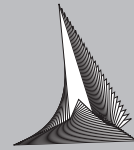


Handling evidence in history: the case of Einstein's wife

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Historical claims in science need to be inspected carefully, just as when testing hypotheses



Here is a good story: a 26-year-old patent clerk, having studied theoretical physics largely on his own, publishes in a single year *four* extraordinary papers that revolutionise physics. Most of us believe, for many reasons, that this story is true. We say that in 1905 it actually happened, that it is history.

Still, we know that it is unlikely that a single person in a single year can be so successful in physics. Accordingly, some people have formulated hypotheses to explain Albert Einstein's productivity. Recently, some have argued that he worked with a secret collaborator, his first wife Mileva Maric. It would be an extraordinary story. Famous physicist steals credit from his modest wife. Such a story, if true, would be of great interest to social historians, and it would serve as a vehicle for reaffirming the rights of women and for encouraging female students

ABSTRACT

According to an online Internet site, 75 per cent of people polled believe that Albert Einstein's first wife, Mileva Maric, contributed to his famous works of 1905. The author reviews claims that have appeared in books, television and on the Internet, concerning the role of Maric as Einstein's alleged collaborator. He critically illustrates how certain derivative accounts introduce inaccuracies when attempting to convey history. A scale of distinctions among different kinds of documentary evidence is outlined, to help teachers and students differentiate between more or less fallible sources of historical information.

to study physics. In that sense, it's a good story. But is it true?

Like many extraordinary stories, it might be tempting to simply disbelieve it, to dismiss it as fiction. But if you are a teacher, you may soon find that some of your students ask you '*Is it true that Einstein's wife co-authored his famous theories?*' Because, there are currently several books and many Internet websites that ascribe to Mileva Maric a contributing role in the creation of Einstein's works.

In 2003, television stations in the United States and other countries began to broadcast a documentary called *Einstein's Wife* (see end-note 1). It overviewed Maric's life and highlighted the idea that perhaps she contributed to Einstein's scientific works. The programme was accompanied by a PBS Internet website (including various errors) on Maric's life. It features an online poll on whether she collaborated with Einstein. It asks: '*Was it really possible for Albert alone to produce all the phenomenal physics generated during 1905?*' Currently, 75 per cent of the people polled responded that Maric indeed collaborated with Einstein. The website beckons: '*Did Mileva Maric collaborate with Einstein? You Decide! Take our online poll.*' As if history were a matter of democratic votes.

Carl Sagan used to say: '*extraordinary claims require extraordinary evidence*'. So let's analyse some of the 'evidence' that the proponents of Maric have highlighted. By doing so, teachers and laypersons can increasingly distinguish the various degrees to which misinformation can be misconstrued as history.

Evidence in context

In the 1980s, old letters between Einstein and Maric were made public by members of their family. In some of those letters, written around 1900, Einstein briefly alluded to projects on which the two seem to have collaborated. He used expressions such as 'our research', 'our paper' and, most interesting, 'our work on relative motion' (Renn and Schulmann, 1992: 41, 39). Specialists in history of physics were fascinated but concluded that such letters are just too vague, and do not establish that Maric contributed in any of Einstein's publications. Still, plenty of non-specialists also began to ponder roles that Maric conceivably could have played.

Consider an example. Christopher Jon Bjerknæs, author of *Albert Einstein: the incorrigible plagiarist* (2002), claimed that 'We have direct evidence from Albert's own pen that the work on relativity theory was a collaboration between Mileva and him' (p. 201). He cited the suggestive letter. Translated, the sentence in question reads: 'How happy and proud will I be, when we both together have brought our work on the relative motion victoriously to its end!' (Stachel, 1987: 282, trans. A M.). Non-specialists might hastily conclude that this letter refers to the theory of relativity. But it does not. One important point that Bjerknæs omits is that the letter was written in 1901. By no means did Einstein have the theory of relativity in 1901. At that time, he believed in the ether and sought ways to detect its relative motion experimentally. This problem of 'the relative motion' was a widespread concern; many people aimed to solve it. Einstein



Figure 1 Albert Einstein and his first wife Mileva Maric, about 1910.

attempted many approaches until he abruptly devised his theory in 1905.

Nevertheless, the letter constitutes evidence that Einstein shared the aspiration with Maric, at least at a time midway through the ten-year process during which he pondered questions on relative motion. It is well known that his obstinacy carried him through. But what about her? We know that she failed college examinations twice. She then abandoned her plan to obtain the teaching degree. We also know that she abandoned her efforts to do a PhD thesis (for more on Maric, see Stachel, 1996).

Charitable exaggerations

One writer, Dord Krstic (1991), claimed that 'From the spring of 1898 until the fall of 1911, Mileva worked daily at the same table with Albert – quietly, modestly, and never in public view' (p. 98). This is a speculative exaggeration. The two could not work 'daily at the same table' because, of course, they were not always at the same place. For example, from mid-1900 until December 1902 they lived mostly in different cities, even in different countries. Moreover, the two did not leave any written evidence that they regularly worked together on physics once they reunited in Bern, Switzerland.

Regardless, Krstic wrote: 'Almost simultaneously, Marie Curie opened the door into the world of radiophysics and radiochemistry and Mileva Einstein bravely began to explore the secrets of quantum and relativity – the fields that even today we call modern physics' (p. 85). Does it sound like a good story?

What role did Mileva play once she lived with Einstein in Bern? It is well known that Einstein and two friends, Moritz Solovine and Conrad Habicht, had a discussion group that they called 'the Olympia Academy'. Their readings and discussions were very influential in Einstein's development. Nowadays, some writers claim that Maric too was an active participant. In the television programme, *Einstein's Wife*, the narrator says:

Maurice Solovine writes: Mileva would sit in the corner during our meetings listening attentively. She occasionally joined in. I found her reserved, but intelligent, and clearly more interested in physics than in housework.

Where did the producers of the show get this information? The source can be traced to the book *Einstein in love*, where Dennis Overbye wrote:

Marriage had made Mileva a de facto member of the Olympia Academy, and Solovine later recalled her sitting quietly in the corner during the meetings at their apartment, following the arguments but rarely contributing. He found her reserved but intelligent, and clearly more interested in physics than in housework. (Overbye, 2000: 110)

This passage sounds plausible. Since Albert and Mileva now lived together, it is easy to *imagine* that Mileva now participated to some extent in the meetings of the Academy. But what is the evidence? What Solovine *actually* wrote was only that once Einstein and Maric married:

That event did not effect any changes in our meetings. Mileva, intelligent and reserved, listened to us attentively, but never intervened in our discussions.

(Solovine, 1956: xii, trans. A. M.)

Compare this passage to the derivative accounts. Writers have skewed the history. Solovine did not write that Maric 'occasionally' or 'rarely' contributed, nor that she was 'clearly more interested in physics than in housework'. There is no evidence that she was an active participant. In none of the correspondence between Einstein, Habicht, and Solovine, does Maric appear as a 'member' of the Academy, nor even in Maric's own letters.

So readers beware. Moreover, errors lurk even in reliable places. For example, the *Collected papers of Albert Einstein* (Klein, Kox and Schulmann, 1993: 617) state that the Academy began in Easter of 1903. But that is a mistake. The meetings began in the Spring of 1902, months before Mileva lived in Bern (see, for example, Solovine, 1956: vi).

Einstein had lively discussions with Solovine and Habicht. He also greatly enjoyed discussing his research with his close friend Michele Besso, whose help he acknowledged in his first paper on relativity. What about discussions with Maric? Consider a statement that her proponents never cite. Philipp Frank, a colleague and friend who interviewed Einstein for a biography, noted that Maric 'was taciturn and reticent' and that 'When he [Einstein] wanted to tell her, as a fellow specialist, his ideas, which overflowed from him, her reaction was so scant and faint, that often he just did not know whether she was interested or not' (Frank, 1949: 39, 44, trans. A.M.).

Checking the sources

In her book, *In the shadow of Albert Einstein: the tragic life of Mileva Einstein-Maric*, Desanka Trbuhovic-Gjuric (1969/1993: 79) claimed that the Russian physicist Abram Joffe, in his article 'In remembrance of Albert Einstein', pointed out that the 1905 papers were originally signed 'Einstein-Maric'.

Following Trbuhovic-Gjuric, Evan Harris Walker wrote a letter to *Physics Today*, published in 1991, reiterating the claim. Walker claimed that, regarding the 1905 papers, Joffe noted that '*Their author was Einstein-Mariti*' (Walker, 1991: 123). That phrase is Walker's translation from an article of 1955 in Russian. Furthermore, Michele Zackheim, in her book *Einstein's daughter* (1999: 19), stated that '*Abram F. Joffe, a Russian scientist, wrote in Meetings with Physicists: my reminiscences of foreign physicists, that three original manuscripts, including the one describing the Special Theory of Relativity, were signed "Einstein-Marity".*' Likewise, Bjercknes (2002: 195) stated that '*Joffe (Ioffe) recounts that the paper was signed "Einstein-Marity".*' Furthermore, in 2003 the claim that Joffe cited Maric's name on the 1905 manuscripts was aired in the television programme, *Einstein's Wife*. And, the companion website (see end-note 1) claims that '*there is at least one printed report in which Joffe declared that he personally saw the names of two authors on the 1905 papers: Einstein and Marity*'.

To add credibility to their claims, writers who ascribe such words to Joffe often add that he was a successful and respected physicist. Hence they attempt to argue by appeals to authority along with allusions to purported evidence. But what did Joffe actually write?

First, Zackheim and others are wrong in claiming that in his book *Meetings with physicists* Joffe claimed anything about how the 1905 manuscripts were signed. He did not even claim to have ever seen them. As for the article 'In remembrance of Albert Einstein', published in 1955, it was an obituary for Einstein. Literally translated, it reads:

In the year 1905, in Annals of Physics, there appeared three articles, thereupon beginning three most important, relevant directions in the physics of the 20th century. Those were: the theory of Brownian motion, the photon theory of light and the theory of relativity. Their author – unknown until that time, a bureaucrat at the

Patent Office in Bern, Einstein-Marity (Marity – the last name of his wife, which by Swiss custom is added to the last name of the husband). (Joffe, 1955: 187, trans. A. M.)

This passage shows that, for example, Walker's 'translation' is a gross misrepresentation: 'Their author was "Einstein-Mariti".' Likewise, a few other writers have distorted Joffe's words to make it seem as though he made a controversial claim. It is unusual that Joffe this one time happened to refer to Einstein by the name 'Einstein-Marity'. But that simple peculiarity does not entail that he ascribed any authorship to Einstein's wife. It is clear that Joffe meant that the author was one person, a male employee at the patent office, namely Albert Einstein.

Still, proponents of Maric have tried to make something out of the fact that Joffe happened to write 'Marity' instead of 'Maric'. For example, Walker claimed that Joffe just had to have seen an original paper, with the name Marity on it, because otherwise he would not have known the alternative spelling of Maric, since it 'apparently is not found in any of the *Einstein biographies*' (Walker, 1991: 123). Again, Walker was wrong. The name 'Marity' appears, for example, in Carl Seelig's well-known biography of Einstein published in 1954 (p. 29). Moreover, when Joffe first sought to meet Einstein in Switzerland, he happened to meet Maric (Joffe, 1967: 889). At the time, she used the name Einstein-Marity.

The key point remains the same. Joffe did not claim that Maric co-authored or collaborated in any of Einstein's papers. And he did not claim that her name was on the original manuscripts or that he ever saw any such manuscripts. In multiple places throughout his career, like anyone else, Joffe acknowledged Einstein for having authored the famous works of 1905.

In a particularly careless confusion, the producers of *Einstein's Wife* and the companion website pictured a fragment of a page that reads that the *articles* were 'signed Einstein-Marity', purportedly written by Joffe. But the page pictured is instead from a popular science book from 1962, by a Russian writer, Daniil Semenovich Danin, who, again, did not even claim to have ever seen the original *manuscripts* or to have known anyone who had (Danin, 1962: 57).

Suppose, imagine, that some credible individual actually had claimed to have seen manuscripts that listed Maric as co-author. Would that constitute

evidence? It would only constitute the testimony of an alleged witness. Further evidence would be required to substantiate the claim. Likewise, imagine that a famous scientist, or perhaps a wealthy writer, gets divorced. And suppose that then the ex-spouse claims to actually have been the true author of some works. Such allegation, by itself, would not constitute authorship. We might reply: 'That is a serious allegation. What evidence do you have to support it?'

Lacking evidence, some writers cultivate rampant speculations. For example, Bjercknes (2002) claims that Einstein probably stole the credit from Maric and that she, in turn, probably plagiarised the ideas from other writers.

Who really said what?

In her book, Zackheim (1999) claims that 'Mileva and Albert's son Hans Albert told Peter Michelmores, an Einstein biographer, that Mileva helped Albert "solve certain mathematical problems".' (p. 19). Is Zackheim claiming that Maric spoke with Michelmores? We must reject that impression because Michelmores never met Maric. Better syntax would be: 'Hans Albert Einstein, son of Mileva and Albert, told Peter Michelmores ...'.

Michelmores (1962) wrote that, while Einstein struggled to solve puzzles of relative motion in electrodynamics, 'Mileva helped him solve certain mathematical problems, but nobody could assist with the creative work, the flow of fresh ideas' (p. 45).

But is it true that Hans Albert really *told* that to Michelmores? We do not know. It is *conceivable* that he did. But strictly speaking, the historical evidence does not certify the claim. We know what Michelmores published. We do not know for certain what parts of it were really told to him by Hans Albert. He visited and interviewed Hans Albert for two days in February of 1962, in California. In his book, Michelmores admitted that Hans Albert never saw or proofread the manuscript for the book:

he answered all my questions, and waited while I wrote down the answers. He did not ask to check my notes, or edit my book. He trusted me. It was the sort of naiveté his father had. Thank God for all naive people, and I use the word in its noblest sense. (p. vii)

Unfortunately, when interviewees do not check writer's accounts, errors and inaccuracies often increase.

Alongside correct and verifiable statements, Michelmores book also includes incorrect information. For example, he mentioned that while Einstein studied at the Polytechnic in Zurich he befriended 'Maurice Solovine, a Frenchman taking the physics course' (p. 36). But actually, Moritz Solovine was Romanian, born and educated in Romania, until he moved, not to Zurich, but to Bern, where he met and befriended Einstein in 1902, almost two years after Einstein had graduated at Zurich. Michelmores also wrote that once Mileva fell in love with Einstein, by their final year of college, 'Her personal ambition had faded' (p. 36). But we know from letters that she remained interested in a career at least until mid-1901. Such inaccuracies detract from the credibility of an author's words.

Years ago, John Stachel, editor of the *Collected papers of Albert Einstein*, enquired whether Michelmores family happened to possess Michelmores manuscript or ideally the notes from the interview with Hans Albert. The answer was negative. If we had the notes from the interview, then perhaps we might know what Hans Albert apparently told Michelmores.

Faced with such ambiguities, each historian must decide whether to believe, disregard, or at least incorporate, a given passage into a historical reconstruction. Personally, in a manuscript that I am finishing on the origins of special relativity, I chose to incorporate Michelmores suggestive words about Mileva. But I hope that readers will realise that the sentence in question is not necessarily a photograph of the events that happened. It is but a passing claim that appears in a popular biography written by an author who only interviewed a son of the individuals in question, a biography that was not proofread by the individuals discussed in it or by the interviewee. It was written and published almost 60 years after the event in question. Hans Albert himself could not possibly testify to such an event, since he was a one-year-old baby in the spring of 1905. Hence, if he actually spoke such words in 1962, he was merely voicing a conjecture or echoing words voiced by someone else. The point is to distinguish this kind of indirect claim from evidence from the historical moment.

Several documents shed light on Maric around 1905. For example, Krstic provided this translation of a letter from Maric to her friend Helene Savic, written after the 1905 papers were published (see end-note 2):



Figure 2 Einstein with his wife and son, about 1904.

My husband spends all of his free time at home, often playing with the boy; but ... I would like to remark that this, together with his official job, is not the only work he does – he is writing a great number of scientific papers. (Krstic, 1991: 94)

As usual in her letters to her intimate friend, Mileva made no claim of working on science herself, ever since she left college. Now notice the ellipsis in the quotation above. What did Krstic omit? An uncut translation of the original letter was published later by a grandson of Helene Savic (see end-note 3). It reads:

My husband often spends his leisure time at home playing with the little boy, but to give him his due, I must note that it is not his only occupation aside from his official activities; the papers he has written are already mounting quite high. (Popovic, 2003: 88)

So we see that Krstic chose to omit a phrase in which Maric herself further acknowledged Einstein's labours; she gave him his due credit.

Likewise, on 3 September 1909, when Einstein was receiving much recognition from physicists, Maric wrote to her friend 'I am very happy for his success, because he really does deserve it' (Popovic, 2003: 98).

Box 1 Scale of likely reliability for information sources

- 1 Original notes and drafts of the scientist's labours and ruminations
 - 2 Contemporary private diaries of the scientist, peers, or friends
 - 3 Contemporary documents such as letters to friends
 - 4 Contemporary accounts of statements among scientists and peers
 - 5 Manuscripts, the original scientific work
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- 6 Early retrospective accounts by the scientist
 - 7 Early interviews of the scientist, proofread by the scientist
 - 8 Later retrospective accounts by the scientist
 - 9 Later interviews of the scientist, proofread by the scientist
 - 10 Systematic interviews by historians, psychologists, or other specialists
 - 11 Informal interviews of the scientist
 - 12 Recollections that exist only in an indirect form, such as a transcribed lecture
 - 13 Retrospective accounts that exist only in a doubly indirect form
 - 14 Late recollections by an intimate acquaintance
 - 15 Biography based on interviews, approved by the scientist and interviewees
 - 16 Account based on multiple interviews but not proofread by the interviewees
 - 17 Account of interviews with a close relative or peer, proofread by that person
 - 18 Material based partly on interviews from a relative, peer, or acquaintance
 - 19 Rough translations of biographies or sources
 - 20 Hearsay, late indirect accounts of what someone allegedly told someone else

Distinguishing among sources

Students and laypersons may lack a clear understanding of the extent to which different sources warrant different degrees of credibility. Therefore, it seems useful to illustrate such differences. Historians sometimes disagree on what weight to attribute to any one document, but I can at least sketch my own outlook.

The list in Box 1 describes some of the different kinds of information that may exist pertaining to the genesis of a scientific work. To distinguish them, I have ranked them in order of proximity to the historical event, the instance of scientific creativity. The greater the number of an item, the less credibility I would tend to ascribe to it as a likely source of precise information about that moment in time.

This list is not exhaustive. My aim is only to distinguish among some different kinds of information. The line following item 5 sets a boundary between evidence generated during the production of the scientific work and various kinds of hindsight and conjecture.

In this scale, the biography written by Michelmore falls on level 18. In contradistinction, a letter by Einstein to his friend Conrad Habicht, written in May of 1905, while he was drafting the paper on relativity, counts as evidence of level 4. That letter, which historians cite often, is a precious though narrow window to the creative moment. There are many different kinds of information between the two, to which we ascribe various degrees of reliability.

For example, in 1922 Einstein delivered a lecture in Kyoto, Japan, titled 'How I created the theory of relativity'. He delivered it in German without having written it down, and, as he spoke, it was translated into Japanese. The translator kept notes that were soon published in Japanese. In my scale, I would rank this Japanese rendition of the lecture as being of level 13. It is 'doubly indirect' in the sense that Einstein did not write it, and that we only have the version in Japanese. It is not a very late document in Einstein's life, so that we may imagine that forgetfulness perhaps did not distort his account very much. But still, the transcript was not proofread by Einstein. Less credible, for instance, might be a document placed in level 14. Consider one such example: a letter written in 1948 by Michele Besso. At 74 years of age, he asked whether Einstein's early reading of a book by Ernst Mach, following Besso's suggestion, had been at the root of Einstein's thoughts about clocks and measuring rods when conceiving the theory of relativity (Besso and Einstein, 1972: 386). Einstein replied in the negative. He acknowledged a great influence of Mach on his intellectual development in general. But he noted that his reading of David Hume, which he discussed with Solovine and Habicht, had been of greater importance (Besso and Einstein, 1972: 391).

Readers can identify how the different claims about Maric fall at various levels in the list above. Any document, even a document from level 1, can include errors, omissions, inaccuracies or even lies. Likewise, information of all kinds can include truthful claims, of course. The important point is to realise that the further a document stands away from the period it purportedly describes, the more layers of potential inaccuracy. Inaccuracies can exist in the translation, rewording, interpolation, and so forth. A letter written, even decades later, by a participant in the events in question, can still be very informative, even though placed at level 14, though we should still be careful with its contents. More so, an even later account, by someone who was not present at the events in question, involves greater uncertainties. Unfortunately, we cannot always confirm or refute all such uncertainties. But we should at least acknowledge them.

Teachers should carefully grant different degrees of trust to various sources. Most readers do not usually have the time or opportunity to research and examine the validity of a given source of information. Nevertheless, one should cultivate a moderate scepticism, especially against outstanding stories that resonate with what we would personally like to believe. We can teach students that historical claims should be inspected carefully, as when testing hypotheses in science. Too often, writers enamoured with a sensational conjecture tend to misread evidence. Too often, they seek not to test a hypothesis, but to confirm it. But what makes a good story, or plausible fiction, is not necessarily what makes good history.

End-notes

- 1 *Einstein's Wife* was produced by an Australian company, Melsa Films, in association with the Australian Broadcasting Corporation and Oregon Public Broadcasting in the United States. Website: <http://www.pbs.org/opb/einsteinswife/>
- 2 Krstic (1991: 94) dated this letter as being from 'the very beginning of 1906'.
- 3 Popovic (2003:88) dated this letter as being from December 1906, apparently following notes by Julka Savic, see p. xi. The historians who edited *The collected papers of Albert Einstein* Vol. 5 (Klein, Kox and Schulmann. Princeton: Princeton University Press, 1993) also dated the letter as being from December 1906, owing to its contents (see p. 45). Popovic's translation is a literal rendering of the original in German (copy at the Einstein Archive, item 70-724; someone wrote 'juli 1906' on the letter itself).

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