

Steno's Scientific Life in a Nutshell (1638–1677)

Niels Stensen was born in 1638 in Copenhagen. His father was a goldsmith, but many members of the family had been or were Lutheran clergymen (Chap. I). His father died in 1645, and the workshop was carried on by the successive husbands of his mother. In 1656 Stensen graduated from the School of Our Lady and began studying science at Copenhagen University under the famous Thomas Bartholin. From Stensen's time as a student here, we have a most interesting collection of his notes and abstracts, the so-called *Chaos*-manuscript, depicting three months of intensive study in the year 1659.

Stensen went abroad to conclude his studies (Chap. II). First to Amsterdam, where he made his first discovery, the parotid salivary duct, and then to Leiden, where he spent three fruitful years under François de le Boë Sylvius and van Horne and among friends like Jan Swammerdam and Reinier de Graaf. A dispute about his first discovery intensified his glandular research, and in 1661 he published his *On glands of the mouth and salivary ducts*, followed in 1662 by *Observationes anatomicae* with the former reprinted and three more papers on glands. He became deeply involved in the discussion of Descartes' philosophy and became friends with Spinoza. His anatomical research, however, soon made him realize the weaknesses of their philosophical systems.

Stensen returned to Denmark in the spring of 1664, where he published one of his principal works, the *On muscles and glands*. In spite of his success he failed to obtain a professorship at the university and left again for Europe with a small legacy after his deceased mother.

First he went to Paris (Chap. III), where he stayed from November 1664 to September 1665. Here he lived among the best scientists and earned for himself a reputation as a most distinguished anatomist. His famous *Discourse of anatomy of the brain* was held at Thevenot's house for a gathering of scholars. In the autumn of 1665 he continued his travels, probably staying a few months in Montpellier, where he met such English scientists as William Croone, John Ray and Martin Lister. In March 1666 Stensen finally reached Pisa, where he was received by the Grand Duke of Tuscany, Ferdinand of Medici, who became his benevolent patron (Chap. IV).

During the next years Stensen settled in Tuscany, recognizing it as his second home country. Here he worked among the members of the Cimento Academy, notably Francesco Redi and Vincenzo Viviani, in close contact with the Grand Duke, Ferdinando II, and Prince Leopold. During the summer of 1666 he concluded his treatise on muscle movements. The head of a large shark, brought to him for dissection, gave the research a new direction: the shark's teeth led to the investigation of fossil shark-teeth and further into the field of geology. In April 1667, his *Specimen of elements of myology* was published, dealing with three treatises, the first and main part with myology, thereafter palaeontology and embryology. He then seems to have concentrated on geology, but this was interrupted by a major religious crisis, which in November 1667 led to his conversion to the Catholic Church (Chap. V).

In the summer of 1668 he seems to have received a summons from the Danish king to return to Denmark and hastily he put together a short introduction to his results in geology, the now classic *Prodromus on Solids*, which was written before the end of August (Chap. VI).

In November 1668 he set out on his long journey (Chap. VII) to Rome, Naples, Bologna, Venice, Innsbruck, Vienna, the mines of Hungary and Bohemia and finally to Amsterdam, but not to Denmark. In Holland he found his conversion to be a subject of long discussions and when he returned to Florence due to news about the Grand Duke's illness and death, he took up a long correspondence particularly with Johannes Sylvius, a reformed clergyman in Amsterdam, about religious matters (Chap. VIII). Although at this time he is still known to have pursued scientific research, in which he was encouraged by the new Grand Duke, Cosimo III, his life-long friend, he stood, in fact, on the threshold of a life devoted to God.

In 1672 he was summoned to Copenhagen, where he stayed from July 1672 to July 1674 (Chap. IX). Here he held his famous opening speech on the occasion of a public dissection of a female body, stating that beautiful is that which we see; more beautiful that which we know; by far the most beautiful that which we do not know. The conditions for the convert in orthodox Lutheran Denmark, however, were unfavourable, and in 1674 Stensen decided to accept Cosimo's offer to become the tutor of the Crown Prince of Tuscany and returned to Florence (Chap. X).

Nicolaus Steno

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