ADOLPHE QUETELET (February 22, 1796 – February 17, 1874)

by HEINZ KLAUS STRICK, Germany

When LAMBERT ADOLPHE JACQUES QUETELET was born in Ghent in what is now Belgium, the country had just been annexed by France. (It was previously the *Austrian Netherlands*, and owned by the Habsburgs.)

After NAPOLEON's defeat at Waterloo (15 km south of Brussels), the area became a southern part of the *United Kingdom of the Netherlands*.

In 1830, however, there were uprisings and finally the declaration of independence by the state of Belgium, when the Dutch King WILHELM I tried to impose Dutch as an official language in the Walloon part of the country as well. The predominantly Catholic population also felt restricted in their religious practice.

ADOLPHE QUETELET's father, an employee of the city of Ghent, died when the boy was only seven years old. After successfully attending the *Lyceum*, ADOLPHE took up teaching mathematics at the age of 17 at a school in the neighbouring parish, in order to support his family financially, and in early 1815 he became a mathematics teacher in Ghent.

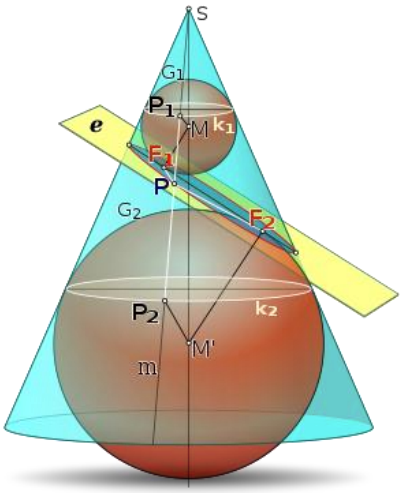
While still at school, he made friends with GERMINAL DANDELIN, two years his senior, who had gone to Paris to study mathematics, fought in the French army under NAPOLEON and returned to his home town after the Battle of Waterloo.

The joint work with QUETELET led to a novel idea for the proof of a theorem that DANDELIN presented in 1822:

- *If a cone is intersected by a plane* (*which does not pass through the apex of the cone*), *then the line of intersection is a parabola, an ellipse or a hyperbola*.

The so-called DANDELIN spheres touch both the cone and the plane; the points of contact of the spheres with the plane of intersection are exactly the focal points of the cone intersections.

Conic sections played a special role in QUETELET's career as a mathematician. When a university was opened in Ghent in 1817, QUETELET began studying mathematics there, which he completed in 1819 with a doctorate on the theory of conic sections.



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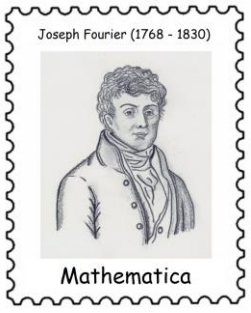
While DANDELIN became more interested in the application of mathematics and worked as an engineer, QUETELET took on a teaching post for elementary mathematics at the *Athenaeum* in Brussels and was appointed a member of the *Royal Academy of Sciences* shortly afterwards.

In 1823 he travelled to Paris, where he listened to lectures on astronomy by FRANCOIS ARAGO and on probability by PIERRE LAPLACE and JOSEPH FOURIER.

He was particularly interested in practical astronomy, with the intention of setting up an observatory in Brussels. After his return, he became professor of higher mathematics and in his programme he also included lectures on probability theory.



(drawing © Andreas Strick)

In 1827, the King finally granted funds for the establishment of the observatory in Brussels. Together with DANDELIN, who in the meantime had taken up a professorship in engineering (mining) in Liège, QUETELET travelled to England, Scotland and Ireland to gain experience for the construction of an observatory and the foundation of an astronomical society, then also to Germany and Italy. When the observatory in Brussels was finally completed in 1832, he was appointed the first director of the *Observatoire Royal de Belgique*. From 1834 he was permanent secretary of the (now Belgian) *Academy of Sciences*.

In 1828 QUETELET published the *Instructions populaires sur le calcul des probabilités*, in which he emphasises the importance of mathematics for scientific progress and in particular the role of probability theory in the evaluation of scientific observations.

The year before, he had published his first work in which he investigated the laws of population development (*Recherches sur la population, les naissances, les décès, les prisons, les dépôts de mendicité etc*. *dans le royaume des Pays-Bas*).

Finally, in 1835, he attracted worldwide attention with his work *Sur l'homme et le developpement de ses facultés, essai d'une physique sociale* (On Man and the Development of His Faculties, or Attempt at a Physics of Society). In doing so, he followed the idea that social phenomena such as crime or suicide rates could also be described mathematically in a similar way to physical processes, and investigated the (social) factors on which they might depend:

> *Having seen the path the sciences have taken with regard to the world system, could we not try to follow it with regard to human beings? Would it not be nonsensical to suppose that, while everything proceeds according to such admirable laws, the human race alone is blindly left to itself, or possesses no principle of preservation? We may unhesitatingly assert that such an assumption would be an insult to the Deity, and not the investigation which we have set ourselves for the purpose of making.*

QUETELET's view that there was an average value for all measurable characteristics of man and living conditions, around which the values scatter in a normally distributed manner, met with fierce opposition, especially because he did not leave it at making statements about, for example, the height or life expectancy of man, but also examined questions such as the tendency to crime. His interpretation of criminal statistics – *society prepares the crime and the guilty person is only the instrument through which the crime is carried out* – triggered a discussion on the question of the extent to which man has *free will* or development is *determined by his socialisation*.

QUETELET's *homme moyen* is an ideal type:

> *If we consider man abstractly as a representative of our whole species, who in addition possesses in an average degree all the characteristics of the others, he takes for us the name of average man; he can be greater and stronger in one country than in another, just as he can be more inventive, more educated, but also more moral.*

Among the parameters he considered to describe the average man was a quotient, the so-called *QUETELET index*, for which the term *body mass index* is commonly used today:

$$BMI = \frac{\text{Weight in Kilograms}}{(\text{Height in Metres})^2}$$

QUETELET is considered the founder of social statistics. Nowadays, we take it for granted that statistical offices exist that systematically and regularly record and analyse living conditions.

In 1841, Belgium was the first country to set up a statistical office and in 1846, Belgium conducted a census in which data were collected that could be analysed socially and statistically. Incidentally, QUETELET used the term *social physics* instead of the term *social statistics*, which is common today.

AUGUSTE COMTE, philosopher of positivism, had come up with the very same name for a science that is supposed to deal with the preconditions, processes and consequences of people living together, but is less influenced by mathematics; COMTE therefore had to find a new name: he called it *sociology*.

In 1853, QUETELET organised the first international statistics congress in Brussels, at which agreements were reached to improve the comparability of statistical data to be collected; in the same year, he also chaired a congress of seafaring nations, at which the exchange of meteorological data was agreed.

After suffering a stroke in 1855, QUETELET, who had shaped the international reputation of the young Belgian state through his many activities, had to reduce his workload. Nevertheless, he published numerous papers, including on astronomy and geomagnetism, as well as statistical studies on climatic data (*physique du globe*).

Much honoured by memberships of foreign scientific societies, such as the *Royal Society of London*, he died in Brussels in 1874.

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https://www.spektrum.de/wissen/adolphe-quetelet-1796-1874/1062084

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