



Daniel Bernoulli

1700 - 1782

You will come across the name 'Bernoulli' very frequently in scientific textbooks. At least eight members of this dynasty were prominent scientists who made great contributions to the development of mathematics and physics. Daniel was probably the most outstanding of them all and, certainly, the one with the widest scientific interests. He developed the theory of probability and worked in astronomy, hydrodynamics, electrostatics and physiology.

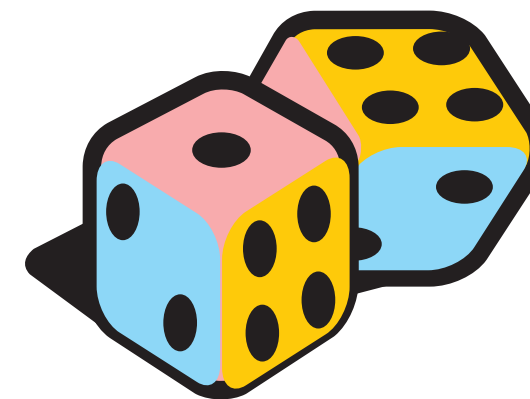
You may already know of Bernoulli's principal law, which relates that **the pressure of a fluid varies according to its speed**, an increase in speed producing a decrease in pressure. This principle explains the pressure difference on each surface of an airfoil, which gives lift to the wings of an aeroplane.

He was born in 1700 in Groningen, the Netherlands, the second son of Johann I Bernoulli and Dorothea Faulkner. Daniel's father was professor of mathematics in Groningen, and later took the chair in Basel, Switzerland, that became vacant upon the death of Daniel's uncle, Jakob I. His mother came from an aristocratic family.

In 1713, Daniel began to study philosophy and logic and obtained his master's degree in 1716. He was also taught mathematics by his father and, especially, by his brother Nikolaus II. An attempt to place young Daniel as a commercial apprentice failed, and he was allowed to study medicine, first in Basel then in Heidelberg and Strasbourg.



He studied the laws of Probability



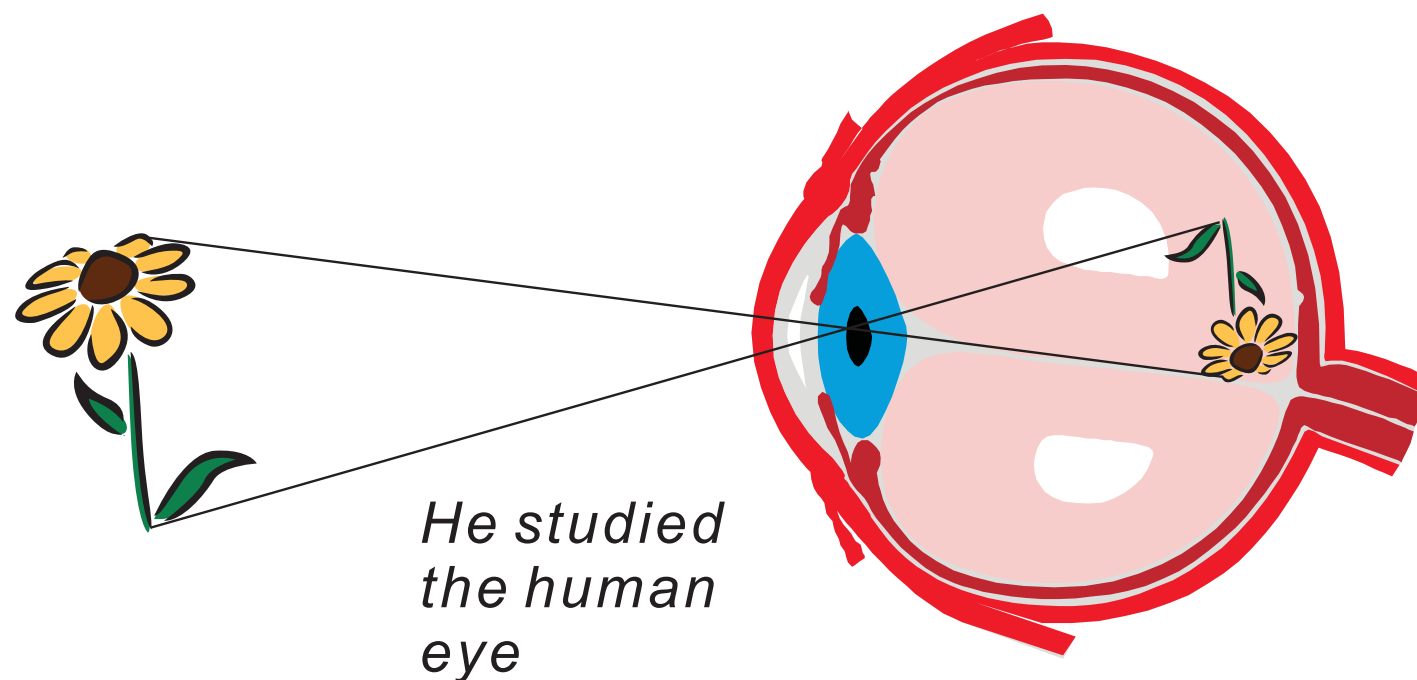
In 1721 he obtained his doctorate with a thesis on respiration and applied for the professorship in anatomy and botany, but without success. He went to Venice where he continued to study medicine. A severe illness prevented him from realizing his plan to work in medicine in Padua. In 1724 he published a paper on mathematical research - one of his outstanding works on differential equations - and won the prize awarded by the Paris Academy of Sciences, the first of ten he was to win.

Soon his name became famous in Europe and he received an invitation from the St. Petersburg Academy, where he went in 1725 following in the steps of his elder brother Nikolaus, who suddenly died there. Although Daniel suffered from the rigorous climate, **the years in St. Petersburg appeared to have been his most creative period**. He started his *Hydrodynamica* and an original work on the theory of probability. He also published a mechanical theory of muscular contraction and studied the human eye.

He came back to Basel in 1733 after a long tour of Europe. On returning he taught mathematics, later botany and physiology and finally, in 1750, he was awarded the chair of physics. He held this post for thirty years.

Daniel completed his *Hydrodynamica* in 1734 but published it only in 1738. It is said that his father published his own *Hydraulica* at about the same time, but predated it to 1732, in an attempt to ensure priority for himself!

Contemporaries considered Daniel Bernoulli a kind and warm person. Apparently, he had no family of his own. After his death in 1782 he was buried in the Peterskirche, not far from his apartment in Klein Engelhof.



He studied the human eye