QUETELET, LAMBERT-ADOLPHE-JACQUES | Encyclopedia.com

(*b*. Ghent, Belgium, 22 February 1796; *d*. Brussels, Belgium, 17 February 1874)

statistics.

Adolphe Quetelet was the son of François-Augustin-Jacques-Henri Quetelet and Anne-Françoise Vandervelde. After graduating from the *lyeee* in Ghent he spent a year as a teacher in Oudenaarde. In 1815 he was appointed professor of mathematics at the Collège of Ghent. He wrote an opera, together with his friend G. P. Dandelin (better known for a theorem on conics); he also published poems and essays. Quetelet was the first to receive a doctorate (1819) from the newly established University of Ghent, with a dissertation on geometry. The same year he was appointed professor of *mathématiques élémentaires* at the Athénée of Brussels. In 1820 he was elected a member of the Académie Royale des Sciences et Belles-Lettres of Brussels. During the next years he worked in geometry. His papers were published by the Academy and in the periodical *Correspondance mathématique et physique* which he founded and coedited with J. G. Garnier, a professor at Ghent who had guided Quetelet's first steps in higher mathematics. From 1824 Quetelet taught higher mathematics at the Athénée and physics and astronomy at the Museée, which later became the Université Libre. His wife, whom he married in 1825, was a daughter of the French physician Curtet and a niece of the chemist van Mons; she bore him a son and a daughter. In 1826 he published popular books on astronomy and on probability.

From 1820 Quetelet had proposed founding an observatory, and in 1823 the government sent him to Paris to gain experience in practical astronomy. Here he met famous scientists. His increasing interest in probability was possibly due to the influence of Laplace and Fourier. In 1827 he went to England to buy astronomical instRūments and to visit universities and observatories. The following year he was appointed astronomer at the Brussels Royal Observatory, which was not completed until 1833. Meanwhile he traveled extensively. In 1834 he was elected permanent secretary of the Brussels Academy.

From 1832 Quetelet lived at the observatory. His research there was more meteorological and geophysical than astronomical, with an emphasis on statistics. He had turned to statistics as early as 1825, and until 1835 he wrote a considerable number of papers on social statistics. In that year he published *Sur l'homme et le devéloppement de ses facultés, essai d'une physique sociale*, which made him famous throughout Europe. Subsequently a great part of his activity consisted in organizing international cooperation in astronomy, meteorology, geophysics, and statistics. His work after 1855 was impaired by the consequences of a stroke he had suffered in that year.

Quetelet was an honorary member of a great many learned societies and received many decorations. His funeral was a gathering of princes and famous scientists, and his memory was honored by a monument, unveiled in Brussels in 1880.

By his contemporaries his personality has been described as gay, charming, enthusiastic, and gifted with wide intellectual interests. Though he exerted a tremendous influence in his lifetime, his fame hardly survived him. His work has not been republished since his death.

The word *"Statistik"* first printed in 1672, meant *Staatswissenschaft* or, rather, a science concerning the states. It was cultivated at the German universities, where it consisted of more or less systematically collecting "state curiosities" rather than quantitative material. The actual predecessor of modern statistics was the English school of political arithmetic; the first effort to describe society numerically was made by Graunt in 1661. This school, however, which included Malthus, suffered from a lack of statistical material. In 1700 Napoleon, influenced by Laplace and fond of numerical data, established the Bureau de Statistique. In 1801 the first general censuses were held in France and England. Statistics became a fashionable subject, but nobody knew what kind of data to collect or how to organize the material. Nothing was done to justify Fourier's plea:

"Statistics will not make any progress until it is trusted to those who have created profound mathematical theories."

With Quetelet's work of 1835 a new era in statistics began. It presented a new technique of statistics or, rather, the first technique at all. The material was thoughtfully elaborated, arranged according to certain preestablished principles, and made comparable. There were not very many statistical figures in the book, but each figure reported made sense. For every number, Quetelet tried to find the determining influences, its natural causes, and the perturbations caused by man. The work gave a description of the average man as both a static and a dynamic phenomenon.

This work was a tremendous achievement, but Quetelet had aimed at a much higher goal; social physics, as the subtitle of his work said; the same title under which, since 1825, Comte had taught what he later called sociology. Terms and analogies borrowed from mechanics played a great part in Quetelet's theoretical exposition. To find the laws that govern the social body, said Quetelet, one has to do what one does in physics: to observe a large number of cases and then take averages. Quetelet's average man became a slogan in nineteenth-century discussions on social science. The use of mathematics and physics in social sciences was praised, although none of the parties to the discussions knew what it should really mean.

The above statement also applied to Quetelet himself. There is not much more mathematics contained in his work than the vague idea that the reliability of an average increases with the size of the population—and even this idea was not understood by many of his contemporaries. It is evident that Quetelet knew more about mathematical statistics, but he never thought to apply it in his social statistics. Neither did he make significance tests, although as early as 1840 they came into use in medical statistics. He often urged that one should consider not only the average but also the deviation in order to know whether the latter is accidental or not, but he never followed up this suggestion. He always judged intuitively whether a statistical figure was constant or variable under different conditions.

In more theoretical work about 1845, Quetelet approached mathematical statistics more closely. For the first time he mentioned the normal distribution, or, rather, a binomial distribution of a high degree. As an example, he explained the error distribution by the theory of elementary errors. Possibly he made this discovery independently of Thomas Young, G. Hagen, and Bessel. In any case it was clearly Quetelet's own achievement to unveil the normal distribution of the heights of a population of soldiers. The normal distribution, not only as a law of observation errors but also as a genuine natural law, was indeed an important discovery, although Quetelet's examples were not convincing.

Quetelet's impact on nineteenth-century thinking can in a certain sense be compared with Descartes's in the seventeenth century. He certainly gave science new aims and tools, although his philosophy was rather pedestrian and his thinking in somewhat sophisticated matters was rather confused. There was a strong emotional component in Quetelet's influence. In fact, he became famous for a passage, quoted again and again from *Sur l'homme*, in which he draws his conclusions from the statistics of the French criminal courts from 1826 to 1831:

The constancy with which the same crimes repeat themselves every year with the same frequency and provoke the same punishment in the same ratios, is one of the most curious facts we learn from the statistics of the courts; I have stressed it in several papers; I have repeated every year: *There is an account paid with a terrifying regularity; that of the prisons, the galleys, and the scaffolds. This one must be reduced*. And every year the numbers have confirmed my prevision in a way that I can even say: there is a tribute man pays more regularly than those owed to nature or to the Treasury; the tribute paid to crime! Sad condition of human race! We can tell beforehand how many will stain their hands with the blood of their fellow-creatures, how many will be forgers, how many poisoners, almost as one can foretell the number of births and deaths.

Society contains the germs of all the crimes that will be committed, as well as the conditions under which can develop. It is society that, in a sense, prepares the ground for them, and the criminal is the instrument ….

This observation, which seems discouraging at first sight, is comforting at closer view, since it shows the possibility of improving people by modifying their institutions, their habits, their education, and all that influences their behaviour. This is in principle nothing but an extension of the law well-known to philosophers: as long as the causes are unchanged, one has to expect the same effects.

H. T. Buckie, in England, and Adolph Wagner, in Germany, were Quetelet's most fervent supporters in social science. Florence Nightingale considered his work a new Bible.

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