

JERZY NEYMAN (April 16, 1894 – August 5, 1981)

by HEINZ KLAUS STRICK, Germany

JERZY NEYMAN's ancestors came from Poland, which had been ruled in personal union by the Russian Tsar since the *Congress of Vienna* (1815). In 1863 there was an uprising by Polish nobles that was hopeless from the start. Both of JERZY NEYMAN's grandfathers were involved and they were deported to Central Asia or Siberia.

Years later they returned from there to the Kiev area and started their families. JERZY's parents met and married there. JERZY's father CZESŁAW SPŁAWA-NEYMAN worked as a lawyer and judge; the family often had to move for professional reasons.

JERZY himself was born in Bender (today in Transnistria, Republic of Moldova) and spent the first years of his life in Kherson (today in Ukraine) and then in Melitopol and Simferopol on the Crimean peninsula. He was taught by private teachers until the age of ten and then he attended the local secondary school. Polish was spoken in his Catholic family and JERZY also spoke Ukrainian and Russian. French and German were added as foreign languages at school.

After his father's sudden death, his mother KAZIMIERA moved to live with relatives in Kharkiv (now in Ukraine), where JERZY finished his schooling with excellent grades.

In the autumn of 1912, JERZY SPŁAWA-NEYMAN began studying mathematics and physics at the *University of Kharkiv*. Because of poor eyesight, he was not drafted into the military after the outbreak of the World War and he was able to continue his studies. He concentrated on mathematics when he realized that he lacked the necessary skill to experiment in physics.

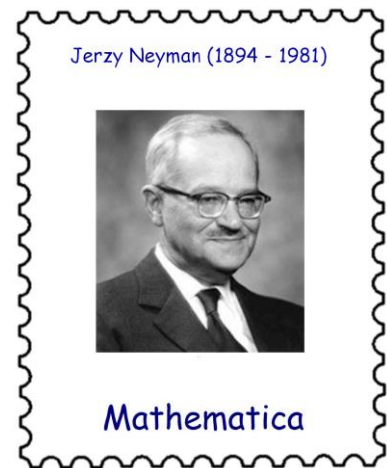
Inspired by his mathematics professor, he studied HENRI LEBESGUE's book *Leçons sur l'intégration et la recherche des fonctions primitives*. A 500-page handwritten paper he wrote on the LEBESGUE integral was awarded a gold medal. In the lectures on probability theory he became aware of KARL PEARSON's work *The Grammar of Science*, which had a significant influence on his future career.

After completing his basic studies, SPŁAWA-NEYMAN prepared for an academic career and took on his first teaching and supervision tasks at the university when the supply situation for the population deteriorated dramatically as a result of the *October Revolution* and the outbreak of civil war. After contracting tuberculosis, he was sent to Crimea to recover, where he met his future wife, the Russian OLGA SOLODOVNIKOVA.

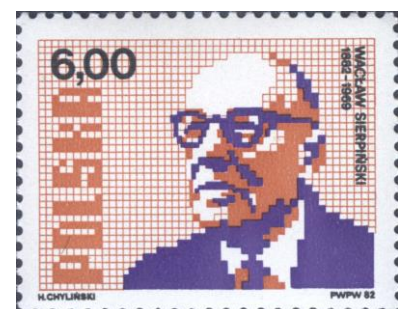
In the fall of 1919, SPŁAWA-NEYMAN resumed his work at the *University of Kharkiv* and in May 1920 he married. When a war broke out between revolutionary Russia and the now independent Poland over the final borders of the two countries' territories, SPŁAWA-NEYMAN was arrested as a supposed Polish spy. After his release as part of a prisoner exchange, he was able to take his exams.

Since he no longer felt safe in Kharkiv, he traveled to Warsaw in 1921 to talk to WACŁAW SIERPIŃSKI about his professional opportunities. SIERPIŃSKI was interested in his cooperation, but had to put him off until a later date.

To bridge the gap, SPŁAWA-NEYMAN took a job as a statistician at an agricultural institute in Bydgoszcz in Poland (called Bromberg in German) and published his first works on the use of statistical methods in plant breeding.



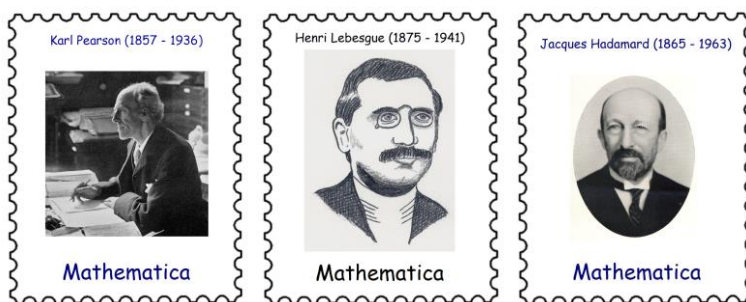
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When the *Meteorological Institute* in Warsaw offered him a job, he moved to the Polish capital, although the job itself actually interested him little. In the winter semester of 1923/24 he was finally able to move to the *University of Warsaw*; his paper *Justification of Applications of Probability Calculus to Solve Certain Questions in Agricultural Experimentation* was the basis for his doctorate under SIERPIŃSKI.

NEYMAN, who from 1924 omitted the first part of his family name SPŁAWA (this indicated the noble origins of his ancestors), was actually more interested in pure mathematics than in the application of mathematics. Nevertheless, he accepted the *ROCKEFELLER Foundation's* offer to go to KARL PEARSON in London for an academic year.

There he took the opportunity to publish three articles in PEARSON's journal *Biometrika*, but otherwise he was very disappointed with PEARSON's work since he showed no interest in the current state of mathematical research and was also unwilling to further develop the statistical methods he had previously practised. This technical dispute almost led to NEYMAN's early departure from London.



Thanks to another *ROCKEFELLER scholarship*, NEYMAN was able to move to Paris in 1926, where he attended lectures and seminars by ÉMILE BOREL, HENRI LEBESGUE and JACQUES HADAMARD, which once again awakened his particular interest in set theory and measure theory. Over the next few years he wrote several articles for the journal *Fundamenta Mathematicae*, edited by SIERPIŃSKI.

But the problem of finding mathematical justifications for statistical procedures would not leave him alone. While he was still in Paris, he was introduced to KARL PEARSON's son EGON, with whom he had become friends during his stay in London and with whom he had written letters ever since. The exchange inspired him to write the first fundamental contributions to *testing hypotheses*.

In May 1927 NEYMAN returned to Warsaw and, after completing his *habilitation*, began working as a lecturer in Warsaw and Kraków. In 1928 he was able to set up a biometric laboratory in the *Nencki Institute for Experimental Biology*. However, the general financial situation as a result of the global economic crisis severely limited his work opportunities and concerns about his livelihood paralysed his activities.

In the meantime, EGON PEARSON, in collaboration with WILLIAM S GOSSETT (whose pseudonym was STUDENT), had developed an approach according to which an existing hypothesis could be rejected if there was an alternative hypothesis that could more adequately explain an existing test result (*maximum likelihood approach*). In 1928, NEYMAN and EGON PEARSON jointly published the article *On the Use and Interpretation of Certain Test Criteria for Purposes of Statistical Interference*, in which, among other things, terms such as *type I* and *type II errors* and the *power of a test* were defined.

Even though the 1933 article *On the Problem of the Most Efficient Tests of Statistical Hypotheses* appeared under both names, the *NEYMAN-PEARSON lemma* contained therein is more likely to be attributed to NEYMAN. In contrast to RONALD AYLMEY FISHER's significance test, which only considers *one* hypothesis to be tested, NEYMAN and PEARSON called for the introduction of a competing *alternative hypothesis* that can be found by minimizing *type II error*.

In 1933 EGON PEARSON succeeded his father KARL in the statistics chair (*Galton Chair*) at *University College London* and R A FISHER was put in charge of the *Eugenics Department*.

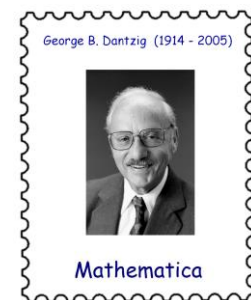
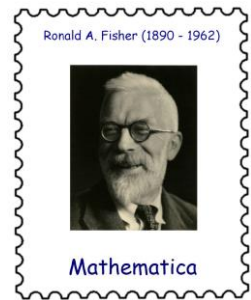
NEYMAN accepted an invitation from PEARSON for a visiting professorship in London – and stayed until 1937. During this time, further important contributions were made – the latest being *Outline of a theory of statistical estimation based on the classical theory of probability*, in which he developed the method of *determining confidence intervals*. He also dealt with criteria for evaluating various sampling procedures – the basis for opinion surveys and series of tests in biological and medical studies.

After a series of lectures in the USA, NEYMAN was thinking about returning to Warsaw when he received a job offer from the *University of California* at Berkeley. After weighing up the work opportunities in Warsaw and London, the impending threat of war in Europe ultimately influenced his decision to emigrate with his wife and 2-year-old son and try for a new start.

The *Statistical Institute* at Berkeley developed under NEYMAN's leadership into an extremely successful and ultimately independent institution. He supervised a total of 39 doctoral students, including GEORGE DANTZIG. Not least, thanks to the international symposia regularly held in Berkeley, his institute gained worldwide importance.

Neyman was honoured many times for his achievements and contributions, including by the *Royal Statistical Society London*.

In 1968, despite his public protests against the Vietnam War, he received the *Medal of Science* from American President JOHNSON. NEYMAN died at the age of 87 after a heart attack.



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