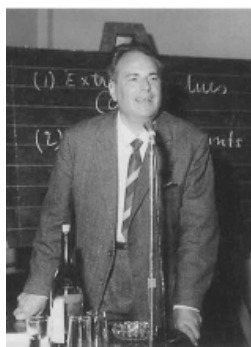
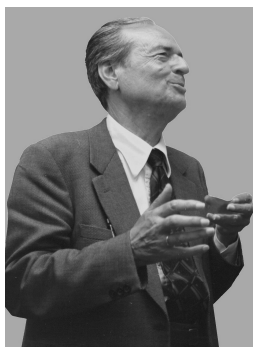


## Bruno de Finetti, an Italian on the Border

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*The German translation of my work on probability means a lot to me because both my parents and grandparents were Italians but Austrian citizens. My father, engineer Walter von Finetti, planned and directed the construction of the Stubaitalbahn Innsbruck–Fulpmes, and I was born at that time in 1906 in Innsbruck where I lived for 5 years.*

*The first book I read on Probability was German: Czuber's "Wahrscheinlichkeitsrechnung".*

*Because of my attitude and my way of thinking Italians consider me a German. On the contrary Germans consider me Italian and in fact I feel so.*

*The conflicts between these two populations went on for many centuries and this should never be forgotten, but remembering it must never be bitter. On the contrary it must be an advice so that the tragic events of the past will not be repeated and will at most be heroically idealized like the Trojan wars. Both players: Andreas Hofer and Cesare Battisti and many others on the north and south of Brenner will not have died in vain because Independence and Rights of People were their common concern.*

This is the preface written by Bruno de Finetti in 1981 for the German edition of his Theory of Probability. Probably somebody may find these words difficult to accept even today and probably it took him a whole life to arrive at writing these words.

### On the border between two nations

If we analyze the 79 years of his life we discover that he spent 44 years in Innsbruck, Trento, Trieste and under Austro-Hungarian Empire, for the first 12 years of his life.

The origins of the Finetti family seem to be found in Siena, but the von Finetti appears as a noble family in a draft dated 1672–1777. On December 17, 1770 Maria Theresa conferred in Vienna knighthood on one of the ancestors for merits deserved "in jure publico" and precisely for the tax reform she promoted.

When after the First World War the existing and functioning administration was changed to the inefficient Italian bureaucracy, patriots began to regret Austria in this respect.

Bruno was of course educated to love Italy and as he will recall, irredentism was especially alive in his grandmother Anna Radaelli, a niece of Carlo Alberto Radaelli, who participated in the defence of Venice in 1848–49. So the little Bruno who spoke both Italian and German started his personal war against Franz Joseph refusing to answer his German nurse when she spoke German to him.

In 1869 Anna Radaelli married Giovan Battista de Finetti, a civil engineer, member of the Association of Hungarian Engineers, working in Austria and Hungary at the railways Trieste–Fiume and Trieste–Pola. In the years 1880–1884 he worked for the Arlbergbahn. In the following years he will have worked mostly in Trieste. His first son (the father of Bruno) who was born in Fiume in 1871 studied in Innsbruck and then at the University of Graz becoming an engineer. In this way he learned a perfect German and could start working for the Ybbstalbahn. Then in 1899 he returned to Innsbruck and started working for the Stubaitalbahn. He became a friend of Francesco Menestrina a young man approximately of his same age, that had studied at Graz University and was appointed a professor of law at the newly opened Italian University in Innsbruck (1901). The day of his prolusion there were incidents caused by young

Austrians against the Italian University and confronted by Italian students coming from Graz headed by Cesare Battisti. Before being dismissed in 1904 he was visited by his sister Elvira who then met Walter de Finetti. They married in 1905.

The very day of the birth of Bruno his father started a diary. It gives us a very complete and detailed story of his physical and intellectual development but also states the attention paid by his parents to their son.

The five years spent in Innsbruck were the happiest for the family: they walked in the Hofgarten or along the Inn River to reach the theatre; sometimes they went to Trento and Trieste to meet Bruno's grandparents. In Trento Bruno was very much impressed by the big statue of Dante and he used to imitate his posture: for sure he knew the story of the statue and the meaning of the right hand pointing to Italy. In Trieste he saw the sea for the first time and easily learned how to swim. Once he was taken to Bruneck to give the first strike to the construction of one of the many railways that his father Gualtiero (Walter), an appreciated civil engineer working for the Joseph Riehl (1842–1907) enterprise operating in Tyrol, was going to build. It seems that Bruno took very seriously his job and that he would have liked to continue the excavation ... He was 4 years old when a Hungarian man travelling on the same train decided to take note of his name convinced that ... he will become a great man: "*Der wird ein großer Mann werden*".

In 1911 Gualtiero moved his family to Trieste to be near his parents who were becoming old but there he died in 1912. His wife Elvira, pregnant again, decided to move to Trento where her family lived to get their support. Bruno was admitted to the second class thanks to the many things he had learned from his father and he did very well in school.

Because of the First World War he had to leave Trento and the school and kept studying by himself. At the end of the war in 1919 he returned to Trento and was admitted to the third class of gymnasium. Owing to a very serious infection he had to be operated and he got one leg shortened by 7 centimetres. He was out of school for the whole year but kept in pace with the program by himself. Before he had just time to see the arrival in Trento of the tenth *Giro d'Italia* (Tour of Italy) with his idol Girardengo, and enrolled in the Boy Scouts Association headed by Giggino Battisti, the son of Cesare Battisti, the Italian martyr he admired both for his socialist ideals and for his fierceness at execution.

The economic situation of his family became even worse owing to the unfavourable exchange rate of Austrian crowns into liras. To gain one year Bruno studied in summer 1923 the program of the last year of high school and in October he passed the examination and immediately enrolled at *Politecnico di Milano* to become an engineer like his father and grandfather.

## On the border of many branches of science

After finishing the first two years, he attended some lectures of Analysis and discovered to be more interested in the courses of the faculty of Mathematics. He immediately wrote a letter to his mother asking the permission to shift to Mathematics but he got a negative answer, she was worried about his future. Two more moving letters

*... Mathematics is not by now a field already explored, just to learn and pass on to posterity as it is. It is always progressing, it is enriching and lightening itself, it is a lively and vital creature, in full development and just for these reasons I love it, I study it and I wish to devote my life to it ...*

did not have the desired effect. Bruno sent to his mother a very eloquent one-word cable

### OBBEDISCO

same answer given by Garibaldi to Vittorio Emanuele II in 1866 when ordered to stop the conquest of Trento. Sure the disappointment was the same but he stayed at the *Politecnico* for one more year.

It was during this third year that he wrote a work on population genetics that was examined by a biologist, a mathematician, a statistician and finally published in *Metron* in 1926. His first publication was immediately appreciated on the other side of the Atlantic Ocean:

*I have noted with interest your important paper ...*

writes Alfred J. Lotka to "Professor" de Finetti who answered to be still a student.

The promise of a position in Rome at the Italian Central Statistical Institute founded and directed by Corrado Gini convinced his mother to give her permission, so Bruno graduated in Applied Mathematics in 1927 and immediately went to Rome accepting the promised job at the Italian Central Statistical Institute: it was too important for him to start earning to sustain his family. Rome was at that time a centre of attraction for scientific research and Bruno's hope was to have the opportunity to get in touch with it.

In fact, the three years he spent in Rome were the only ones for a long time when he could contact the big outstanding professors of the University of Rome like Enrico Fermi and his group of assistants at that time working at the experiments that would earn them the Nobel prize, like Guido Castelnuovo, who in a letter dated July 28, 1928 writes

*I feel sure that you will be able to give important contributions to Probability Calculus and its applications*

and in September that same year Bruno would present *Funzione caratteristica di un fenomeno aleatorio* at the International Congress of Mathematicians held in Bologna. A summary of his presentation was published already in 1929 in the U.M.I. Bulletin, but the full version appeared in 1931 so this is why you celebrate this year the 80 years of his representation theorem.

This International Congress gave him the opportunity to meet many important foreign mathematicians, including, Jacques Hadamard, Maurice Fréchet, Aleksandr Khinchin, Paul Lévy, Jerzy Neyman, Octave Onicescu and George Polya. In 1929 Hadamard in a letter to Giulio Vivanti will write:

... *je suis tout convaincu de son valeur. Je serai très heureux de le voir à Paris avec nous.*

With Fréchet the young Bruno had a polite dispute in the 30s that did not prevent him to be invited in Paris on May 1935 to give five lectures on probability at the Institut Poincaré.

In 1937 most of them will meet again in Geneva for the famous Colloquium on Probability.

Even if his job at the Central Statistical Institute did not completely satisfy him (at the end of 1929 he started to contact Assicurazioni Generali) the three years in Rome were decisive for his future ... also because there he met Renata, his future wife, and sure less important he became a fan of the Rome soccer team.

In 1931 he moved to Trieste and started working for the "Assicurazioni Generali", an insurance company. There he worked as an actuary and also on the mechanisation of some actuarial services. This probably contributed to make him one of the first mathematicians very aware of the possibilities offered by computing machinery. In the following years, he supplemented his work with several academic appointments, both in Trieste and Padua.

Then, starting from 1946, he dedicated himself to the academic activity as full professor at the University of Trieste, initially in the Faculty of Science and then in that of Economics. Even if World War II was over it was a very painful period of time for Trieste, that became a Free Territory ruled by the Allies while waiting to know the final destination. A condition particularly painful for my father worrying to become again an Italian citizen in a foreign country.

In 1950 Bruno got a Fulbright grant to visit the United States for three months. At this occasion he studied English with a young officer of the U.S. Army stationed in Trieste. He visited several places: in Cambridge, Massachusetts, at the International Congress of Mathematicians, in Berkeley at the second Berkeley Symposium to present a paper on *Recent suggestions for the reconciliation of theories of*

*probability*. Neyman received him with great friendship and promoted his membership to the International Statistical Institute. Neyman was one of the three names; the others were Castelnuovo and Fréchet who, beside Jimmy Savage, my father mentioned in his Farewell Lesson. At important occasions they gave him the possibility to explain his ideas even when in contrast to their own. This is what my father appreciated the most.

In 1954, he moved to the Faculty of Economics at *La Sapienza* University in Rome.

When in 1961 the Faculty of Science decided to resume the chair of Probability for him that had been created for Guido Castelnuovo but discontinued when he retired, the main concern of my father was that the same thing might happen when he would leave. Luckily that wasn't the case.

For his enthusiastic involvement in the teaching of mathematics he was appointed President of Mathesis and became Director of *Periodico di Matematiche* in 1972; he invited Polya for a conference and during the stay of Polya in Rome they prepared a documentary to teach mathematics at school. The protagonist was an animated pupil who got the name of *Giorgetto* (Little George) after George Polya. While Polya himself acted in the movie asking questions, Giorgetto animated by de Finetti answered by means of a succession of slides illustrating the steps to reach the solution.

Up to now I have mentioned his relationship with the mathematicians he met in Bologna, but it is time now to talk about another mathematician that I mentioned before and that he met on the occasion of the second Berkeley Symposium (1950): Jimmy Savage.

*Recent suggestions for the reconciliation of theories of probability* was the title of de Finetti's communication at the Symposium. I presume that Savage must have found something interesting and to better understand and deepen the ideas of Bruno he invited him to Chicago. Chicago was not a foreseen stop in Bruno's itinerary in USA, but to find somebody interested to discuss his ideas was an opportunity not to be lost because at that time there were not many people who paid attention to his view about probability. By the way this gave my father the pleasure to meet again Fermi and sadly enough that was also the last one.

That first encounter started an intense correspondence and frequent meetings. In 1957 de Finetti was again in Chicago as visiting Professor and this time also his family joined him. I remember how the Savages took care of us to make our stay as pleasant as possible. More often were the Savages to come to Europe especially for sabbatical years and Jimmy started to learn Italian to better communicate with my father. This gave rise to very amusing mistakes like for instance *carta bollata* (marked paper) becoming *carta bollita* (boiled paper). All contributed to create a very friendly

atmosphere between the two families and of course especially between Bruno and Jimmy. I remember their endless conversations and also our meeting in Bucharest in September 1971 at the Congress on Logic, Methodology and Philosophy of Science where Savage was an invited lecturer. The title of his talk was *Probability in Science: A Personalistic Account*. In Bucharest we met also Octav Onicescu, the founder of the Romanian school of probability theory and of the school of statistics. Onicescu and de Finetti first met in Rome at the beginning of their career when both lived there. Later they saw each other in 1937 in Geneva and again in Rome in the 60s.

Few months after the Congress in Bucharest the sudden news of the death of Savage came as a shock to my father, who lost the only person able to fully understand his view on probability and to adhere to it, and ended a twenty years long and fruitful correspondence.

In April 1973 my father received an invitation from the University of Michigan for the year 1973–74. I think it may be of interest to read part of the answer of my father declining the invitation:

*... I am very pleased and honoured for such attracting invitation and for the interest in my research ... and in my point of view about subjective probability. I would be surely willing to support it, especially in your University where L.J. Savage spent several years of his admirable activity ... I am involved in many programs here, highly depending on myself (my collaborators are too young to be fully responsible for the courses).*

In the already mentioned 1976 Farewell Lesson, Bruno evaluates the importance of Savage for the acceptance of his ideas:

*I must stress that I owe to him if my work is no longer considered a blasphemous but harmless heresy, but as a heresy with which the official statistical church is being compelled, unsuccessfully, to come to terms ...*

It is also worth considering his vital interest in economics and social justice, as well as his struggle against bureaucracy.

Bruno de Finetti's interest in economics was innate and led him, during his first year at *Politecnico di Milano*, to attend the lectures given there by Ulisse Gobbi. These, in turn, confirmed him in his radical position, which he himself summarised as follows in an autobiographic note:

*... the only directive of the whole of economics, freed from the damned game and tangle of individual and group egoisms, should always be the realisation of a collective Pareto optimum inspired by some criterion of equity.*

His longing for social justice caused him, in the 1970s, to be candidate in several elections and also arrested for his antimilitarist position. On the other hand, for his work in the field of economics in 1982 he was awarded a degree *honoris causa* in Economics by the LUISS University of Rome and received a broad international appraisal. In 1985 the Nobel Prize winner Franco Modigliani was asked which Italians would deserve the same prize, he indicated Paolo Sylos Labini and Bruno de Finetti.

More recently it came in the words of Mark Rubinstein:

*it has recently come to the attention of economists in the English speaking world that among de Finetti's papers is a treasure trove of results in economics and finance written well before the work of the scholars that are traditionally credited with these ideas ... de Finetti's 1940 paper anticipating much of mean variance portfolio theory later developed by Harry Markowitz.*

Markowitz himself, the 1990 Nobel Prize laureate in Economics and founder of modern finance recognized:

*it has come to my attention that, in the context of choosing optimum reinsurance levels, de Finetti essentially proposed mean variance portfolio analysis using correlated risks.*

His last participation at an International Conference was the one on Exchangeability in Probability and Statistics, held in Rome in 1981 to honour his 75th birthday. At that occasion professor Reinhard Viertl who was born in Hall discovered that Bruno was born in Innsbruck and so devised to organize an International Symposium on Probability and Bayesian Statistics in Innsbruck to honour his 80th birthday in 1986. On January 1985 the first announcement arrived and my father filled in the form indicating he would submit a paper and he will be accompanied by *Frau* and *Tochter*. He could not maintain the promise; he died on July 20, 1985. My mother and I were there and the Symposium became in Memoriam of Bruno de Finetti.

The last time he was in Innsbruck was in 1973. He had to move to Vienna in August to present his paper *Bayesianism: its unifying role for both the foundations and the applications of statistics* at the Session of the International Statistical Institute. We decided to drive there by car and the first stop was in Trento to visit our relatives and then in Innsbruck. We saw the house in Adolf-Pichler-Straße and took the train to Fulpmes and then we were in Igls and went to Hungerburg, where at Easter 1911 Bruno got lost, and then to Hall, Salzburg, Lienz and finally Vienna, the Capital of the Austro–Hungarian Empire that for centuries had organized a fruitful synergy among multiple ethnics concurring in the commonwealth. For my father it was really a travel in the past.