

Genius

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ABSTRACT

The article is devoted to the description of amazing and remarkable coincidences connected with the creation of the General Theory of Relativity by Albert Einstein in 1915. It also attempts to explain why the contribution of David Hilbert to the creation of the General Theory of Relativity was completely forgotten.

Introduction

Ten years had passed from the events of 1905 and the publication of „*Zur Elektrodynamik bewegter Körper*” in *Annalen der Physik* [1]. Said work became the basis for a completely new physical theory called the Special Theory of Relativity (STR). The exceptional and remarkably controversial circumstances of creation of the discussed publication were touched upon earlier [2]. During the aforementioned decade, both science and the world as such had seen a number of changes. It was autumn of 1915, the very middle of the First World War. Fierce battles had been raging in Europe for two years. Albert Einstein (1879-1953), a famous scientist, had been working on a new theory that would be a generalization of the Special Theory of Relativity for eight years. He had worked hard, but he still had not reached the satisfactory results. As an act of desperation, Einstein decided to travel to the Göttingen University. He came to the seminar of the guru of German mathematics: David Hilbert (1862 – 1943). Said decision must have been truly difficult for Einstein. He had known Hilbert very well and was aware of what he would have to face. However, he knew that he had to do that, for he had not been able to find the proper solution, so the help of Hilbert was needed. At the Göttingen University, there had been weekly seminars in physics organized by Hilbert – Debye. He acted as if there had not been a war. Yet, there was one. There were hardly any students at the university. They had been conscripted and were dying a miserable death near Marne or in Flandreau. For the remaining students who stayed at the university, the seminars by Hilbert – Debye were out of this world, for they were devoid of war, violence, and fear. They were strictly related to the ideal world of

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physical examinations [3]. Seminars in physics – or in physics and mathematics – were conducted by a German mathematician, David Hilbert and a Dutch physicist, Peter Debye. Also, an important change in the approach of David Hilbert could be seen. Earlier on, Hilbert had believed in the so-called „pure” mathematics, in contrast to his great rival, a French mathematician Henri Poincaré (1854 - 1912), who had been focusing on matters touching upon both mathematics and physics [2]. After many years and after his experiences from 1905, Hilbert probably was of the opinion that Poincaré was right and he also appreciated the importance of physics-related problems with regard to the development of mathematics. At that time, Hilbert was exceptionally interested in physics-related phenomena, hence the Hilbert – Debye seminars devoted to the issue. "Mathematics is much too hard for physicists." [3] Hilbert used to point out maliciously. Was he referring to his “friend”, Albert Einstein? Einstein decided, rather unwillingly, to attend Hilbert – Debye seminar to present his problem strictly connected with formulae describing the correlation between geometry and mass. It was September 1915.

Seminar in Göttingen

The meeting of Hilbert and Einstein became a legend and an anecdote. During the seminar in Göttingen, Einstein presented the issue he had been struggling with, whereas Hilbert humiliated him publicly! Such a behavior was unbelievable. David Hilbert had reached such a scientific status not only thanks to his mathematical talents, but also thanks to the fact that he had always known what to say and to whom. Hilbert was not a person blabbering whatever he wanted. The public humiliation of professor Albert Einstein by professor David Hilbert was exceptional. A year later, Albert Einstein would become the chairman of the German Physicist Association (*Deutsche Physikalische Gesellschaft*) after Max Planck. Similarly, such a brusque, condescending, and even brutal behavior towards a remarkable scientist was something highly unusual.

In summer 1905, Hilbert had not known a thing about the electromagnetic theory. He had had to be helped by Herman Minkowski, who probably had been the factual author of „*Zur Elektrodynamik bewegter Körper*” published in *Annalen der Physik* in 1905 [2]. In 1915, the things were different. Hilbert immediately understood that Einstein’s problem was an issue pertaining to geometry, differential geometry even. Hilbert was an expert in the field, possibly the best in the world. Even earlier, Hilbert had been intrigued by time and space geometry and had read numerous articles by Gustav Mie on the theory of relativity. David Hilbert was perfectly prepared to tackle the subject Einstein presented. After humiliating Einstein, David

Hilbert immediately started writing down a formula which is nowadays known as Einstein's field equation. Hilbert quickly solved the problem Einstein had been struggling with for many years. It was the basic equation of the general theory of relativity. Einstein left Göttingen both angry and contempt. He was angry as he had been treated harshly and condescendingly, but was also happy because he finally had his equation. It was worth visiting Hilbert and the humiliation was not in vein. Thanks to that, he could finish his new theory, which would be later on called the General Theory of Relativity (GTR). However, Hilbert, after drawing proper conclusions from the experience, did not want to give Einstein the results of his works on a golden platter.



First World War (1914 - 1918), The Western Front

Hilbert used to say that "every boy in the streets of Göttingen understands more about four-dimensional geometry than Einstein, yet, in spite of that, Einstein did the work and not the mathematicians." [3] Once during a lecture, Hilbert asked: "Do you know why Einstein said the most original and profound things about space and time in our generation? Because he had learned nothing at all about the philosophy and mathematics of time and space!" [3] Those were very harmful jokes for Einstein, whom they had to reach eventually and to whom they were addressed. Hilbert was intelligent and malicious, but it does not mean that he was lying. If Einstein had not had the slightest idea about four-dimensional geometry, how could he have come up with „his own” field equation? Einstein had not learned anything and did not know anything, so he could not have been the man behind both STR and GTR. Those were fascinating times indeed. However, it has to be stated at this point that the public humiliation of Einstein was a well-thought-out and deliberate action. Hilbert mocked Einstein, because memories of

the publication of „*Zur Elektrodynamik bewegter Körper*” ten years ago and harm that had been done to his best friend, Herman Minkowski were still fresh [2]. Hilbert could finally do what he had wanted. He was sure that Einstein would not reply harshly to that. He was right.

The answer of Einstein was quite a peculiar one: "The people in Gottingen," he said, thinking about Hilbert, "sometimes strike me, not as if they want to help one formulate something clearly, but as if they want only to show us physicists how much brighter they are than we." [3] Einstein was also an intelligent man and could have surely come up with a witty remark, but he answered in a rather moderate manner. It seems that he did not want to be malicious. Did Hilbert know something that would be problematic for Einstein? Aside from that, Einstein did not need to exchange blows with Hilbert. He was above that. At the time, David Hilbert was slowly yet surely pushed into oblivion by his younger „friend”. The fame of David Hilbert was coming to an end, whereas the popularity of Albert Einstein was constantly raising. Hilbert mocking Einstein did not show his maliciousness, but rather hopelessness.

Was it Hilbert who created the field equation? Was Einstein the one who discovered it independently? Who was first and who was second? Who was inspired by whom? David Hilbert, even though he had some flaws, could not have copied Einstein’s equation and that can be stated for sure. Were the events during the Göttingen seminar as they were later on described? Did Hilbert really write down the equation or did he provide it afterwards? Is it possible that both Einstein and Hilbert reached their scientific goals at the same time, as it has been maintained by Einstein’s propagators? When it comes to Einstein, such “independent” discoveries and “simultaneous” publications were nothing unusual. Today, it is difficult to provide an unequivocal statement. However, some facts are known. It is certain that in November 1915, yet another lucky coincidence took place. The very first one was connected with the creation of the Special Theory of Relativity in 1905, when both Poincaré’s articles and Einstein’s work were published [1, 2]. Ten years later, in 1915, there was yet another coincidence and once again – it was strictly connected with Albert Einstein and the publication of works being the basis of the General Theory of Relativity. Albert Einstein was involved in many coincidences in his life, that has to be said.

Two months after the seminar, in November 1915, both David Hilbert and Albert Einstein publish their equations almost simultaneously. They must have been in a remarkable rush to write their works in just two months. Hilbert must have made quite an effort, especially considering the fact that he had constantly been occupied with other tasks. Hilbert must have move them aside to deal with his own publication. It might have been a notable rush or a competition between two “friends”. However, it is rather non-inspiring. Experts have claimed

that the equation provided by Hilbert had more finesse to it than the one Einstein came up with. Their formulae were notably different. The explanation of that difference is remarkably simple. In Göttingen, Hilbert presented Einstein with an equation being the first solution to the problem. Later on, Hilbert started working on it and found a more elegant form of it, which was not presented to Einstein, hence the difference. The similarity of publication dates cannot be neglected as well. Einstein presented his works entitled "On general relativity theory" at the Prussian Academy in Berlin on 11th November and his major work, „*Die Feldgleichungen der Gravitation*” (Equation of the gravity field), on 25th November [4]. David Hilbert presented his results in the “Die Grundlagen der Physik. (Erste Mitteilung)” (The foundations of physics) that was issued to the Royal Scientific Association in Göttingen on 20th November 1915, five days before Einstein [5].

As the paper tackles the history of physics, the author would like to touch upon the field equation briefly.

$$R_{\mu\nu} - \frac{1}{2}Rg_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4}T_{\mu\nu} \quad (1)$$

where: $R_{\mu\nu}$ is the Ricci tensor, $g_{\mu\nu}$ is the metric tensor, $T_{\mu\nu}$ is the stress-energy tensor, Λ is the cosmological constant, R is the scalar curvature, G is the gravitational constant. In general terms, it can be stated that the formulae specifies the correlation between time and space and energy (mass). Humanists may consider the equation to be similar to Egyptian or Greek hieroglyphs. It is widely known as Einstein’s field equation (1). Why Einstein’s? It was presented by both Hilbert and Einstein. Should it not then be called Einstein-Hilbert’s or Hilbert-Einstein’s equation? Should it not be just Hilbert’s equation? The refusal to acknowledge the achievements of the German mathematician and his impact on the development of the General Theory of Relativity is remarkably unfair. It seems that David Hilbert deserved the equation (1) to be called at least Hilbert – Einstein’s or even Hilbert’s equation.

What an intriguing coincidence it was. Albert Einstein had been working on his new theory for eight years without finding the fitting solution. He then went to Göttingen for a seminar and returned with a ready equation. Suddenly, he had the right idea. It was a miracle. But when had the miracle happen? On the train to Göttingen? Obviously on the train to the place not from it. In 1905, young Einstein had been commuting to work by tram and had been thinking about what would have happened to a man trying to chase a tram riding at the speed

of light while running at the speed of light himself. That is how the Special Theory of Relativity had come to be. Was it then not possible for Einstein to come up with the field equation on a train to Göttingen? Why would it be impossible? Train or streetcar, no matter. Everything could have been yet another inspiration for the genius. Of course inspiration in the right company.

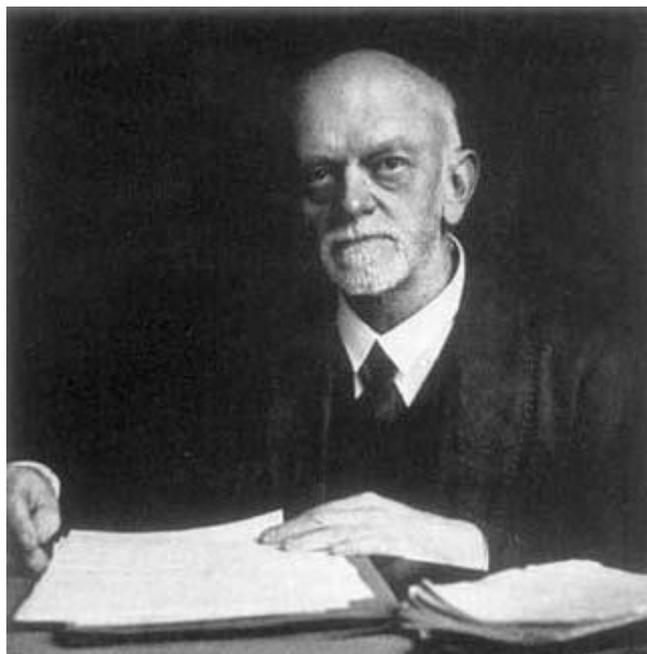
After the events of 1915, David Hilbert and Albert Einstein maintained their relation, which seemed to be full of respect and friendliness. Still, they had more in common with each other than they had earlier (1905). They exchanged rather polite correspondence and behaved properly towards each other, while still being a bit malicious. Officially, the great German mathematician, David Hilbert supported and admired the German physicist, Albert Einstein and the other way round. In fact, however, they were constantly fighting for leadership. There was one notable difference between them. David Hilbert did not forget to give credit to Einstein. He claimed that the idea of GTR was Einstein's one. The thing was different with Einstein. He remained silent with regard to the topic of Hilbert's contribution to „his” discovery. In his work entitled „*Die Feldgleichungen der Gravitation*” (Equation of the gravity field) [4] of 25th November 1915, Einstein did not mention Hilbert or any other scientist. The work did not include biography or references for that matter. It could be therefore assumed that Einstein had discovered everything by himself, as well that there had not been a seminar in Göttingen, as well as no meetings and brainstorming with Hilbert. Even if the idea had truly originated in Einstein's mind... the case is similar in life, science, or sports. It does not matter who is first at the start of the race or who puts the most effort. The one who crosses the line first, the winner is the one that matters.

Einstein published his article in *Annalen der Physik*, the most prominent scientific magazine then. After the death of Henri Poincaré in 1912, Hilbert was considered to be the brightest mathematician alive, even though his work had appeared in a relatively unknown Göttingen magazine. Since the very beginning, Einstein had had it better in the pursuit of fame and the title of the creator of the General Theory of Relativity.

David Hilbert knew Albert Einstein well and was aware of the fact that if he failed to publish his findings, Einstein would never mention his contribution, hence the haste. It can be compared to attending a meeting with a notorious person. Even though there are no evidence, it is known that after such person's visit, small valuable items tend to go missing. If one cannot avoid the meeting, then after its conclusion one just has to check one's wallet and specify whether precious possessions are still there. Nevertheless, Hilbert could not have expected that his work and achievements would be completely forgotten and that his findings would be afterwards ascribed to Einstein.

Many years later

First World War finally ended and the era of peace started. Those were extremely turbulent times in Germany. In 1933, Adolf Hitler, the leader of the National Socialist German Workers' Party (*Nationalsozialistische Deutsche Arbeiterpartei*, NSDAP), became chancellor and shortly afterwards gained absolute power, transforming Germany into Third Reich (*Drittes Reich*) or officially - into *Deutsches Reich*. David Hilbert was still a mathematics professor at the Göttingen University at the time. He is currently rather forgotten, which is a shame for he is surely worth remembering. David Hilbert, a brilliant mathematician, was an egocentric and arrogant person, as well as an intelligent and malicious scholar. Hilbert loved his family, mathematics, his work, and the city of Königsberg in East Prussia, where he had been born and raised. He also loved his homeland – Germany. His son, Franz, who was to inherit the family name, fortune, and fame, turned out to be mentally ill. A mental illness had damaged his mind, eradicating all the higher feelings. At the beginning of April 1945, the Red Army captured Königsberg after two months of fierce fights, just to turn it into a pile of debris. The town of Königsberg, the hometown of Emmanuel Kant and David Hilbert, was replaced by a new, Soviet one, which is known today as Kaliningrad. Germany turned into a blood-thirsty monster and by committing atrocious actions, it was fighting for life or death. The country lost the war and become hated, disrespected, and despised. Family, homeland, city of childhood, so-called “friends”. Only mathematics do not betray him.



David Hilbert (1862-1943)

David Hilbert died on 14th February 1943 in Göttingen, at the age of 81. Two years later, at the beginning of 1945, his wife, Käthe died. What is interesting, their son, Franz, survived the reign of Führer Adolf Hitler. German authorities followed the „scientific” theory of eugenics decided that individuals that were mentally ill or handicapped were unwanted in the better, new Germany, so they were to be eliminated within the framework of the T4 Action (*Aktion T4*). German doctors issued lists of ill individuals and German nurses gave them a poison, starved them to death, or sent them to such units as the one in the Sonnenstein castle, where they were gassed en masse. The T4 Action was especially brutal in the area of occupied Poland. According to German authorities, the life of a Pole or a Jew was worth nothing. The existence of handicapped sub-humans was considered to be worth even less, less than zero. They were believed not to be worthy of food, so the authorities cancelled all funds devoted to treating and feeding the ill and the handicapped for them to starve to death. Polish personnel employed in hospitals tried their best to keep such people alive. What is more, local people provided support as well. Hospitals were full of thin, yet still living people. Mass murders of mentally ill individuals started quickly after German conquest of Poland. German police or SS forces surrounded hospitals, forced the patients out, and let them to nearby forests to be shot. Both dead and still living people were thrown to freshly dug up holes in the ground and buried. Germans frequently came as far as to murder the personnel of a given hospital as well, namely – doctors, nurses and so on. To efficiently murder handicapped individuals, Germans also utilized temporary gas chambers and gas trucks, which were also useful for testing new mass murder techniques. A German driver was driving slowly for the exhaust gases to choke the patients/prisoners. Below, there is only a short, incomplete list of mental hospitals together with the estimate number of victims, for exact number are frequently unknown: Świecie – 1350 (September/October 1939), Dziekanka – 2080 (December/January 1940), Kościan – 3334 (January/February 1940), Chełm Lubelski – 440 (12th January 1940), Kochanówka – 690, Kobierzyn – 500, Międzyrzecz – 10000, etc. German patients were also transported to occupied Poland to be murdered during mass executions, while at the same time ensuring their families that it was just a temporary „transport to the East”. Germans killed everyone: men, women, the elderly, teenagers, and kids. Things happening in Polish mental hospitals under German rule made the most famous, modern horrors look like decent fairytales in comparison. The T4 action was just one of the many genocidal crimes that Germany committed during the Second World War like mass murder of Jews, Poles, soviet POWs, and so on.

Nevertheless, the aim of the paper is not to dwell on that. Several month later, similar methods – tested while murdering mentally ill Poles – were used by Germans on a much wider

scale while murdering Jews. The slaughter of Jews is commonly known, but it has to be mentioned that it had been preceded by the murder of ill and handicapped Poles. One also should notice a vital difference. German psychiatrists, neurologists, and pediatricians killed their patients, whereas Polish ones tried to help them and frequently chose death together with them. There is a long list of Polish psychiatrists murdered by Germans. Only few of them survived the German occupation. On the other hand, German doctors had the time of their lives. After the war, the practitioners who had murdered their patients were requested to treat their **new** ones. They also delivered speeches during scientific conferences, wrote numerous articles, published medical guidebooks, and were considered to be paragons worth following. There is a reason why German science, including medical sciences, is so advanced.

Surprisingly, Franz Hilbert survived the aforementioned bloodbath. When Franz had started suffering from a psychosis and had been sent to a hospital, David Hilbert had said that he had had no son anymore. It seems that his wife, Käthe Hilbert, saved the son [3]. She did her best for influential authorities to forget about the existence of Franz Hilbert. His mother saved him from a shot, a lethal injection or from starvation. Franz Hilbert died in 1969. It is often stated that exceptional scholars and artists live in separation, in isolation, in an ivory tower. If so, then the walls of such a tower are as thick as paper. Hilbert had to deal with some problems as well. The authorities were suspicious of his seemingly „Jewish-sounding” name. David Hilbert presented his family tree to prove that he was of Aryan descent. The life of unique scholars and artists is frequently interwoven with the one of ordinary people and their „splendid isolation” is frequently nothing more than just a mirage. It does not mean that David Hilbert was against the ruling party, for he was not. Adolf Hitler was elected chancellor on 2nd August 1934. A day earlier, German newspapers published statements of domestic scientists expressing their appreciation towards Adolf Hitler. Among the signatures of such scholars, the one of David Hilbert can be found [3].

When David Hilbert was dying, the remains of the German 6th Army capitulated after being surrounded by the Red Army in Stalingrad. A millionth armies fought on the eastern front. In the German Konzentrationslager (concentration camp) Auschwitz – Birkenau, works on buildings four new crematoriums and gas chambers were highly advanced. The objects were opened from March to June 1943. The Holocaust mechanism threw a higher gear. Slaughter and terror reigned supreme on territories occupied by Germans, especially in the “Heart of Darkness” on Polish lands under German occupation. In occupied Poland, the T4 Aktion had almost finished. All the mentally ill and handicapped individuals, as well as the majority of Polish Jews had been murdered. Fights were fought on all fronts, thousands of tons of bombs

were dropped on German cities and industrial centers, both during the day and at the nighttime. It should not be surprising that with all the discussed events happening, with all the murders and fights, the death of an old German professor from Göttingen went completely unnoticed. However, Albert Einstein, living in a calm and safe neighborhood in Princeton, USA, made a note of it. What did he feel then? It was possibly relief. His great nemesis finally passed away. At first, there had been Herman Minkowski, then Henri Poincaré, and afterwards David Hilbert – with the last one being also the most dangerous one. Einstein finally felt safe and free. After Adolf Hitler becoming chancellor in Germany, Albert Einstein, together with his wife, assistant, and secretary, moved to the USA for good, leaving Germany behind.



Adolf Hitler (1889 - 1945)

Albert Einstein was one of many emigrants from Germany. There were many of them. It was the exodus of brilliant minds: physicists, mathematicians, chemists, and other scholars. Einstein was the most prominent and most well-known. He became a shorthand for people forced to leave Germany. Some of them were of Jewish descent and had to flee, but some others were not affiliated with Jews in the slightest. All of them felt the same hatred towards Hitler and his National Socialist German Workers' Party. Hitler's coming to power polarized and differentiated the environment of German scholars. It was not a unified bunch of 1905 and 1915 anymore. All of them had to choose: to leave Germany or to stay and collaborate with the national and socialist government of Germany. It was not easy to choose between lectures in Berlin or in London between working at the Göttingen University or Princeton one. It was a

choice between good and evil. However, and as the T4 Aktion showed, only one choice was the right one.

Scholars, including physicians, were (and are) either directly or indirectly financed by the government. Every researcher willing to stay in Germany had to collaborate with it. Many individuals were against that. Some others who decided to do so later on regretted their cooperation with the murderous German state. One of them was David Hilbert. Scientists who left the country, such as Albert Einstein, made the right choice. Emigrants from Germany together with later escapees from the burning of Europe. They created the power of American science. In 1905, American universities were of negligible quality. In 1915, they were below average. Up to 1933, they were comparable to educational units operating in Denmark or Italy. After 1933, they became considered the pinnacle of education and science. American universities started to be the leading ones and English became the language of science worldwide. Such a state of affairs continues and will probably continue. The reign of Adolf Hitler was a success for the United States of America. Individuals who fled Germany, as well as their children and grandchildren have ruled the international world of science. Their symbol has been Albert Einstein. Scholars who decided to stay in Germany, such as David Hilbert, Max Planck, and Werner Heisenberg, they all lost their opportunity. The more atrocious were the acts of the Germans, the greater was the defeat.

After 1933, as well as after German war crimes and genocide, David Hilbert simply had to lose to Albert Einstein with regard to the General Theory of Relativity. The achievements of the former became forgotten quite quickly.

A true genius

Paradoxically, thanks to Adolf Hitler the German chancellor, Einstein won the race and became the greatest genius of all time. After 1933, German government started a strong propaganda against the so-called „Jewish science”, the side effect of which was the exodus of scholars who decided to leave Germany. Albert Einstein started to be the synonym of Jewish science and the main victim of propaganda-related attacks. The Minister of Propaganda, Doctor Joseph Goebbels was a liar and cynic, but surely was not a fool. He probably knew about the circumstances of „Zur Elektrodynamik bewegter Körper” publishing in 1905, but he could not disclose them. It must be terrible situation for Dr Goebbels. He had to be silent. The disclosure of the truth would not only humiliate the despised Jew – Albert Einstein, but also prominent German scientists, such as Max Planck and David Hilbert, who were the faces of “pure and honest” German science. Goebbels’ propaganda was hopeless in its anti-Semite attacks against

Einstein. The rulers of the Third Reich even set a reward – 5000 dollars for a person who would kill Einstein. It was a lot of money back then.

However, the effect was far from the expected one. The anti-Semite campaign of the Third Reich, full of bile and lies, convinced honest people that Einstein was an innocent victim of Nazi regime and that people accusing him were the worst human beings alive. It crystalized the myth of Einstein being the greatest genius in history. The achievements of German mathematician David Hilbert, who collaborated with the Nazis, were neglected and quickly forgotten. It was a similar case to Henri Poincarè, whose works were forgotten as he had insisted on publishing them in French only. Albert Einstein won the memory of future generations whereas Hilbert and Poincarè lost. The shadows of two big rivals: a German and a French, were finally united in the shadows of oblivion.

Einstein was lucky. As some may say: he was born with a silver spoon in his mouth. However, Albert Einstein also heled his luck very skillfully. The rule of Adolf Hitler and his party brought despair to Europe and to Germans, as well as the death of millions of people, including Jews with them. Nevertheless, some people won, Jews among others. The USA as a country won. The victory was also achieved by some individuals. It has to be that way. One has to lose for the other to win. There is no misery that would not be an opportunity to some other person. Some gained profit even from mass murders and executions as well. Up to 1933, Albert Einstein worked as a **German** scholar. When Hitler started ruling the country, he became an American, **anti-German** scientist. The man had a lot of luck. Contrary to what some may think, the rule of Adolf Hitler was very beneficial for Einstein, even though the Nazis killed some of his relatives. Einstein was as huge an egocentric as Hilbert. Had he stayed in Germany, he would have been killed without a doubt. However, in the USA, in the country of the free, there was no one to discredit Einstein's genius and prove that he was not the creator of the General Theory of Relativity or Special Theory of Relativity. People who knew the truth went silent. The non-believers stopped asking. The rebellious ones started being called Nazis or anti-Semites to stop them talking. Albert Einstein became the greatest scholar in history. He became an idol, the symbol of the 20th century. He was the protagonist of many films, cartoons, books, and comics. He was the pride of the USA. America won and once again showed that it was the best country of all. Also, it had the biggest genius of them all – Albert Einstein.

Albert Einstein was the only one to left on the stage. He was alone, at the top. When information about the death of Hilbert reached him, he surely felt relief, but maybe a bit of pity as well. Together with the death of an enemy, a part of a person dies as well. In 1943, in the fourth year of the Second World War, David Hilbert could not discredit the position of Albert

Einstein, but the fact that he was alive was a nuisance. Afterwards, the past was gone. The only one person remained. Albert Einstein, the greatest genius in the history of the humankind.

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