Biography

Childhood

Euler was born in Basel to Paul Euler, a pastor of the Reformed Church, and Marguerite Brucker, a pastor's daughter. He had two younger sisters named Anna Maria and Maria Magdalena. Soon after the birth of Leonhard the Eulers moved from Basel to the town of Riehen, where Euler spent most of his childhood. Paul Euler was a family friend of the Bernoullis, and Johann Bernoulli, who was then regarded as Europe's foremost mathematician, would eventually be an important influence on the young Leonhard. His early formal education started in Basel, where he was sent to live with his maternal grandmother. At the age of thirteen he matriculated at the University of Basel, and in 1723, received a masters of philosophy degree with a dissertation that compared the philosophies of Descartes and Newton. At this time, he was receiving Saturday afternoon lessons from Johann Bernoulli, who quickly discovered his new pupil's incredible talent for mathematics.

Euler was at this point studying theology, Greek, and Hebrew at his father's urging, in order to become a pastor. Johann Bernoulli intervened, and convinced Paul Euler that Leonhard was destined to become a great mathematician. In 1726, Euler completed his Ph.D. dissertation on the propagation of sound with the title De Sono and in 1727, he entered the Paris Academy Prize Problem competition, where the problem that year was to find the best way to place the masts on a ship. He won second place, losing only to Pierre Bouguer—a man now known as "the father of naval architecture". Euler, however, would eventually win the coveted annual prize twelve times in his career.

St. Petersburg

Around this time Johann Bernoulli's two sons, Daniel and Nicolas were working at the Imperial Russian Academy of Sciences in St Petersburg. In July 1726, Nicolas died of appendicitis after spending a year in Russia, and when Daniel assumed his brother's position in the mathematics/physics division he recommended that the post in physiology that he vacated be filled by his friend Euler. In November 1726 Euler eagerly accepted the offer, but delayed making the trip to St Petersburg. In the interim he unsuccessfully applied for a physics professorship at the University of Basel.

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Euler arrived in the Russian capital on May 17, 1727. He was promoted from his junior post in the medical department of the academy to a position in the mathematics department. He lodged with Daniel Bernoulli with whom he often worked in close collaboration. Euler mastered Russian and settled into life in St Petersburg. He also took on an additional job as a medic in the Russian Navy.

The Academy at St. Petersburg, established by Peter the Great, was intended to improve education in Russia and to close the scientific gap with Western Europe. As a result, it was made especially attractive to foreign scholars like Euler: the academy possessed ample financial resources and a comprehensive library drawn from the private libraries of Peter himself and of the nobility. Very few students were enrolled in the academy so as to lessen the faculty's teaching burden, and the academy emphasized research and offered to its faculty both the time and the freedom to pursue scientific questions.

However, the Academy's benefactress, Catherine I, who had attempted to continue the progressive policies of her late husband, died shortly before Euler's arrival. The Russian nobility then gained power upon the ascension of the twelve-year-old Peter II. The nobility were suspicious of the academy's foreign scientists, and thus cut funding and caused numerous other difficulties for Euler and his colleagues.

Conditions improved slightly upon the death of Peter II, and Euler swiftly rose through the ranks in the academy and was made professor of physics in 1731. Two years later, Daniel Bernoulli, who was fed up with the censorship and hostility he faced at St. Petersburg, left for Basel. Euler succeeded him as the head of the mathematics department.

On January 7, 1734, he married Katharina Gsell, daughter of a painter from the Academy Gymnasium. The young couple bought a house by the Neva River, and had thirteen children, of whom only five survived childhood.

Berlin

Concerned about continuing turmoil in Russia, Euler debated whether to stay in St. Petersburg or not. Frederick the Great of Prussia offered him a post at the Berlin Academy, which he accepted. He left St. Petersburg on June 19, 1741 and lived twenty-five years in Berlin, where he wrote over 380 articles. In Berlin, he published the two works which he would be most renowned for: the Introductio in analysin infinitorum, a text on functions published in 1748 and the Institutiones calculi differentialis, a work on differential calculus.

In addition, Euler was asked to tutor the Princess of Anhalt-Dessau, Frederick's niece. He wrote over 200 letters to her, which were later compiled into a best-selling volume, titled the Letters of Euler on different Subjects in Natural Philosophy Addressed to a German Princess. This work contained Euler's exposition on various subjects pertaining to physics and mathematics, as well as offering valuable insight on Euler's personality and religious beliefs. This book ended up being more widely read than any of his mathematical works, and was published all across Europe and in the United States. The popularity of the Letters testifies to Euler's ability to communicate scientific matters effectively to a lay audience, a rare ability for a dedicated research scientist.

Despite Euler's immense contribution to the Academy's prestige, he was eventually forced to leave Berlin. This was caused in part by a personality conflict with Frederick. Frederick came to regard him as unsophisticated especially in comparison to the circle of philosophers the German king brought to the Academy. Voltaire was among those in Frederick's employ, and the Frenchman enjoyed a favored position in the king's social circle. Euler, a simple religious man and a hard worker, was very conventional in his beliefs and tastes. He was in many ways the direct opposite of Voltaire. Euler had very limited training in rhetoric and tended to debate matters that he knew little about, making him a frequent target of Voltaire's wit. Frederick also expressed disappointment with Euler's practical engineering abilities:

I wanted to have a water jet in my garden: Euler calculated the force of the wheels necessary to raise the water to a reservoir, from where it should fall back through channels, finally spurting out in Sanssouci. My mill was carried out geometrically and could not raise a mouthful of water closer than fifty paces to the reservoir. Vanity of vanities! Vanity of geometry

Eyesight Deterioration

Euler's eyesight worsened throughout his mathematical career. Three years after suffering a near-fatal fever in 1735 he became nearly blind in his right eye, but Euler rather blamed his condition on the painstaking work on cartography he performed for the St. Petersburg Academy. Euler's sight in that eye worsened throughout his stay in Germany, so much so that Frederick referred to him as "Cyclops". Euler later suffered a cataract in his good left eye, rendering him almost totally blind a few weeks after its discovery. Even so, his condition appeared to have little effect on his productivity, as he compensated for it with his mental calculation skills and photographic memory. For example, Euler could repeat the Aeneid of Virgil from beginning to end without hesitation, and for every page in the edition he could indicate which line was the first and which the last.

Return to Russia

The situation in Russia had improved greatly since the ascension of Catherine the Great, and in 1766 Euler accepted an invitation to return to the St. Petersburg Academy and spent the rest of his life in Russia. His second stay in the country was marred by tragedy. A 1771 fire in St. Petersburg cost him his home and almost his life. In 1773, he lost his wife of 40 years. Euler would eventually remarry three years later.

On September 7, 1783, Euler passed away in St. Petersburg after suffering a brain hemorrhage and was buried in the Alexander Nevsky Laura. His eulogy was written for the French Academy by the French mathematician and philosopher Marquis de Condorcet, and an account of his life, with a list of his works, by Nikolaus von Fuss, Euler's son-in-law and the secretary of the Imperial Academy of St. Petersburg. Condorcet commented,

> "...il cessa de calculer et de vivre," (he ceased to calculate and to live).