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Ladislaus von Bortkiewicz - statistician, economist, and a European intellectual

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Abstract

Ladislaus von Bortkiewicz (1868 - 1931) was a European statistician. His scientific work covered theoretical economics, stochastics, mathematical statistics and radiology, today we would call him a cross disciplinary scientist. With his clear views on mathematical principles with their applications in these fields he stood in conflict with the mainstream economic schools in Germany at the dawn of the 20th century. He had many prominent students (Gumbel, Leontief, Freudenberg among them) and he carved out the path of modern statistical thinking. He was a true European intellectual with a career path from St. Petersburg via Göttingen to Straßburg and finally the Berliner Universität, now Humboldt-Universität zu Berlin. He is known for the precise calibration of insurance claims applying the - at that time hardly known - Poisson distribution to Prussian horse kick and child suicide data. He proposed a simple solution to the Marxian transformation problem and wrote numerous articles and books on the mathematical treatment of statistical (including radiological physical) data. In this article we sketch his life and work and point out the prominent role that he has in today's statistical thinking.

Key words: History of science, Statistics, Horse kicks, Bortkiewicz
JEL classification: N01, D02, B14, B16

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1 Introduction

On 16 July 1931 in an obituary for the Berlin newspaper "Vossische Zeitung", Ock (1931) wrote: *"Bortkiewicz war ein Meister der Wahrscheinlichkeitsrechnung. Die Beherrschung dieser Wahrscheinlichkeitsrechnung, die er auf Versicherungswissenschaft und Bevölkerungslehre genau so anwandte wie auf naturwissenschaftliche Gebiete, besonders auf die radioaktive Strahlung, trug dazu bei, Bortkiewicz den Ruf als einen der fähigsten Statistiker der Welt zu schaffen."*
(Bortkiewicz was a master in theory of probability. The containment of this theory of probability allowed him to apply it to the insurance science and the theory of population as well as on topics in science such as radioactivity; this led him to have the reputation as one of the most capable (competent) statistician in the world.)

About 30 years later one of Bortkiewicz's students, Emil Julius Gumbel (1891-1961), underlined: "He was one of the few representatives of mathematical statistics in Germany and as such a lonely figure, highly respected but rarely understood" (Gumbel (1968), p.128), and pointed out: "His writings stimulated numerous scientists in Germany, in the northern European countries and in Italy, but not in England." (Gumbel (1968), p.130)

These quotations demonstrate that Ladislaus von Bortkiewicz (LvB) was in fact one of the founders of statistical science as we know it today. What was this topic - statistical science - in the early 20th century? How was it linked with the development of scientific disciplines like economy, political sciences and mathematics? How and what did LvB contribute to this development? These are questions, that we would like to answer and thereby shed some light on the development of statistics in the early 20th century.

Statistics as a scientific discipline like, for example, physics or medicine, meaning statistics as a science with its own fundamental laws, its own technology and methods was defined at the end of the 19th century. The foundation of the International Statistical Institute in Brussels in 1889 was one of the important element of this development. In central Europe it took a little while longer to establish statistics firmly in the curriculum universitas. The importance of this science was made evident when the German Statistical Association was founded in June 1911. Georg von Mayr (1841-1925) became it's first president and he was

the president until his death in 1925. When he was honoured in 1911, it was written about statistics: who pointed it out on the occasion of the foundation of the German Statistical Association on 7 June 1911 in Dresden:
„Die Statistik nimmt heute auf weiten Gebieten des öffentlichen Lebens eine Achtung gebietende, einflussreiche Stellung ein. Reich, Staat, Kommune, Allgemeinheit, Privatwirtschaft, Wissenschaft bedienen sich ihrer Hilfe in ausgedehntem Maße. Die Statistik ist selbst zu einer Wissenschaft geworden.“ (quoted in Steger (2011), p. 17)
(Statistics today occupies an influential and an imposing position in many public spheres. The (German) Federation, counties and communities, the general public, industry and science make use of it extensively. Moreover, statistics itself has become a science in itself.)

One of the driving forces for the establishment of statistics as a science at this time was LvB, since he realized that the introduction of mathematical concepts into the analysis of statistical data created a new quality. Unfortunately LvB died too early to see the fruits of his thoughts ripen in the work of his brilliant students who shared his view on applicability of statistical concepts to science in general.

On 15 January 1901 the Russian citizen Vladislav Josephovich Bortkievich (1868-1931) - known as Dr. habil. Ladislaus von Bortkiewicz (also transliterated as Bortkewitsch) - was appointed as “ausserordentlicher Professor” at the “Friedrich-Wilhelms-Universität” Berlin (after 1945 named “Humboldt Universität zu Berlin”) by the Prussian Ministry for Culture and Education. How was it possible that the Prussian administration for science and education appointed an official staff member of the civil service in an Imperial Russian ministry? Who was this young scientist, where was he trained, and what had he done of importance?

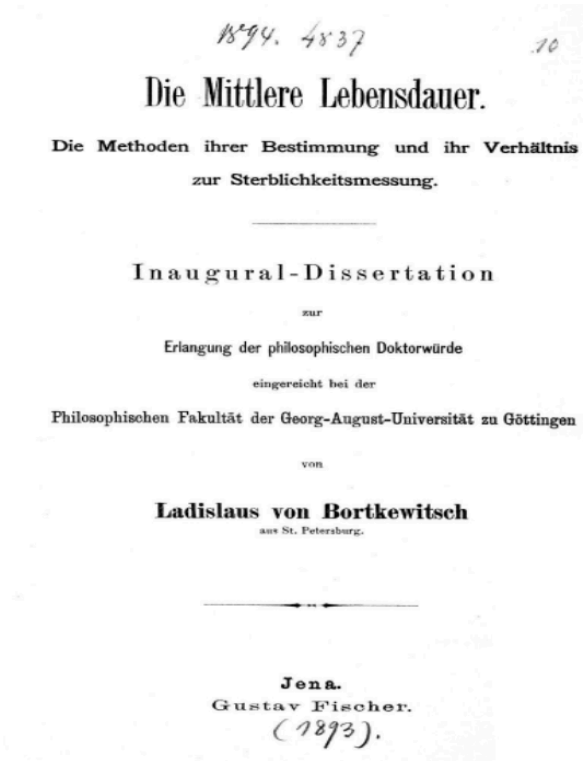
The letters of the administration related to LvB and other relevant documents are saved in the archive of the Berlin University (Archive HU), containing the aforementioned appointment letter from the Prussian Ministry for Education. But the personal papers of LvB, including hundreds of letters, his class notes, his manuscripts are not in Berlin. The Bortkiewicz papers are saved in Uppsala (Archive Uppsala). We will later explain why this happened. Independently from archival sources, the life, destiny and fate of LvB was always linked to Europe. LvB by his training, his mind and his vision was a true European scholar

and one of the most respectable founders of modern statistical science.

In this paper we would like to demonstrate how LvB has contributed to the development of statistics by a cross disciplinary view of the sciences. We start with a sketch of his life and scientific growth in section 2 and continue by describing his courses in section 3. His network of friends and colleagues is described in section 4. After giving an overview on his numerous publications in section 5, we discuss LvB and the transformation problem in section 6, his stochastic thinking and his influence on modern statistics in section 7. Finally we summarize our results in section 8.

2 From St. Petersburg to Berlin - the ways of education of LvB

Ladislaus von Bortkiewicz was born in the Russian imperial city of St. Petersburg (see [1]) on 7 August 1868 into a Polish family. In the Russian language his name reads, Vladislav Josephovich Bortkievich (see BSE, vol. 5, p. 605). He studied law at the University St. Petersburg for eight semesters. At that time the education system of Imperial Russia successfully applied the principle of "komandirovka za granicy" (travelling abroad, to foreign countries), i.e. the mission of young academic researchers to universities outside of Russia, in most cases to western European countries, especially to France and Germany. This principle was described by Pelagaja Jakovlevna Kochina (1899-1999) who studied the career paths of the Russian disciples of the mathematician Karl Weierstrass (1815-1897) in her biography about him (see Kochina (1985)). The same principle was also applied to ophthalmologists and physicists who studied with Hermann von Helmholtz (1821-1894). After studying at Western European universities, most of these post-doc students obtained doctoral degrees there and later became professors at Russian universities. LvB chose the University in Göttingen, to study with Wilhelm Lexis (1837-1914) who was one of the most prominent economist and statistician at that time. He finished his dissertation on 2 August 1892 and received his Doktor-Diplom the following year on 6 February 1893 after his thesis was published (LvB (1893), see Figure 1).



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Die Mittlere Lebensdauer.

Die Methoden ihrer Bestimmung und ihr Verhältnis zur Sterblichkeitsmessung.

Inaugural-Dissertation

zur

Erlangung der philosophischen Doktorwürde

eingereicht bei der

Philosophischen Fakultät der Georg-August-Universität zu Göttingen

von

Ladislaus von Bortkewitsch

aus St. Petersburg.

Jena.

Gustav Fischer.

(1893).

Figure 1: The dissertation of LvB, 1893

Further studies in economics and statistics led him to Straßburg, Alsace (today Strasbourg), where he worked together with Georg Friedrich Knapp (1842-1926), another prominent statistician at that time. Between 1871 and 1918, Alsace, and therefore Straßburg, belonged to Prussian Germany and consequently had a Prussian university. The Habilitation (see [2]) of LvB was finished on 2 March 1895 and LvB became a "Privatdozent". In Straßburg he was a contemporary of A. A. Chuprov (1874-1926) who was also a disciple of G. F. Knapp. However, just being a Privatdozent does not pay well, is not really exciting and even today in Germany is not equivalent to a real professorship. Other prominent examples of this non-incentive based German university system include Johann von Neumann (1903-1957), who was a Privatdozent at the Berliner Universität. In brief: it was not Straßburg but it was his Privatdozent status that made LvB change locations. After seven years in Germany, LvB went back to St. Petersburg to look for an academic position. He was offered an appointment in the civil service of the Russian ministry of transport and thanks to Aleksandr Ivanovich Chuprov (1842-1908) - the father of Aleksandr Aleksandrovich Chuprov (1874-1926) - he also taught statistics at the Aleksandrovskij Lyceum (see Oscar

Sheynin (1996), p. 38, and Sheynin (2005)). LvB achieved excellent work in St. Petersburg and A. I. Chuprov tried again to find an academic position for him in 1905/06, but failed and then finally LvB accepted the offer by the Berlin Universität and made the decision to stay in Berlin for the rest of his life.

3 Teaching modern statistics

LvB lectured statistics, insurance science, mortality and fertility forecasting, mathematics, quantitaive economics and mathematical statistics at two academic institutions in Berlin. From 1901 until 1931 he was a professor and from 1920 onwards a full professor (professor ad personam), at the Berlin University (Friedrich-Wilhelms-Universität zu Berlin). In addition, from 1906 until 1923 he taught at the newly founded Berlin School of Economics (Handels-Hochschule, located in Spandauer Str. 1), where a higher income from teaching was possible.

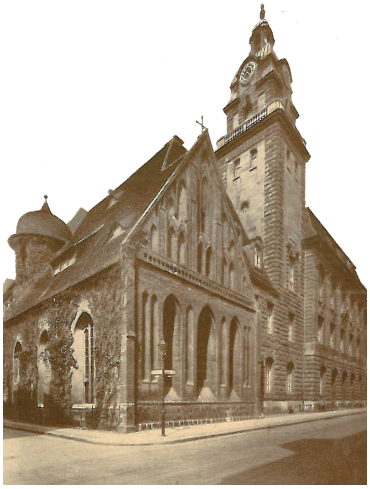


Figure 2: Handels-Hochschule (now School of Business and Economics) with the Heiliggeist Kapelle.

At the Berlin University, each semester LvB normally offered (the winter semester started in October each year and ended in February the following year, the summer semester was from April to July) two courses, one lecture and one training seminar ("Übung"). Over a period of 30 years he offered approximately 120 courses (see [3]), most of the lectures and

Übungen he held more on general statistics (once an introduction to statistics); all in all, he offered them 28 times. Another big issue (19 lectures and five training courses) he offered on population theory and population statistics. Sometimes he offered these lectures with special consideration to the Malthus' theory. Seven lectures he held on the mathematical and statistical foundations of insurance science, and 11 special training courses on insurance science and insurance mathematics. He also offered similar lectures and courses at the Berlin School of Economics, but the students there protested against the high mathematical content. Only four times, between 1917 and 1920, did he offer courses on mathematical statistics and one training course on mathematical statistics. In winter semester 1915/1916 the class list of his seminar (he called it "Statistisches Konservatorium") contained the young post-doc student from Munich, Emil Julius Gumbel (1891-1966) . Figure 3 displays the original handwritten table of LvB (in Archive Uppsala) on class room attendance. Gumbel wrote later that this class motivated him to work on extreme value theory, Gumbel (1958).

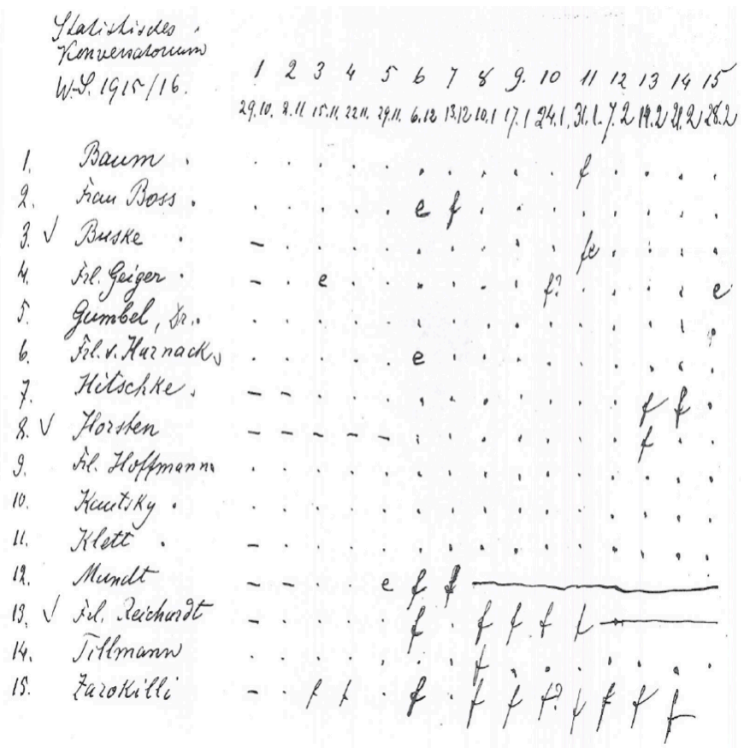


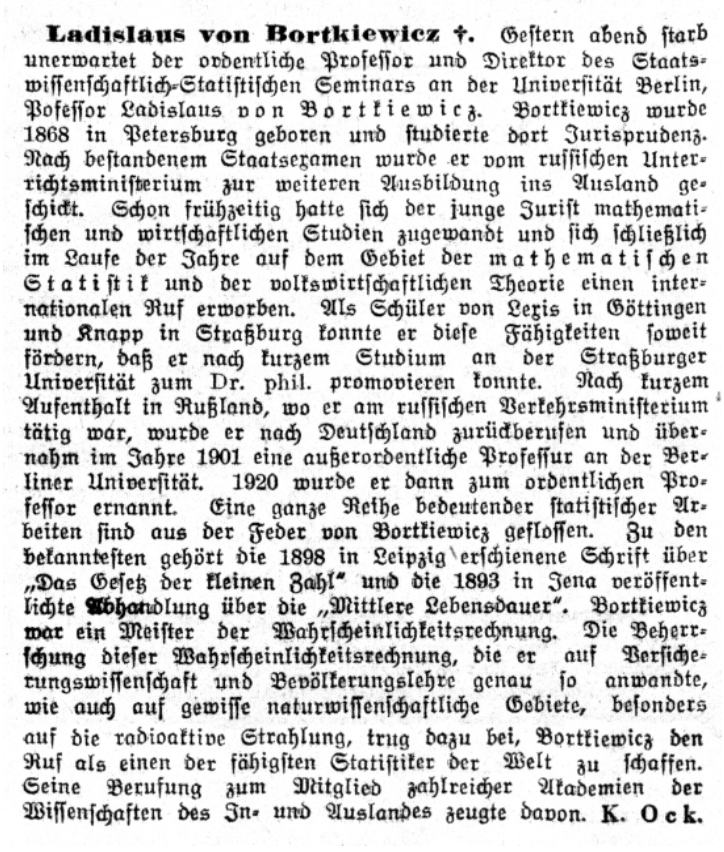
Figure 3: Class list of "Statistisches Konversatorium" (i.e. seminar) 1915/16- "e" means excused, and "f" means not in class without excuse. (In: Archive Uppsala, Bortkiewicz Papers, box 36)

LvB rarely taught jointly with colleagues and if it was with the close friend Carl (Karl) Ballod (1864-1931). They offered eight tutorials on socio-economic and business statistics between 1902 and 1914.

The Faculty of Economics, Humboldt–Universität zu Berlin, where LvB also taught is a traditional academic teaching and research institution. It was founded in 1886 as the Economic-Statistical Seminar of the Friedrich-Wilhelms-Universität zu Berlin. The early years were dominated, besides LvB, by economists and statisticians such as Richard Boeckh (1824-1907), Gustav von Schmoller (1838-1917) and Adolph Wagner (1835-1917). In 1904 the chamber of commerce of Berlin decided to establish and to build a school of economics in Spandauer Straße 1, between St. Wolfgang Str. and Anna Louisa Karsch Str. The Heiliggeist Kapelle (Holy Spirit Chapel) - built around 1300 - is one of the oldest buildings in Berlin and was integrated into the new building, see Figure 2. On 27 October 1906, the Berlin School of Economics was inaugurated. Ever since that time, economics has been permanently taught at Spandauer Straße 1. Because of the Nazi's policy many prominent scientists were forced to leave the university and the school of Economics. Among the many emigrants were the rector of the School of Economics (1931-1933) Moritz Julius Bonn (1873-1965), one of the founders of modern insurance science Alfred Maues (1877-1963), and the philosopher Arthur Liebert (1878-1946). The statistician and economist Franz Eulenburg (1867-1943), rector from 1929 to 1930, became a victim of the Nazi persecution.

4 The network of LvB - family, friends, and colleagues

Thanks to different primary and secondary sources we were able to reconstruct the network of the many relationships LvB had with different scientists and scholars from many European countries. The correspondence in the Bortkiewicz papers in Uppsala, altogether contain 991 letters from more than 60 colleagues (63 in total). After his death several obituaries were written, by, for instance, E. J. Gumbel in the journal "Statistisches Zentralblatt", by colleagues such as Thor Andersson (1869-1935), Hermann Schumacher (1868-1952), Oskar Anderson (1887-1960) and Ferdinand Tönnies (1855-1936). The leading intellectual newspaper at that time, the "Vossische Zeitung", published an obituary (see Figure 4). An excerpt of this text appears at the beginning of this article.



Ladislaus von Bortkiewicz †. Gestern abend starb unerwartet der ordentliche Professor und Direktor des Staatswissenschaftlich-Statistischen Seminars an der Universität Berlin, Professor Ladislaus von Bortkiewicz. Bortkiewicz wurde 1868 in Petersburg geboren und studierte dort Jurisprudenz. Nach bestandenem Staatsexamen wurde er vom russischen Unterrichtsministerium zur weiteren Ausbildung ins Ausland geschickt. Schon frühzeitig hatte sich der junge Jurist mathematischen und wirtschaftlichen Studien zugewandt und sich schließlich im Laufe der Jahre auf dem Gebiet der mathematischen Statistik und der volkswirtschaftlichen Theorie einen internationalen Ruf erworben. Als Schüler von Lexis in Göttingen und Knapp in Straßburg konnte er diese Fähigkeiten soweit fördern, daß er nach kurzem Studium an der Straßburger Universität zum Dr. phil. promovieren konnte. Nach kurzem Aufenthalt in Rußland, wo er am russischen Verkehrsministerium tätig war, wurde er nach Deutschland zurückberufen und übernahm im Jahre 1901 eine außerordentliche Professur an der Berliner Universität. 1920 wurde er dann zum ordentlichen Professor ernannt. Eine ganze Reihe bedeutender statistischer Arbeiten sind aus der Feder von Bortkiewicz geflossen. Zu den bekanntesten gehört die 1898 in Leipzig erschienene Schrift über „Das Gesetz der kleinen Zahl" und die 1893 in Jena veröffentlichte Abhandlung über die „Mittlere Lebensdauer". Bortkiewicz war ein Meister der Wahrscheinlichkeitsrechnung. Die Beherrschung dieser Wahrscheinlichkeitsrechnung, die er auf Versicherungswissenschaft und Bevölkerungslehre genau so anwandte, wie auch auf gewisse naturwissenschaftliche Gebiete, besonders auf die radioaktive Strahlung, trug dazu bei, Bortkiewicz den Ruf als einen der fähigsten Statistiker der Welt zu schaffen. Seine Berufung zum Mitglied zahlreicher Akademien der Wissenschaften des In- und Auslandes zeugte davon. **K. Ock.**

Figure 4: Obituary, in the "Vossische Zeitung", 16 July 1931

Some authors reviewing his life have pointed out that LvB was a very ambitous and strong university teacher as well as an intensive reader of the publications of his colleagues. Hermann Schumacher stressed the stereotype that LvB lived together with his sister, living without a family because he wanted to serve the sciences only.

4.1 Family

LvB was born in a wealthy Polish family in St. Petersburg, in that time the capital of the Russian Empire. His father Joseph von Bortkiewicz died in summer 1914, shortly before the outbreak of World War I. It was during this summer of 1914 that LvB visited St. Petersburg for the last time; he never returned because of the political changes in Russia. The Russian intelligentsia made sure that children learned French and German as second languages to read and write fluently, consequently his family motivated LvB and his younger sister Helene to study in Germany.

LvB's sister Olga married and died of cancer later in Russia in December 1917. Her death was announced by the second sister Helene who had, because of WW I, communicated with LvB in Berlin from St. Petersburg via Thor Andersson in Sweden. Helene von Bortkiewicz (3.8.1870 St. Petersburg - 29.10.1939 Berlin) was a remarkable woman, she was one of the first female students of mathematics to attend Women's Courses (vysshiye zhenskiye kursy - Higher Women's Courses) in St. Petersburg, where she received a very good scientific training. These Women's Courses (Vysshiye zhenskiye kursy) were opened in 1878 with support from scientists of the University and of the Russian Academy of Science (see Kochina (1988), p. 45-47). Helene von Bortkiewicz then became one of the Russian mathematics students at the University of Göttingen. She took classes from David Hilbert (1862-1943) and Felix Klein (1849-1925) (see Archive of the Göttingen University, Tobies (1991/1992), p. 156, 158, 165-166).

Back in Russia, Helene von Bortkiewicz published papers in Russian journals, but the situation was not comfortable for her since the only widely accepted professions for women were as a physician or a teacher in a girls school. From 1910 until summer 1914 she lived with her brother. She travelled together with him to St. Petersburg in the summer of 1914 but did not return with him to Berlin. After the outbreak of WW I she stayed in St. Petersburg and then in fact worked as a teacher of mathematics and languages. After the first Russian revolution, in February 1917, she became a staff member in a St. Petersburg bank. After the October revolution 1917 she moved, with the help of Thor Andersson, to Berlin where she lived from 1919 until 1931 in her brother's apartment in Berlin-Halensee, (Johann Sigismundstr. 2).

We can only speculate whether she worked scientifically with LvB, or whether she ran her brother's household. After the death of her brother in 1931 she encountered serious financial problems (see [4]) and finally had to give up the apartment and to move to Berlin-Steglitz (see Archive HU, personal file LvB, Bd. 1, Bl. 22R, Bl. 24). This move to more modest accommodation must also have been the reason why the Bortkiewicz papers have found shelter in Sweden.

4.2 Friends

Among LvB's friends, one of the first, was the Swedish economist and statistician Thor Andersson (1869-1935). Thor Andersson was not only an economist and statistician, he was also an entrepreneur and publisher. He founded and edited the journals "Nordisk statistisk tidskrift" and later the "Nordisk Statistical Journal" (see Sjöström (2002), p. 195). He invited his friend and colleague LvB to publish in his journals and often visited Berlin. It was his idea to start the "LvB Collected Papers" project which he unfortunately could not finish.

His oldest friend, dating back to LvB's student years in St. Petersburg was the mathematician, statistician, and economist Aleksandr Aleksandrovich Chuprov (1874 - 1926). Aleksandr Chuprov received his doctoral degree in 1896 and as a post-doc he stayed until 1902 at several German universities. First, he went to Berlin where he visited Adolph Wagner (1835 - 1917), then moved to Straßburg, where he studied with Georg Friedrich Knapp. In 1902 he defended his dissertation in economics (Staatswissenschaft), and also passed his master examination at the Faculty of Law of the Moscow University. From 1902 to 1917 he taught statistics at the St. Petersburg Polytechnical Institute, and was always in close contacts with LvB. In May 1917 he visited Sweden and with the October Revolution became an emigré. First, he lived in Stockholm and later in Oslo. In 1920 he moved to Germany, desperately looking for an academic position. For five years he lived in Dresden and taught in Prague, at the Russian Institute. In the LvB Papers in the Uppsala Archive 125 letters are kept detailing concerning these almost parallel career paths (see Sheynin (2005)).

One of the disciples of A. A. Chuprov was the statistician Oskar (Nikolaevich) Anderson (2.8.1887 Minsk - 12.2.1960 Munich). He studied mathematics and physics first in Kazan, then statistics in St. Petersburg, where in 1912 he defended his thesis (on correlation analysis). From 1910 onwards he worked with Chuprov and LvB. From September 1912 to Oct./Nov. 1917 he was employed as an instructor (teacher) in the Higher Commercial School in Lesnoe (near St. Petersburg), where he taught political economy, commercial geography and jurisprudence (see Sheynin (1996), p. 59). After the revolution in October 1917 he emigrated, first teaching in Kiev, then in the Higher Commercial School in Varna (Bulgaria), where he lived from 1924 to 1942. During WW II, in 1942, he became a full professor

of statistics in Kiel and after 1947 he was a professor in Munich (see "Metrika" 3 (1960), pp. 89 - 94). Among his papers the one titled "Über die Anwendung der Differenzenmethode bei Reihenausgleichungen, Stabilitätsuntersuchungen und Korrelationsmessungen", published in "Biometrika" 1926/27 had great influence. He propagated cross disciplinary links between humanities and mathematics. This perception was that of LvB and more of his friends and was a rather rare position among statisticians at that time, and not only at that time!

Carl Ballod (1864-1931) was also a close friend of LvB. He was a statistician and an expert on Russian economy and taught at the Berlin University from winter 1900/01 until summer 1919.

Ballod received the doctoral degree in 1892 at the University of Jena, the procedure "Habilitation" he made at the Berlin University where he became Privatdozent in december 1899. From 1905 until 1914/1919 he was ausserordentlicher Professor at the Berlin University and at the same time staff member at the Prussian Statistical Office. Carl Ballod became a close friend of LvB.

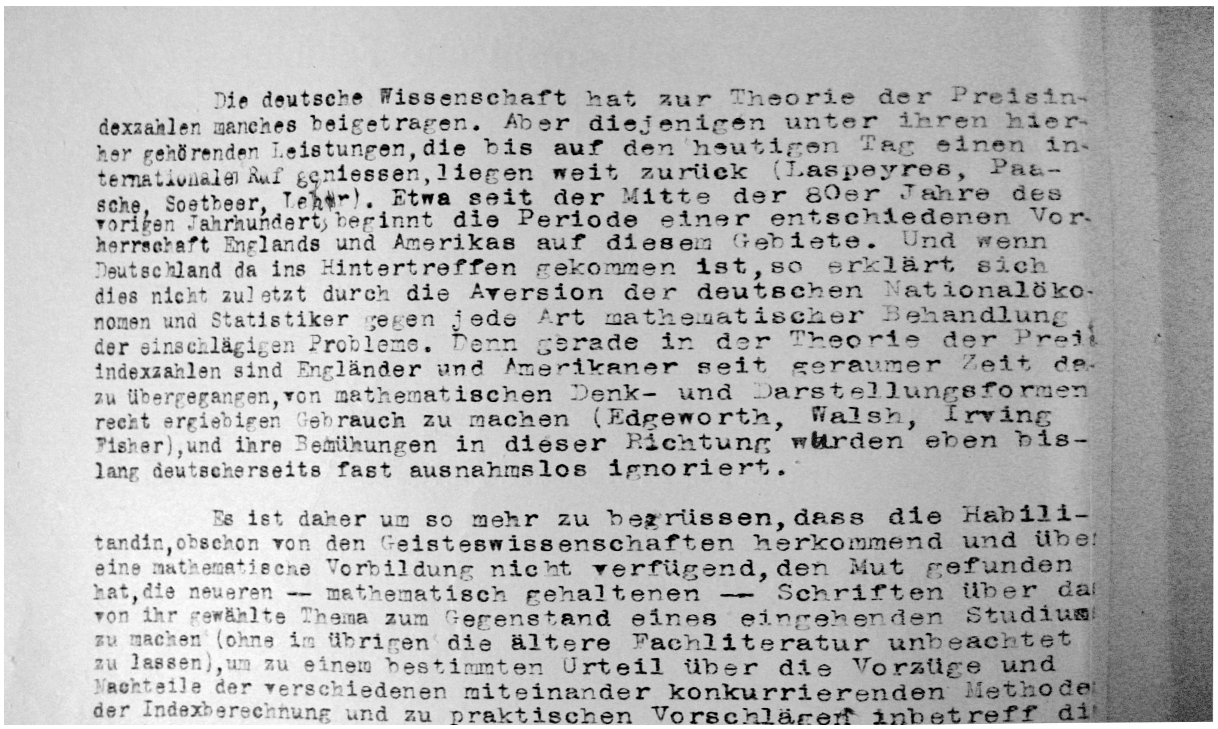
The couple Wladimir Savel'evich Woytinsky (12.11.1885 St. Petersburg - 11.6.1960 Washington D.C.) and Emma Shadkhan Woytinsky (19.4.1893 Witebsk - April 1968 Washington D.C.) became close friends of LvB and Helene vB. This friendship was an unusual one. In their autobiographies (see Wl. Woytinsky (1961), pp. 452-453 and Emmy Woytinsky (1965), pp. 108-110) both described the history of this relation. Their famous publication "Die Welt in Zahlen" (The World in Figures) in seven volumes was published in Berlin between 1925 and 1928. Originally the series should have been published in Russian and in German, both by the publishing house Rudolf Mosse in Berlin. In fact, only two volumes were published in Russian, in 1924 and in 1925, then it was halted because of the developing situation in the Soviet Union. However all seven German volumes were published, edited by LvB. Emma Woytinsky called it a "marvelous feature of this project", that he "played (a part) in it. We learned later that he had been the terror of all German publishers, most of whom had ceased to send him their statistical publications for comment. Not that he was mean - actually, he was just the opposite. He was the embodiment of scientific integrity and honesty; ... The only trouble was that it was extremely difficult to satisfy him, to reach his level. He was called the 'Pope of Statistics', also 'Die Leuchte' (The Luminary)." (Emma Woytinsky (1965), p. 109) She finished her description about the

collaboration with LvB and the later friendship with him with the observation: "Nobody who knew Bortkiewicz from his behaviour at the university or from his writings, so highly technical that he could never distribute all ten of the reprints he received from a journal, could realize how much wit and fun he had in him when he let the bars down." (ebenda, p. 110) After the success, Wladimir S. Woytinsky became the head of the small statistical department of the leading trade union organisation (Allgemeiner Deutscher Gewerkschaftsbund) in Berlin. Here he worked together with a young colleague, Bruno Gleitze (1903-1980), who later in 1946 became the first dean of the newly established economics faculty at Berlin University. Emma and Wladimir Woytinsky described LvB as a warm, friendly, helpful, and very generous person, quite the opposite of other descriptions of him (as dry, cold, very strict and dangerous). It is worth mentioning that Wladimir S. Woytinsky also published a remarkable article "Limits of Mathematics in Statistics" (1954).

4.3 Colleagues

Among the colleagues of LvB we have to firstly mention his teachers Wilhelm Lexis in Göttingen and Georg Friedrich Knapp in Straßburg. LvB was in close and regular contact with both of them and kept almost all of their letters that they had written to him (see Archive Uppsala). When LvB was appointed in 1901, statistics was taught by Richard Boeckh (1824-1907) - the co-founder of the Economic Statistical Seminar (Staatswissenschaftlich-Statistisches Seminar), established in 1886, and the "Altmeister der Berliner Statistik" (master of Berlin statistics), – and the agricultural statistician August Meitzen (1822-1910). He also had contact with Adolph Wagner (1835-1917) and Gustav von Schmoller (1838-1917). Boeckh and Meitzen had enormous practical experience from their work in statistical offices; the Royal Prussian Statistical Bureau, the Imperial Statistical Office and the Statistical Office of the town of Berlin, where Boeckh was the director from 1875 to 1902. Studying the lecture schedules, we found that until 1910 LvB taught special courses on statistics. After the death of Boeckh and Meitzen, LvB became the only expert on statistics, and he offered the introductory courses. From 1907 until 1922 he was the only professor of statistics at Berlin University. From 1922 to 1928 Rudolf Meerwarth (1883-1946) joined him teaching economic and business statistics.

One of the very few female colleagues of LvB was Charlotte Lorenz (1895-1979). In 1919 she received her doctoral degree on a thesis about the economic situation in Turkey. Later she became interested in statistics, and she was employed in the Imperial Statistical Office. Her thesis for "Habilitation" was on price indices, and her work was highly acknowledged by LvB who was one of her advisers in 1927 (see Archive HU, Phil. Fak. Nr. 1242, pp. 217-237). LvB underlined in his review that Charlotte Lorenz was willing to learn the mathematical basis and was able to study recent mathematical literature on price indices (see Figure 5, Archive HU, Phil. Fak. Nr. 1242, p. 225R).



Die deutsche Wissenschaft hat zur Theorie der Preisindexzahlen manches beigetragen. Aber diejenigen unter ihren hierher gehörenden Leistungen, die bis auf den heutigen Tag einen internationalen Ruf geniessen, liegen weit zurück (Laspeyres, Paasche, Soetbeer, Lehr). Etwa seit der Mitte der 80er Jahre des vorigen Jahrhundert beginnt die Periode einer entschiedenen Vorherrschaft Englands und Amerikas auf diesem Gebiete. Und wenn Deutschland da ins Hintertreffen gekommen ist, so erklärt sich dies nicht zuletzt durch die Aversion der deutschen Nationalökonomen und Statistiker gegen jede Art mathematischer Behandlung der einschlägigen Probleme. Denn gerade in der Theorie der Preisindexzahlen sind Engländer und Amerikaner seit geraumer Zeit dazu übergegangen, von mathematischen Denk- und Darstellungsformen recht ergiebigen Gebrauch zu machen (Edgeworth, Walsh, Irving Fisher), und ihre Bemühungen in dieser Richtung würden eben bislang deutscherseits fast ausnahmslos ignoriert.

Es ist daher um so mehr zu begrüssen, dass die Habilitandin, obschon von den Geisteswissenschaften herkommend und über eine mathematische Vorbildung nicht verfügend, den Mut gefunden hat, die neueren — mathematisch gehaltenen — Schriften über das von ihr gewählte Thema zum Gegenstand eines eingehenden Studiums zu machen (ohne im übrigen die ältere Fachliteratur unbeachtet zu lassen), um zu einem bestimmten Urteil über die Vorzüge und Nachteile der verschiedenen miteinander konkurrierenden Methoden der Indexberechnung und zu praktischen Vorschlägen inbetreff di

Figure 5: LvB review (In: Archive HU, Phil. Fak. Nr. 1242, p. 225R)

He highly acknowledged her work. Only in 1937 did Charlotte Lorenz become a professor at Berlin University, teaching mainly economic and business statistics. After 1945 she taught at the Göttingen University.

Scientific activities received momentum in 1920 when Richard von Mises (1883-1953) was appointed as the first professor of applied mathematics and director of the Institute for Applied Mathematics and Mechanics. They both belonged to the Philosophical Faculty then and von Mises took over the classes that had a more mathematical touch from LvB . Soon

they had a joint doctoral student. Both belonged to the Berlin Mathematical Society too, and they had much in common. Among the colleagues of the Berlin School of Economics ("Handels-Hochschule") we have to mention the founder of modern insurance science, Alfred Manes (1877-1963), and the economist and statistician Franz Eulenburg (1867-1943). Alfred Manes was an economist, editor of a series on insurance mathematics, and in 1919 published the book "Staatsbankrotte" (the 3rd edition came out in 1923). LvB and Manes had common interests in insurance calculations, and LvB published some articles in the journal of the German Association of Insurance Science ("Deutsche Gesellschaft für Versicherungswissenschaft") where A. Manes was one of the leaders (see Koch (1990)). It was the statistician Franz Eulenburg, from 1929 until 1930 rector of the School of Economics, who first had the idea to publish a series "Collected Papers" of LvB (see the letter, written by F. Eulenburg to Thor Andersson, spring 1933 in: von Bortkiewicz Papers, Uppsala). Because of the world economic crisis (1929) and the Nazi's rise this project failed. In 1933 both A. Manes and F. Eulenburg were dismissed from the School of Economics, and A. Manes also from the Berlin University. Whereas A. Manes successfully managed to emigrate in 1935, first to South America, then later to the USA (University of Chicago), Franz Eulenburg stayed in Berlin. In December 1943 he was arrested by the Gestapo in Berlin and died on 28 December 1943 in a Gestapo prison.

4.4 Disciples and doctoral students

In 1926 the Austrian physician Karl Freudenberg (11.10.1892 Berlin - 14.1.1966 Berlin (West)) defended his thesis on statistics in medicine at the Berlin University (see Archive HU, Phil. Fak. Nr. 646, Bl. 373-397, Diss. Karl Freudenberg, 12.10.1926). His advisors were LvB and Richard von Mises. LvB also supported the "Habilitation" of Karl Freudenberg which followed two years later (see Archive HU, Habil. Med. Fak. Nr. 1359, Bl. 153-167, Habilitation Karl Freudenberg, 9.6.1928). From 1928 until 1935 Karl Freudenberg was a Privatdozent at the Medical Faculty of the Berlin University, he was the only teacher in medical statistics (Medizinalstatistik). In 1935 he was dismissed (see Archive HU, personal file Karl Freudenberg) and in 1938 arrested by the Gestapo, but in 1939 he was able to emigrate to the Netherlands, where he escaped Nazi persecution. As one of the very few German-Jewish emigrants in mathematics and statistics he came back to Berlin in 1947 and taught medical

statistics at the Free University Berlin.

One of the most famous disciples was Emil Julius Gumbel (18.7.1891 Munich - 10.9.1966 New York), who later followed the ideas of LvB on distributions (see Gumbel (1958)). Obviously, E. J. Gumbel met LvB often in Berlin, between 1920 and 1932 he lived in Berlin regularly during the semester breaks. Gumbel was not only a successful mathematician and statistician at Heidelberg University, he was also politically very active. As a member of the German League for Human Rights he became one of the leading individuals to fight against the Nazi's before 1933. He published two books against them in the Weimar Republic (see Jansen (1991), Vogt (1991), and Brenner (2001)). As a result, he was forced to leave Germany, emigrating first to France and in 1940 to the USA. In the early 1950s Gumbel was a guest professor at the Free University Berlin, where he again met, among others, Karl Freudenberg. Gumbel remembered LvB and his work continuously (see Gumbel (1931), Gumbel (1968)).

Thanks to the documents in the Archive of the Berlin University we were able to analyze all the instances where LvB was the advisor of doctoral students. At the Philosophical Faculty two different doctoral degrees were possible, Dr. phil. and Dr. rer. pol. Between 1920 and 1931 LvB was the advisor of 11 PhD projects which led to Dr. phil. In addition he was the advisor of 29 students who received the degree Dr. rer. pol. Six of his 11 PhD students had to go into exile because of the Nazi regime. We have already mentioned Karl Freudenberg, another student was Karl Kost who received a degree in 1926 also then, emigrated to Argentinia where he became a novelist. Raimund Goldschmidt (b. in 1904) who received a doctoral degree in 1928 emigrated later to the USA where he published, as Raymond W. Goldsmith, many articles and papers.

Another famous doctoral student of LvB was Wassilij Leontief (5.8.1905 München - 5.2.1999 New York), a Nobel Prize winner later. He received his doctoral degree in December 1928 (see Archive HU, Phil. Fak. Nr. 678, Bl. 135-197), his advisors were LvB and Werner Sombart. LvB wrote a long reference about Leontief's thesis, at six pages (see Archive HU, Phil. Fak. Nr. 678, Bl. 156-158R), where LvB strongly argued that this young man from St. Petersburg (meanwhile Leningrad) was highly talented in statistics as well as in economics. After his studies in Berlin Leontief obtained an assistant position in Kiel and thanks to a

fellowship he was able to go to the USA after 1933, where he worked very successfully. In 1973 he was awarded a Nobel Prize in Economics.

Another student was Miron Kantorowitsch (b. 1895 Minsk) who lived in Germany from 1919 to 1933. He received his doctoral degree in 1930 and from 1934 to 1938 he worked as a demographer in London and published in the Journal of the Royal Statistical Society. In 1938 he emigrated to the USA where he became an acknowledged statistician and an expert on the Soviet Union and Soviet demography (see Tolts (2012), he changed his name to Myron Kantorowicz, later Myron K. Gordon. Also Harald von Waldheim received his doctoral degree in 1930. He was a disciple and an assistant of Alfred Manes. Like him, Harald von Waldheim he also had to go into exile.

LvB was a member of the German Society (Association) of Insurance Sciences and he belonged to the founding members of the German Statistical Society (Grohmann et al (2011), pp. 227-229). He was also a member of the International Statistical Institute in Brussels. He was less visible in the UK, possibly because of a controversy with Karl Pearson (1857-1936) (see Porter (2005)). Shortly before his death he was invited to give a key lecture of the Annual Meeting of the American Statistical Society in 1930. He cancelled this trip because of health complications.

4.5 The publication activities of LvB

LvB's list of publications is long and thanks to Gumbel (1931, 1968), two bibliographies exist. The publications of LvB can be separated into three groups. The first group includes articles in journals like "Allgemeines Statistisches Archiv" (the journal of the German Statistical Society) where he published four papers until 1915, and the "Nordisk Statistical Journal" where he published articles between 1922 and 1930. The second group of publications includes articles in encyclopaedias and most famous is his article "Anwendungen der Wahrscheinlichkeitsrechnung auf Statistik" (Application of the Theory of Probability on Statistics) in the "Mathematische Encyclopedie" (1901). The third group includes his reviews, among others in the "Deutsche Literaturzeitung". As Emma S. Woytinsky remembered (1965, p. 109): "We learned later that he had been the terror of all German publishers, most of whom had ceased to send him their statistical publications for comment." In the

mid 1920s several publisher were afraid of LvB and his critical reviews, and consequently he didn't publish reviews any more.

When one re-reads his different papers, we found that the evaluation of his work should be discussed with the following aspects in mind: the role of mathematics in his work, the under-representation of mathematical statistics in Germany, and the extraordinary role of LvB and E. J. Gumbel had in this field (see Grohmann et al (2011), p. 16, 23f, 81, 138-139 and p. 141), LvB's publications on theory of probability and radioactivity, his discussions on Karl Pearson, and finally the links to his disciple E. J. Gumbel and his book "Statistics of Extremes" (1958).

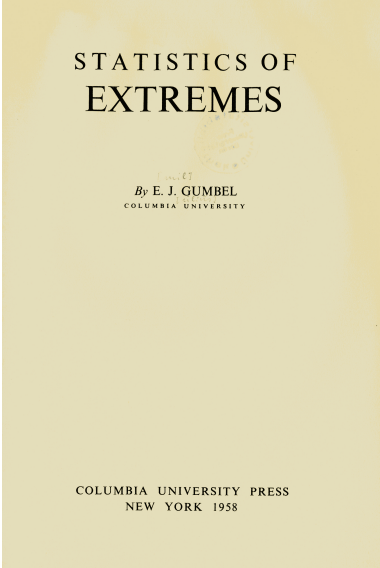


Figure 6: Statistics of Extremes by E. J. Gumbel (1958)

4.6 LvB and the transformation problem

The transformation problem deals with the question of how to transform the value of goods into prices of production. The value of goods is measured for instance in units of time of labour and is in its simplest form decomposable as:

$$W = c + v + m,$$

where W denotes the value, c the capital invested in production, v the circulating or variable capital and m the surplus value (see Marx (1867), Das Kapital, Band 1). In the third volume

of "Das Kapital" (containing thoughts actually prior to 1867, the publication date of the first volume) an additional assumption on the profit rate $m/(c+v)$ is added: it is assumed to be constant across all industry branches.

At this point we would like to invoke a famous quote by Schumpeter:

"By far LvB's most important achievement is his analysis of the theoretical framework of the Marxian system, much the best thing ever written on it and, incidentally, on its other critics." (Schumpeter (1932), 2nd. ed. 1956, p. 303)

What is the transformation problem and what was LvB's contribution to it? Let us consider as in LvB (1907) a simple 3 sector economy producing 3 goods: investment goods, foodstuffs, and luxury goods. The original Marx presentation is based on writing the price of good W_i as $P(W_i) = l_i * x_i$, with l_i the labour costs and x_i (unknown) coefficients. The price of W is a sum of the price of capital and that of the surplus:

$$P(W) = P(C) + P(M)$$

If p is the average profit rate then $P(W) = p * P(C)$ and with $x_0 = 1/(1+p)$

$$P(C) = x_0 * P(W)$$

Combining equations lead to

$$P(C_i) = x_0 * l_i * x_i, \qquad i = 1, \ldots, 3 \tag{A}$$

If we denote the proportion of goods j to produce i as q_{ij} then (A) can also be written as

$$P(C_j) = \sum q_{ji} * x_0 * l_i * x_i, \qquad i = 1, .., 3, \text{ for all } j \tag{B}$$

Putting (A) and (B) together will yield 3 equations

$$x_0 * l_j * x_j, \quad j = 1, \ldots, 3 = \sum q_{ji} * x_0 * l_i * x_i, \quad i = 1, \ldots, 3, \text{ for all } j \tag{C}$$

with the 4 unknowns (x_0, x_1, x_2, x_3). Marx left open how to tackle this simple algebraic problem. Among the first ideas to complement this set of equations was given by Mühlpfordt (1895) who proposed that the sum of the values (sum of l_i) should equal the sum of the prices (sum of $l_i * x_i$). Although writing it down like this he was unable to express it mathematically, Quaas (1991). It was LvB later in 1907 who in the spirit of the quote of Samuelson (1971):

"Contemplate two alternative and discordant systems. Write down one. Now transform by taking an eraser and rubbing it out. Then fill in the other one. Voila! You have completed your transformation algorithm"

proposed "the" (or better "one") solution to transformation problem.

Let us follow the outline of Quaas (1991) and define the (3×3)matrix A as $[c \ v \ 0]$ where $c = (c_1, c_2, c_3)^\top$, $v = (v_1, v_2, v_3)^\top$. Then the first 3 equations of (C) are:

$$Ax = \mathrm{diag}(1^\top c, 1^\top v, 1^\top m), \qquad x \in \mathbb{R}^3 \tag{D}$$

We can see this by setting $c_i = q_{i1} * l_1$, $v_i = q_{i2} * l_2$ and observing that since the 3 sector economy is circular: $l_1 = 1^\top c$, $l_2 = 1^\top v$, $l_3 = 1^\top m$. If we now plug this into (D) we see that LvB has simply put $x_3 = 1$ and thus has provided "the" solution of the transformation problem.

5 v. Bortkiewicz and his influence on modern statistics

At the dawn of the 20th century the mindset about statistics and probability theory as applied to natural or social sciences can be described in the clever way that the Viennese mathematician Emanuel Czuber (1851-1925) used in 1898:

"An der Schwelle der Wahrscheinlichkeitstheorie steht eine Reihe von Begriffen, welche der Mathematik fremd sind, und über deren Deutung die Discussion nicht abgeschlossen ist, ja heute lebhafter geführt wird denn je."

(At the border of theory of probability we find a number of concepts which are alien to mathematics and their interpretation has not been finished yet and even needs to be discussed more than ever.)

The allocation of the statistical science as a non-mathematical discipline has also been underlined by David Hilbert (1862-1943). In 1900 in Paris he presented his 23 "open problems". Problem Nr 6 was:

"Mathematische Behandlung der Axiome der Physik. Durch die Untersuchungen über die Grundlagen der Geometrie wird uns die Aufgabe nahegelegt, nach diesem Vorbilde diejenigen physikalischen Disziplinen axiomatisch zu behandeln, in denen schon heute die Mathematik eine hervorragende Rolle spielt; dies sind in erster Linie die Wahrscheinlichkeitsrechnung und die Mechanik. Was die Axiome der Wahrscheinlichkeitsrechnung angeht, so scheint es mir wnschenswert, daß mit der logischen Untersuchung derselben zugleich eine strenge und befriedigende Entwicklung der Methode der mittleren Werte in der mathematischen Physik, speziell in der kinetischen Gastheorie Hand in Hand gehe." (Hilbert (1971), p. 47)

Hilbert classified here the theory of probability as a part of physics that was to be seen as a future mathematical sub-discipline. Since the probabilistic tools of the statistical discipline were mostly used in physics (promoted by papers of Einstein, Maxwell and Boltzmann) Hilbert more likely classified statistics not as a mathematical discipline but rather as part of theoretical physics.

In fact it was the British School around Karl Pearson (1857-1936), William S. Gosset (1876-1937), Ronald A. Fisher (1890-1962), Jerzy Neyman (1894-1981) and Egon Sharpe Pearson (1895-1980) who developed the branch of mathematical statistics. In contradiction, statistics in Germany leaned more towards a descriptive analysis of data with a preference for a social economic context. It was Ladislaus von Bortkiewicz who in several books and papers promoted the probabilistic approach, for example, on the Poisson- and exponential distributions and on the distributions of runs (Iterationen). In his book on "Die Iterationen" (1917) in the second chapter on "Grundsätzliches aus der Wahrscheinlichkeitstheorie" he gave a clear exposition of the mathematical foundations of probability theory. In a somewhat sneering tone he comments that Marbe (1916-1919) was "touchingly clumsy" in his quantitative description of a simple coin flipping experiment.

"In mathematischer Hinsicht ist Marbe auch sonst von einer, man möchte beinahe sagen, rührenden Unbeholfenheit. (see figure inset)"

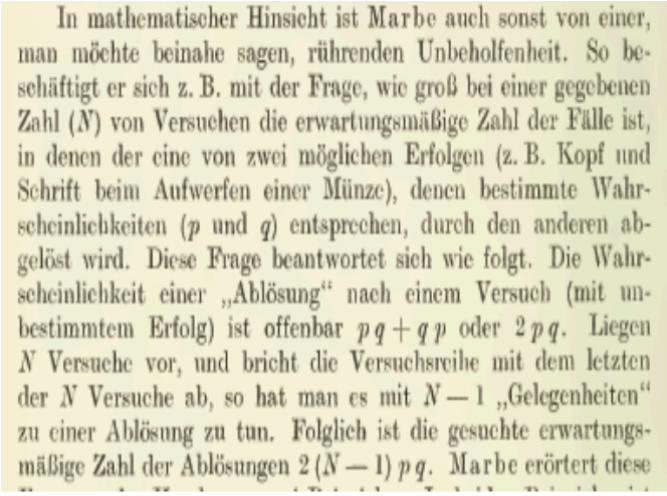
DIE ITERATIONEN

EIN BEITRAG ZUR
WAHRSCHEINLICHKEITSTHEORIE

VON

DR. L. V. BORTKIEWICZ
A. O. PROFESSOR AN DER UNIVERSITÄT BERLIN

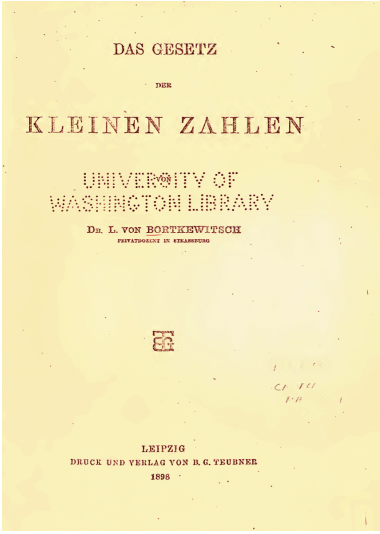
BERLIN
VERLAG VON JULIUS SPRINGER
1917



In mathematischer Hinsicht ist Marbe auch sonst von einer, man möchte beinahe sagen, rührenden Unbeholfenheit. So beschäftigt er sich z. B. mit der Frage, wie groß bei einer gegebenen Zahl (N) von Versuchen die erwartungsmäßige Zahl der Fälle ist, in denen der eine von zwei möglichen Erfolgen (z. B. Kopf und Schrift beim Aufwerfen einer Münze), denen bestimmte Wahrscheinlichkeiten (p und q) entsprechen, durch den anderen abgelöst wird. Diese Frage beantwortet sich wie folgt. Die Wahrscheinlichkeit einer „Ablösung" nach einem Versuch (mit unbestimmtem Erfolg) ist offenbar $pq + qp$ oder $2pq$. Liegen N Versuche vor, und bricht die Versuchsreihe mit dem letzten der N Versuche ab, so hat man es mit $N - 1$ „Gelegenheiten" zu einer Ablösung zu tun. Folglich ist die gesuchte erwartungsmäßige Zahl der Ablösungen $2(N-1)pq$. Marbe erörtert diese

Figure 7: "Die Iterationen" and an excerpt of "Die Iterationen"

Karl Marbe (1869-1953), a professor of psychology, argued that a run of male births leads per se to an increased probability of a female birth. He employed a "nature argument" on equalizing the sex ratio. Bortkiewicz showed, however, that Marbe's mathematics was wrong.



DAS GESETZ

DER

KLEINEN ZAHLEN

DR. L. VON BORTKEWITSCH
PRIVATDOZENT IN STRASSBURG

LEIPZIG
DRUCK UND VERLAG VON B. G. TEUBNER
1898

Figure 8: Gesetz der kleinen Zahlen

LvB became well known also for his precise calibration of real data. In 1898 he published the

book “Das Gesetz der kleinen Zahlen” (The Law of Small Numbers) in which he first noted that events with low frequency in a large population follow a Poisson distribution. The two data sets he considered were the Prussian horse-kick data and child suicides. The horse kick data give the number of soldiers killed by being kicked by a horse each year in each of the 14 cavalry corps of the Prussian Army over a 20-year period.

24 Zweites Kapitel. § 12.

	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
G	—	2	2	1	—	—	1	1	—	3	—	2	1	—	—	1	—	1	—	1
I	—	—	—	2	—	3	—	2	—	—	—	1	1	1	—	2	—	3	1	—
II	—	—	—	2	—	2	—	—	1	1	—	—	2	1	1	—	—	2	—	—
III	—	—	—	1	1	1	2	—	2	—	—	—	1	—	1	2	1	—	—	—
IV	—	1	—	1	1	1	1	—	—	—	—	1	—	—	—	—	1	1	—	—
V	—	—	—	—	2	1	—	—	1	—	—	1	—	1	1	1	1	1	1	—
VI	—	—	1	—	2	—	—	1	2	—	1	1	3	1	1	1	—	3	—	—
VII	1	—	1	—	—	—	1	—	1	1	—	—	2	—	—	2	1	—	2	—
VIII	1	—	—	—	1	—	—	1	—	—	—	—	1	—	—	—	1	1	—	1
IX	—	—	—	—	—	2	1	1	1	—	2	1	1	—	1	2	—	1	—	—
X	—	—	1	1	—	1	—	2	—	2	—	—	—	—	2	1	3	—	1	1
XI	—	—	—	—	2	4	—	1	3	—	1	1	1	1	2	1	3	1	3	1
XIV	1	1	2	1	1	3	—	4	—	1	—	3	2	1	—	2	1	1	—	—
XV	—	1	—	—	—	—	—	1	—	1	1	—	—	—	2	2	—	—	—	—

Figure 9: Prussian Horse Kick Data. The columns are the years 1875 - 1894, rows are the corps numbers

k	nk	p	$\widehat{p}$	exp	χ^2	
0	109	0.545	0.54335	108.670	0.00100	
1	65	0.325	0.33144	66.289	0.02506	
2	22	0.110	0.10109	20.218	0.15705	
3	3	0.015	0.02056	4.111	0.30025	
4	1	0.005	0.00313	0.627	0.22201	
	200			199.915	0.70537	$\sim \chi^2_4$

Table 1: Results for a subset of Prussian Horse Kick Data

The Poisson distribution was first derived in 1837 by Siméon D. Poisson (1781-1840) who applied it to the decisions of juries. Yet, Poisson’s analysis was not regarded as a central piece

of statistical data analysis. It was not until LvB's publication in 1898 with its convincing analysis of the Prussian horse kick data that this distribution entered the standard canon. As a consequence it was suggested that the Poisson distribution should have been named the "Bortkiewicz distribution." Let us just check his analysis. For simplicity we will take a subset of 200 observations as it is presented on the internet. The ML estimator is $\lambda = 0.61$ and with the Bortkieviez distribution: we arrive at Table 1 showing a remarkably good fit indeed. LvB inspired his students to use mathematical techniques for data calibration. His work on Prussian horse kicks and child suicide data promoted in his book on the law of small numbers was trendsetting not only in Germany. LvB can therefore be seen as a founder of modern econometric and statistical education in Germany and beyond.

6 Conclusion

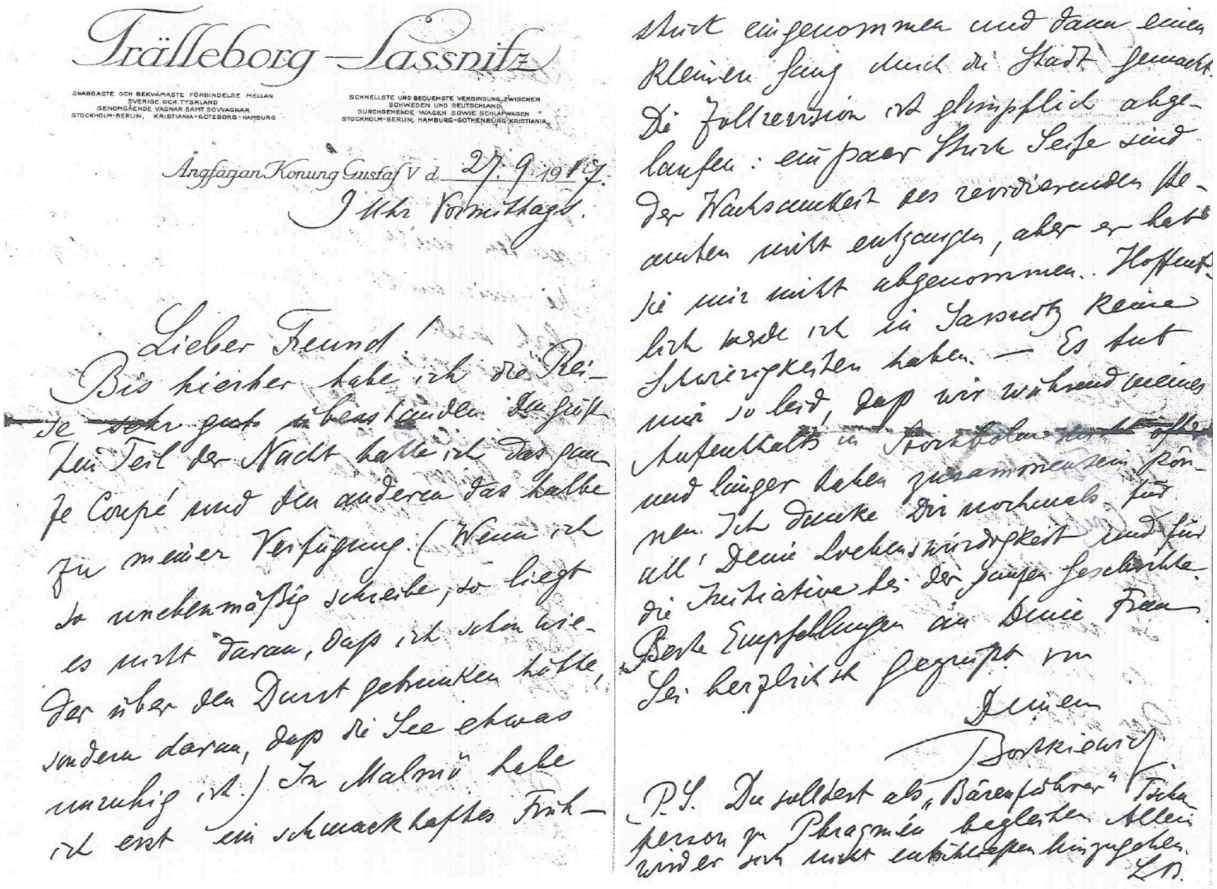
As we have seen, the life, destiny and fate of LvB were always linked to Europe, from the North, including the Scandinavian countries, to the South, where in Varna in Bulgaria a friend and colleague from St. Petersburg worked. LvB by his training, his mind and his vision was a European intellectual, a European scholar and one of the respectable founders of modern statistical science.

Wladimir Woytinsky, who had the luck and the honour to be trained by LvB in private courses, underlined that LvB had his own philosophy on statistics and measurement and that LvB highly acknowledged the role of mathematics (see Wl. Woytinsky (1961), p. 453).

E. J. Gumbel, another disciple and follower of LvB working on distributions, evaluated the work and research results, LvB succeeded, in his posthumously published article in 1968, and he concluded it with the words:

"Four of his contributions are decisive: the proof that the Poisson distribution corresponds to a statistical reality; the introduction of mathematical statistics into the study of radioactivity; the inception of the statistical theory of extreme values; and the lonely effort to construct a Marxian econometry." (Gumbel (1968), p. 130)

Another 45 years later one could argue like E. J. Gumbel, but furthermore, one should request that people should re-read and study the classic papers, written by LvB, again, at least to get a great degree of stimulation.



Trälleborg – Lassnitz

SNABBASTE OCH BEKVÄMASTE FÖRBINDELSE MELLAN SVERIGE OCH TYSKLAND
GENOMGÅENDE VAGNAR SAMT SOVVAGNAR
STOCKHOLM-BERLIN, KRISTIANIA-GÖTEBORG-HAMBURG

SCHNELLSTE UND BEQUEMSTE VERBINDUNG ZWISCHEN SCHWEDEN UND DEUTSCHLAND
DURCHGEHENDE WAGEN SOWIE SCHLAFWAGEN
STOCKHOLM-BERLIN, HAMBURG-GOTHENBURG, KRISTIANIA

Angefangen Konung Gustaf V d. 27. 9. 1917.
7 Uhr Vormittags.

Lieber Freund!
Bis hierher habe ich die Reise ~~sehr gut~~ überstanden. Die größte Teil der Nacht hatte ich das Coupé und den anderen das halbe zu meiner Verfügung. (Wenn ich so unchronologisch schreibe, so liegt es nicht daran, daß ich schon wieder über den Durst getrunken hätte, sondern daran, daß Sie See etwas unruhig ist.) In Malmö habe ich erst ein schmackhaftes Frühstück eingenommen und dann einen kleinen Gang durch die Stadt gemacht. Die Zollrevision ist glimpflich abgelaufen: ein paar Stück Seife sind der Wachsamkeit des revidierenden Beamten nicht entgangen, aber er hat sie mir nicht abgenommen. Hoffentlich werde ich in Lassnitz keine Schwierigkeiten haben. — Es tut mir so leid, daß wir während meines Aufenthalts in Stockholm ~~[illegible]~~ und länger haben zusammensein können. Ich danke Dir nochmals für all' Deine Liebenswürdigkeit und für die Initiative bei der Jungen Geschichte. Beste Empfehlungen an Deine Frau. Sei herzlichst gegrüßt von

Deinem
Bortkiewicz

P.S. Du solltest als „Bärenführer" Fräulein Person zu Phragmén begleiten. Allerdings soll mir nicht entschlüpfen hinzugehen.
LvB.

Figure 10: A letter from LvB, Sept. 1917, to his friend Thor Andersson, while travelling back to Germany after a visit to Sweden. In: Archive Uppsala, Bortkiewicz Papers, Box No. 1, Part II

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Archive of the Göttingen University. *Documents related to Helene and Ladislaus von Bortkewitsch (sic)*

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Annotations

[1] *Until WW1, August 1914, the city was named St. Petersburg, created by Zar Peter I. (the Great) (1672-1725). From 1914 onwards the town was named Petrograd, in 1924 it obtained the name Leningrad. In 1991 it was given its original name back.*

[2] *The "Habilitation" was introduced at German universities in about 1830. The procedure consists of three elements/steps: a thesis (usually a book), a talk ("Probevortrag") and a lecture ("Probevorlesung"). When a chosen committee at a Faculty agreed on all three steps the candidate was nominated as a "Privatdozent". This entailed the right to teach at the Faculty. A Privatdozent (PD) position was the first and also lowest position in the staff hierarchy of a Faculty. When a PD wanted to move to another university he (until 1919 only male PDs were allowed at German universities) had to*

obtain permission from the new Faculty. See the description by Richard Goldschmidt (1960), p. 52, 66-67.

[3] *The sources to analyze his teaching activities are the printed schedules of lectures (in German Vorlesungs-Verzeichnisse), university calendars, or course catalogues, of the Berlin University which were published every semester. These schedules of lectures allowed for detailed reconstruction of the teaching activities between 1901 and 1931.*

[4] *The file of the Humboldt Univeristy Archive contains several letters of Helene v. B., to the Prussian Ministry when she claimed some money after the death of LvB. Since she was not LvB's wife, but rather his sister, the claims could not be adequately responded. But the Prussian Minister of Education admitted her once a small sum (see Archive HU, personal file LvB, Bd. 1, Bl. 15-30).*

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