the bell. The bell was turned off. She lost consciousness. Her son visited her daily before her death. The day before her death, she regained full consciousness. She died on August 4, 1948, at the age of 73.

Around that time, Albert Einstein uttered the much quoted sentence: "Only a life lived for others is worth living."

After Mileva Einstein-Marić had died, her son lived more than 17 years alone in the Burghölzli, fulfilling her deepest fears. In the announcement of his death, his mother's name is not mentioned; he is simply the son of Professor Albert Einstein, a father who had not lived with him since he was four years old and who did not take care of him or even come to see him when he was ill.

Trbuhović-Gjurić speaks of the immense self-denial in Mileva Einstein-Marić's life. Although she did not start out altruistically, she gave up all her dreams for herself when she met Albert Einstein. Her love, and his love for her, changed her life. Her love made her accept all sacrifices as meaningful because they served her husband's career. But Albert Einstein enjoyed the fruits of this fame with another woman. Mileva Einstein-Marić died lonely, worried by the sorrow about her son. "She died an impoverished old woman, pushed aside even by the clinic personnel" (Trbuhović-Gjurić, 1983, pp. 178, 180).

We can see so many patterns in this life story:

- Men who take the beauty, youth, and health of women and leave when these are gone.

- Men who take the intelligence and energy of women and make them work: they expect women to do the household chores and all the other everyday work that is needed; they expect them to take care of the children; they expect them to create a home atmosphere free of worries; they expect to be free for their work; they expect them to do their work, type for them, do their correspondence, go to the library, etc.; they expect them to give them ideas, stimulate them, advise them, comfort them, support them, be their muses, hostesses, companions, nurses, and therapists.
- Men who leave their first wife when children come, leave her to do all the work with small children on her own.
- Men who do not care for their children, other than verbally repeating their commitment.
- Men who do not even feel financially responsible for their children and shirk alimony payment. (In West Germany today, 50% of men do not pay alimony for their children; in the United States, the figure is said to be higher.)
- Men who quickly find new, usually younger companions for a second marriage; mostly these companions are well in sight before they leave their first wife.
- Women who change their life once they fall in love and whose life is changed, whether they want it or not, once they marry and have children.
- Women who feel responsibility toward their children and take it as their natural duty to do the work for society of bringing up the next generation without getting any recognition or help for it.
- Women who do *not* quickly find a second, younger, and energetic husband who will help them bring up the children.
- Women who have no leisure time to pursue their academic, artistic, or other interests once they have children.
- Women who have to fight for survival because their husbands do not support them.
- Women who, having come from wealthy backgrounds or having taken care of themselves independently, end up in poverty after divorce.<sup>9</sup>
- Women, who started out as promising, got

better grades as students than their husbands, and find themselves not advancing in their career with the same speed as their husbands.

- Women who find it difficult to keep up their work, who have worse working conditions, usually working at night, who finally, overburdened, give up their creative work altogether.
- Women whose ideas and work is appropriated by men, their husbands, professors, fellow students, and published under the men's names.

We know these patterns, but we do not apply them yet, think by them, write by them, judge by them when we are dealing with a woman's life. So it comes as no surprise that the editors of Volume 1 of the *Collected Papers of Albert Einstein*, which covers, however, only the time before his marriage, cannot find any evidence that Mileva Einstein-Marić's role was more than "a sounding board for Einstein's ideas." I would not be surprised if not even the next volume, which is to cover the crucial period before and after 1905, would discover any trace of Mileva Einstein-Marić's part in their joint work. *The Collected Papers* are firmly grounded in the tradition of constructing man's success and deconstructing woman's contributions. They are themselves a beautiful example of how it is done.

The most important requirement is to ask few questions about the woman, and many, but not all, questions about the man. Following this rule, every one of the seven letters by Mileva Einstein-Marić to her friend Helene Kaufler-Savić that are reprinted have parts deleted, even parts that are needed and referred to later. For example, one letter (document 64) has three deletions. An editorial footnote indicates that one deletion concerns Mileva Einstein-Marić's Diplomarbeit which she wrote that she had completed (*Collected Papers, Vol. 1*, 1987, p. 245). We have to trust this statement. Another editorial footnote (footnote 5 of document 75) to a later letter from Albert Einstein to Mileva Einstein-Marić refers exactly to the deleted portion of document 64, this time quoting an incomplete sentence from it, from which the predicate is missing: "eine größere Arbeit . . . die ich mir als Diplom- und wahrscheinlich auch als Doktorarbeit ausgewählt,

... " (a larger work ... which I chose as my thesis for my diploma, probably also for my doctorate ...) (*Collected Papers*, Vol. I, 1987, p. 260). From this excerpt we cannot deduce what she is saying about the topic which she has chosen. Is she that unimportant that only bits and pieces of her letter are put into a later footnote? Is what she says about her Diplomarbeit (which, as we know, has disappeared) that unimportant? Instead of presenting document 64 fully, footnote 5 of document 75, with its fragment of a sentence, is referred to again and again in further editorial footnotes. Good editorial practice? Certainly not, but good editorial practice is apparently not required when it comes to women.

Following this rule also, we do not hear anything in the *Collected Papers*, Vol. I, about why Mileva Einstein-Marić failed twice. In the first exam, which she apparently took with Albert Einstein, we can see her grades and the statement of her failure in document 67. In the second case, we have to take the editor's word in another footnote for the fact (note 1 to document 121), therefore we do not know whether she failed by default, that is, by withdrawing her Diplomarbeit, as Trbuhović-Gjurić suggests.

But not only are the leads in Trbuhović-Gjurić's book not followed up, there are also no questions asked about the numerous references to Mileva Einstein-Marić's doctoral dissertation by Albert Einstein himself. What happened to this doctoral dissertation? Do we know its title? Is it still in existence? Are parts of it reconstructible from letters or documents?

Of course, this is not a biography of Mileva Einstein-Marić, and there must be a limit to asking questions about her in the *Collected Papers of Albert Einstein*.

But what about Albert Einstein's single authorship of *Einstein* in 1901?<sup>10</sup> Would not that be a question belonging in the legitimate sphere of interest, especially since Albert Einstein refers to this paper again and again as "our paper"? Apparently not, but this is in accordance with the second part of my rule that you ask many, but by no means all, questions about the man. The result of these practices is that the success of the man can remain untouched and the woman's contribution is played down.

We can expect that none of the books by male authors will give credit to the woman for her scientific contributions,<sup>11</sup> they will not even give her credit for giving him the freedom to work by doing the housework and child care for him. Albert Einstein himself did not give credit to his wife for either of these two contributions to his success. Nor can we expect many books by male authors and editors to point out that Albert Einstein forgot his wife and his children even when they were much in need of his help because he had adopted a new family fitting his new life situation.

*The Collected Papers of Albert Einstein* is an enormous endeavor, funded by numerous foundations and by the wealth of private persons. If only one-hundredth of the resources were expended on Mileva Einstein-Marić and other women physicists and mathematicians of our time, we could answer all our questions.

Trbuhović-Gjurić had no financial support to do the research for her book. She did it out of her own retirement income and on her time. Her book, falling out of the tradition of producing male success, must be unique among all the books on Albert Einstein.

It is, to my knowledge, the only book written on his first wife. It is written by a woman. It is the only book bringing a woman's perspective to bear on Albert Einstein's life, touching upon questions that are not usually asked and, if they are, quickly brushed aside: questions about his responsibility toward his wife and his children, about his gratitude to his wife, about his financial support for his children and his wife, his financial arrangement with the house from which she was turned out just before her death (Trbuhović-Gjurić, 1983, pp. 160, 174), and especially about her scientific contributions. Trbuhović-Gjurić does not ask these questions maliciously, but in the hope that later documents will turn up and provide answers.

The two books that have been announced by the Zurich publisher Origo, one, a book of memoirs by a woman named Julia Niggli, who talks a lot about the Einsteins, and another one, the letters of Mileva Einstein-Marić and Albert Einstein between 1897 and 1938, might still appear and answer some



questions. So far "legal impediments" have hindered their appearance (Trbuhović-Gjurić, 1983, p. 80). The letters are kept inaccessible in the Estate of Albert Einstein in New York (Trbuhović-Gjurić, 1983, p. 173) or in the Einstein Family Correspondence Trust, Los Angeles. They might still be published at some point in the future. After all, Einstein has been dead for 34 years.

But far off in Novi Sad in today's Yugoslavia, people apparently have a different sensibility for the matter, a different sense of time and possibly some evidence the men of Princeton do not possess: on the 100th birthday of Mileva Einstein-Marić they revealed a plaque on the Marić family residence which reads: "In this house Albert Einstein the creator of the relativity theory and his scientific collaborator and wife stayed in 1905 and 1907."

## ENDNOTES

1. Addition of two letters, pp. 139-140 and pp. 196-197; one excerpt of a letter p. 202; addition of text in editor's postscript, pp. 212-213.

2. In three places a Nachtrag (afterthought, addition) is added; pp. 48-52, pp. 59-78, and pp. 161-162.

3. This quotation and all the other excerpts from German texts were translated by the author of this article.

4. This quotation is from Albert Einstein's letter to Mileva Einstein-Marić dated Oct. 3, 1900 (*Collected Papers*, Vol. 1, 1987, p. 267).

5. A more recent case in the history of science is Lise Meitner, who was said to be the head of the Straßmann-Hahn team, who had worked with Hahn for three decades, giving her ideas (e.g., the term *fission* is due to her) and especially giving the exact physical interpretations to the common experiments before she was expelled as a Jew and as a woman from Nazi Germany and its universities. Hahn and Straßmann stayed and published the paper on uranium fission without her name, later receiving the Nobel Prize for the publication (Krafft, 1978).

It is interesting to note that at least one other woman was disregarded by the two men. Immediately after their publication in the journal *Naturwissenschaften*, a chemist, Eda Noddacks, wrote a letter to that journal, dated March 10, 1939, saying that Hahn and Straßmann had persistently ignored her conjecture, first made in 1934, that the nucleus of the uranium atom might break through radiation with neutrons.

The editors of *Naturwissenschaften* answered that "the gentlemen Hahn and Straßmann had neither time nor did they feel like answering to the letter . . . they are leaving it to their colleagues to judge the matter" (cf: *Ignoranz* in *Frankfurter Allgemeine Zeitung*, Dec. 7, 1988.)

6. A brilliant analysis of the politics of naming and defining is given by Bosmajian (1974) in his book *The*

*Language of Oppression*, which deals with the language of white racism and sexism, as well as with the language of anti-semitism, Indian derision, and war.

7. Cf. Woodtli (1975, pp. 93-98).

8. For some of the concrete conditions of combining the care of school-age children with a profession in both countries, cf. Troemel-Ploetz (1990).

9. Cf. the New Jersey Reports on *Women in the Courts* with the finding that the distribution of income and property after divorce, no matter what social class a couple belong to, is unfair to the women. See also *Michigan Bar Journal*, 63(6), June 1984 and Crites, Laura L., & Hepperle, Winfred L. (Eds.). (1987). *Women, the courts and equality*. Newbury Park: Sage.

10. Einstein, Albert. (1901). Folgerungen aus den Capillaritätserscheinungen. *Annalen der Physik*, 4, 513-523.

11. However, some men are beginning to ask questions, e.g., Harris Walker, in a letter to *Physics Today*, February 1989, called "Did Einstein espouse his spouse's ideas?"

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